NUNAVUT'S INFRASTRUCTURE GAP

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ABOUT THIS REPORT

This report was commissioned by Nunavut Tunngavik Inc. (NTI), the organization that represents the territory's 33,000 Inuit and their rights under the *Nunavut Agreement*. NTI is governed by a Board of Directors elected by Inuit 16 years of age and older, including six members nominated by Nunavut's three Regional Inuit Associations: the Kitikmeot Inuit Association, the Kivalliq Inuit Association, and the Qikiqtani Inuit Association.

Defining (and fixing) Nunavut's infrastructure deficit is a crucial project of Inuit self-determination. Closing the infrastructure gap is one of the core priorities established by the NTI board for the 2018–21 period.[1] Inuit Tapiriit Kanatami, the national organization representing Canada's 65,000 Inuit, has identified eliminating the infrastructure deficit as a core priority for Inuit Nunangat more broadly.[2]

This comprehensive research project measures the infrastructure gap between Nunavut and the rest of Canada. This work represents a necessary first step in efforts to close this gap — next steps will require further leadership from Inuit organizations and meaningful partnership with local, territorial, and federal governments.[3]

1 Nunavut Tunngavik Inc., "Niriuttaarijat - Nunavut Tunngavik Incorporated 2018–2021 Priorities," 2018, https://www.tunngavik.com/2019/09/27/niriuttaarijat-nunavut-tunngavik-incorporated-2018-2021-priorities/.
2 Inuit Tapiriit Kanatami, "Arctic and Northern Policy Framework: Inuit Nunangat," 2019, https://www.itk.ca/wp-content/uploads/2019/09/20190907-arctic-and-northern-policy-framework-inuit-nunangat-final-en.pdf.
3 See Nunavut Tunngavik Incorporated and Government of Nunavut, Katujjiqatigiinniq Protocol, https://www.tunngavik.com/2020/01/21/katujjiqatigiinniq-protocol/

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LETTER FROM THE PRESIDENT

As the first comprehensive examination of Nunavut's infrastructure deficit, the final report of the Nunavut Infrastructure Leadership Initiative aims to provide a thorough analysis of several gaps in infrastructure between Nunavut and the rest of Canada. Commissioned to support the renewed relationship between Inuit and the Crown, this gap analysis is a key element of the Nunavut Tunngavik's Board of Directors' 2018-2021 Strategic Objectives.

While the revelations contained in this report may be shocking to some, the aim of the report is not so much to draw attention on the deplorable state of infrastructure in our communities, as it is to set the premise for a renewed engagement with our partners on fulfilling the aspirations of Inuit. Inuit have been clear on our aspirations: we want, among other things, a robust and sustainable harvesting economy. We expect to have banking and health services in Inuktut. We expect to have an education system that supports Inuktut and our world view as Nunavut Inuit. Like the average Canadian, we want to ensure that we can provide for our families, our loved ones, and contribute to our communities.

For millennia, Inuit have been self-reliant, providing for our own needs though our resourcefulness, innovation, and tenacity. Despite attempts to disrupt the societal fabric, of which self-reliance is foundational, Inuit continue to work hard to ensure that we have the structures in place to continue our pivotal role in self-determination. With the research behind this report we have new evidence to help define the true nature of the challenges, and the potential for change, embedded within Nunavut's infrastructure deficit.

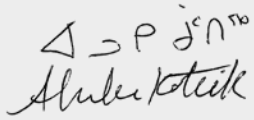
Nunavut Inuit want to pursue infrastructure projects that will have a positive impact and benefit for Inuit – for our economic, cultural, and social wellness. In short, we expect to participate as full partners in the development of Nunavut in Canadian Confederation. And we have been consistent in working to fulfill this expectation.

Whether through the Arctic and Northern Policy Framework's focus on infrastructure; our active participation on the Inuit Crown Partnership Committee, where we continue to work with the federal government to fulfill its commitment to eliminate the infrastructure deficit in Inuit Nunangat by 2030; or in meeting the Katujjiqatigiinniq Protocol objective of co-developing with the Government of Nunavut a Long-Term Infrastructure Strategy for Nunavut, we will keep advocating for meaningful solutions to our infrastructure challenges.

With this report, I believe we have an opportunity to turn the conventional narrative of infrastructure needs in the Arctic on its head. That together, with our federal and territorial partners we can develop a new collective understanding of Nunavut's infrastructure needs that respects our aspirations and roles.

Inuit envision a time where, like any other Canadian, we can take for granted that our basic infrastructure needs are met and surpassed. The information gathered in this report is not only valuable and informative, but it can act as a catalyst for our partners to put into action initiatives that will meet our infrastructure needs so that one day, we may, again, thrive and contribute positively to the broader Canadian society.

Taima,
Aluki Kotierk



President, Nunavut Tunngavik Inc.

EXECUTIVE SUMMARY

Background

Infrastructure is the essential foundation of a thriving economy and effective public services. Infrastructure delivers the water we drink and the power that heats our homes. Infrastructure includes our roads and sidewalks, our ports and airports, our health care and education systems. Infrastructure provides the broadband that connects us to our neighbours and to other parts of the world.

The 1993 *Nunavut Agreement* affirmed a commitment to support the self-determination and economic, cultural and social development of Nunavut Inuit. But Canada's newest territory was created with a legacy of inequity that has left core promises in the *Nunavut Agreement* unfulfilled.

Three things are clear:

- **a substantial infrastructure gap exists** between Nunavut and the rest of Canada;
- this gap has **significant adverse impacts** on Nunavut Inuit; and
- **attention, investment, and action** are needed to close the gap.

The Government of Canada has made a series of commitments to closing that gap, including those in the 2019 Arctic and Northern Policy framework,[1] the Inuit-Crown Partnership Committee agenda,[2] and the Inuit Nunangat Housing Strategy.[3]

However, although Nunavut's infrastructure gap is frequently mentioned, including by elected leaders, little has been done to measure the size of the gap. This kind of evidence-based account of the infrastructure deficit is needed to determine the level of investments required to support a quality of life for Nunavut Inuit that is on par with the rest of Canada.

The infrastructure gap cannot remain just a talking point, recognized but not remedied. To support efforts to understand and close the gap, this study compares the quality and quantity of infrastructure serving Nunavut Inuit to what is available in other parts of Canada.

Measuring the gap lays a foundation for a detailed needs assessment and infrastructure plan developed in partnership with the Governments of Nunavut and Canada and grounded in an Inuit vision for Nunavut's future. It also makes clear the urgency and scale of investment needed to live up to government commitments to Nunavut Inuit.

To directly compare the gap between Nunavut and the rest of Canada, this report uses 55 indicators across a wide range of infrastructure priority areas (e.g. housing, drinking water, roads), drawing on a wide variety of data sources.

In all 18 of the infrastructure priority areas measured, Nunavut faces a significant and quantifiable infrastructure gap with the rest of Canada.

Each infrastructure gap detailed in this report represents a real barrier to economic, health, and educational opportunities for Nunavut Inuit. Together, these indicators quantify an equity gap that is **substantial**, that c**ompounds** and is reinforced across many types of infrastructure, and, if unaddressed, will **continue to grow**.

1 Government of Canada, "Canada's Arctic and Northern Policy Framework," 2019, https://www.rcaanc-cirnac.gc.ca/eng/1560523306861/1560523330587.
2 Inuit Tapiriit Kanatami, "Inuit-Crown Partnership Committee Continues Progress on Shared Priorities — Inuit Tapiriit Kanatami," 2020, https://www.itk.ca/inuit-crown-partnership-committee-continues-progress-on-shared-priorities/.
3 Inuit Tapiriit Kanatami and Government of Canada, Inuit Nunangat Housing Strategy, 2019, https://www.itk.ca/wp-content/uploads/2019/04/2019-Inuit-Nunangat-Housing-Strategy-English.pdf.

Lived impacts of the gap on Nunavut Inuit

Nunavut's infrastructure deficit has effects on the economic health and institutional capacities within the territory. However, even a high-level analysis of the infrastructure gap should not overlook the immediate and personal impacts on individual wellbeing.

The infrastructure gap directly contributes to poverty and lowers the quality of life for Nunavut Inuit. It is felt in food insecurity, overcrowded housing, and limited economic opportunity. As an example, young men in Nunavut aged 20–24 die at six times the rate of Canadians of the same age cohort.[4] As a result of the infrastructure gap, Nunavut Inuit are often forced to leave the territory altogether to access critical services:

- A shortage of health care infrastructure and services means that approximately half of the children born to Nunavut Inuit are delivered in Southern hospitals.[5] Mothers are forced to leave weeks before their due date and welcome their child into the world far from the supports of their community.
- Health care infrastructure for childbirth in the territory is limited to the Qikiqtani General Hospital in Iqaluit and a birthing centre in Rankin Inlet. Since 2017, funding has been available from the federal Non-Insured Health Benefits program for someone to accompany expectant mothers, but this still means being separated from other children, family and community for weeks at a major life moment.[6]
- Getting treatment for a serious or chronic illness can mean living away from home (e.g. in Ottawa) for a long stretch of time. For parents, accompanying one child may mean separation from other children for months. There are currently no addictions or trauma treatment centres in Nunavut.
- Nunavut Inuit have limited opportunities to pursue post-secondary education or training in their communities, or even within the territory. For example, heavy equipment training for mining and infrastructure is concentrated in Morrisburg, Ontario.
- An enduring lack of Inuktut-based public education means the number of fluent professionals who can work and provide service in the mother tongue of Nunavut Inuit remains limited.

- For Nunavut Inuit with disabilities, a lack of locally available services can mean a heartbreaking choice to leave their community behind altogether to access reliable supports for themselves or their family members.[7]
- For those who enter the federal corrections system, a lack of facilities in the territory mean serving a custodial sentence far from home with little connection to family.

4 CBC News, "N.W.T. and Nunavut Continue to Have Highest Workplace Death Rate in Country," 2020, https://www.cbc.ca/news/canada/north/nwt-nunavut-day-of-mourning-1.5547391.
5 Michele LeTourneau, "Bring Birthing Home to Communities, Say Advocates," Nunavut News, accessed June 9, 2020, https://nunavutnews.com/nunavut-news/bring-birthing-home-to-communities-say-advocates/.
6 Hilary Bird, "In Swift Policy Change, Pregnant Nunavut Women to Get Escorts When Travelling to Give Birth ," CBC News, April 2017, https://www.cbc.ca/news/canada/north/pregnant-women-health-canada-nunavut-1.4067761.

7 Research interview, 2020 – for more, see the section on Accessibility in Part III, Cross-cutting factors.

INFRASTRUCTURE DEVELOPMENT AS A COMMITMENT TO INUIT EQUITY

The infrastructure gap drives an equity gap between Nunavut Inuit and other Canadians. Critical housing shortages exacerbate the tuberculosis epidemic and other health outcomes and limit the expansion of economic opportunity.[8]

Slow and unreliable Internet service limits access to education and economic opportunity. Limited port and harbour infrastructure results in a significant share of the economic activity from Nunavut's fisheries going to other provinces or countries and drives up the costs of everything produced in Nunavut for export — from artwork to minerals — and everything imported, including essential food and construction supplies.

Inuit social and cultural well-being and the continued importance of Inuit Qaujimajatuqangit (Inuit knowledge and societal values) also depends on appropriate infrastructure. Article 33 of the *Nunavut Agreement* emphasizes the rights of Inuit to cultural heritage in Nunavut and the importance of institutions and infrastructure to support that role.

But without museum and cultural infrastructure in Nunavut to house and display collections of Inuit heritage, the Government of Nunavut funds institutions in the South to hold Inuit artifacts.[9]

A lack of space to store or prepare country food undermines food sovereignty. Additionally, many communities lack adequate spaces for the transmission of cultural knowledge, including community feasts.[10]

Measuring the gap with a Canada-wide baseline does not presume a future in which Southern-designed solutions are delivered to address Inuit-specific challenges. This report puts Nunavut's infrastructure gap within the context of Northern and Inuit-specific realities.

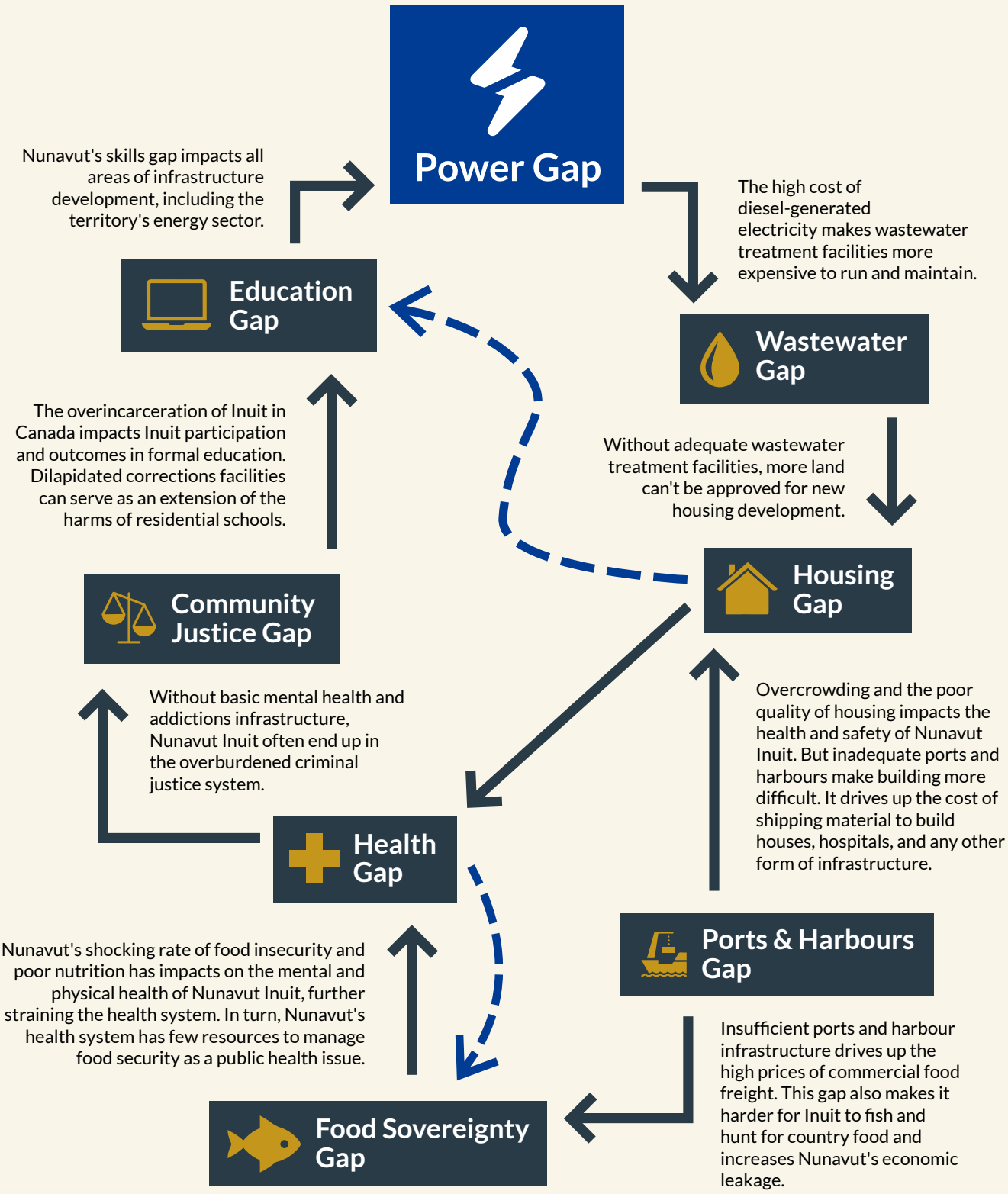
The infrastructure gaps reinforce one another

Nunavut's true infrastructure deficit cannot be measured or fully addressed as an aggregate of isolated deficits: the system-level impacts are greater than the sum of each area. Nunavut's overall lack of appropriate infrastructure makes everything more difficult, more expensive, or both. This makes it more challenging to close the gap, even where there are innovative solutions.

Infrastructure gaps do not exist in silos, instead they intersect and overlap, amplifying the impact of each gap in a combined experience. The illustration on the following page is an example of how infrastructure gaps have compounding and even cyclical effects, creating an infrastructure "trap" that makes it harder to close the gap and makes life more challenging for Nunavut Inuit.

The interconnection of infrastructure creates opportunities as well as challenges. Just as each "distinct" infrastructure deficit has impacts and consequences beyond a specific sector, targeted investments that address key infrastructure gaps can lead to broad downstream benefits. For example, more effective broadband could drastically expand the capacity of local infrastructure to deliver essential services within Nunavut.

8 Nunavut Tunngavik Incorporated, "Nunavut Inuit Left Out of the Canadian Middle Class ," 2019, https://www.tunngavik.com/2019/03/20/nunavut-inuit-left-out-of-the-canadian-middle-class/.
9 Research Interview, 2020.
10 Research interview, 2020.



While this image is designed to visualize how Nunavut's infrastructure gap compounds and self-reinforces, it does not capture the many relationships between all infrastructure priority areas. The dotted lines visualize just some of these additional relationships.

Overview

To quantify the gap, this report groups 18 infrastructure priority areas into three categories — **energy and environment, people and communities**, and **connections**.

The report also includes analysis on key "**cross-cutting factors**" which impact all areas. These cross-cutting factors help to explain both the overall state of the infrastructure (e.g. readiness for climate change adaptation) and the capacity to effectively serve Nunavut Inuit (e.g. the accessibility of public-facing infrastructure to Nunavut Inuit with disabilities).

Each of these priority areas is the subject of its own profile on the state of infrastructure in Nunavut and how it compares with the rest of Canada. In some cases, Nunavut's infrastructure is **inadequate** and fails to meet the needs of Nunavut Inuit. In other cases, Nunavut's infrastructure is in **poor repair**, making assets less efficient or unsafe for use. Finally, in some cases, infrastructure is simply **absent**.

Some priority areas within this report, such as housing, reflect all three of these conditions. There is (a) an inadequate complement of suitable housing stock to meet public need and market demand; (b) a significant portion of housing in acutely poor repair; and (c) an overall acute shortage of housing in Nunavut.

Below are examples of findings from this report, and how these gaps can be quantified to demonstrate infrastructure inequities for Nunavut Inuit. These represent only a small sample of the analysis contained in this report. For a more detailed summary of findings by priority area, see page 17.

Categories of infrastructure & priority areas

Energy & environment

- > Power
- > Drinking water
- > Wastewater
- > Solid waste
- > Emergency response & protection

People & communities

- > Housing
- > Food sovereignty
- > Health
- > Education
- > Community, culture & recreation
- > Community justice

Connections

- > Ports & harbours
- > Telecommunications
- > Roads & sidewalks
- > Air
- > Customs & tourism
- > Banking
- > Rail

Cross-cutting factors of infrastructure

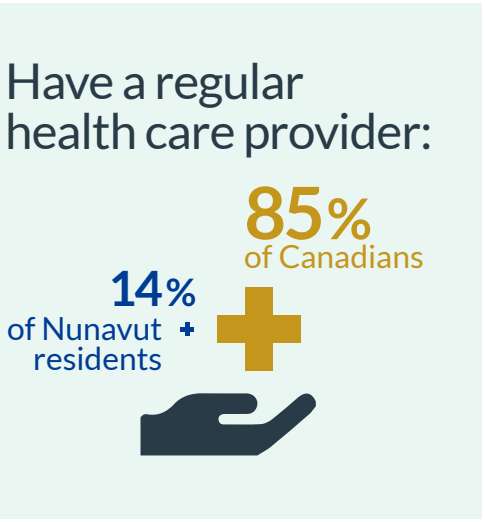
- > Skills & human capacity
- > Energy efficiency & environmental sensitivity
- > State of repair
- > Accessibility
- > Climate change adaptation
- > Governance & ownership

By the Numbers

Inadequate infrastructure

HEALTH

The overall access of Nunavut Inuit to health care is significantly worse than the Canadian average. Outside Nunavut's regional hubs, only limited health services are available to residents. Nunavut has the fewest staffed and operational hospital beds per capita in the country: people often fly out of the territory for even routine medical procedures. Over a third of Nunavut's health budget goes to medical travel costs and paying for out-of-territory hospital care.

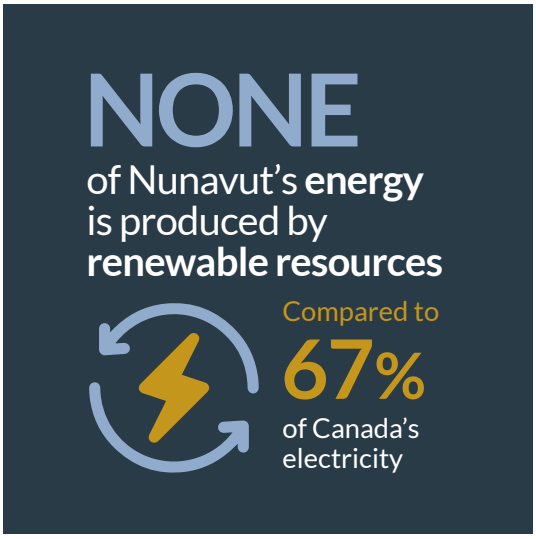


AIR

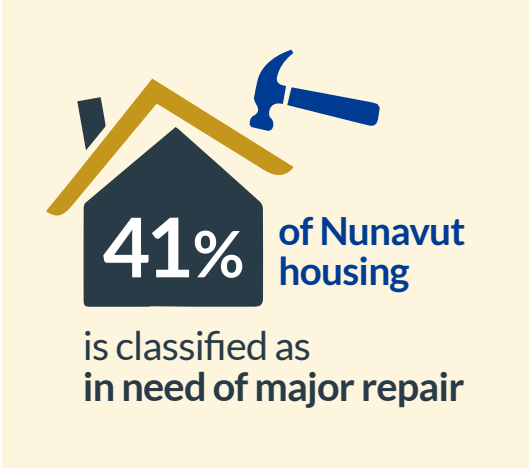
Air travel is the only way to reach communities year-round, including for the delivery of life-sustaining supplies such as food and fuel. However, the average length of runway in Nunavut (4,599 feet) is less than half the length of runways found at major airports in Canada. As a result, only smaller planes can access many of the territory's communities.

POWER GENERATION

Nunavut is the only territory with no regional power grid. Each of the 25 communities relies on its own diesel plant, and therefore depends on diesel fuel to generate power. There are significant expenses and environmental risks associated with importing approximately 50 million litres of diesel fuel via sealift and storing it in communities for electricity generation.



Infrastructure in poor repair

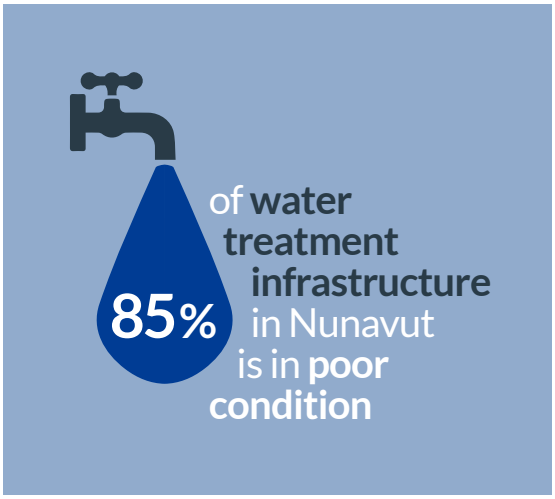


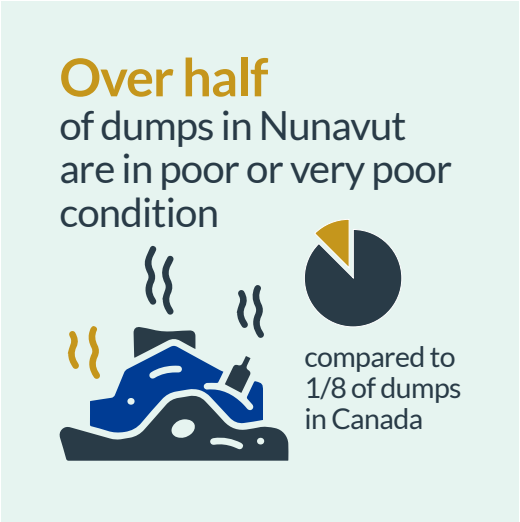
HOUSING

Nunavut has a staggering rate of housing requiring major repairs. The scale of this problem has been increasing: in Nunavut, the share of homes requiring major repairs doubled from 20.2 percent in 2006 to 41 percent in 2018. The Canada-wide average is 7.1 percent. Exposure to mould, a lack of insulation, broken windows, and malfunctioning heating systems are some of the more common issues facing older Nunavut homes.

DRINKING WATER

Geographic, economic, and infrastructure challenges are serious obstacles to providing safe and clean drinking water in Nunavut. Nunavut has the lowest per capita residential water use in Canada, at 153 litres per capita per day compared to 220 litres per capita for the Canadian average.





WASTE DISPOSAL

Dumps are the most rudimentary form of solid waste disposal infrastructure. Unfortunately, dumps are twice as prevalent in waste disposal infrastructure in Nunavut as they are in the rest of Canada, and more than half of Nunavut's dumps are in poor condition. All communities except for three practice open burning of waste, which exposes residents to harmful pollutants.

Absence of infrastructure

PORTS & HARBOURS

Every community in Nunavut depends on summer sealifts for supplies. Safe access to waterways is critical to support fisheries and strengthen Inuit food sovereignty. Yet, out of 95 ports overseen by Transport Canada nationally, none are in Nunavut. Out of 25 communities, 24 have no harbour where residents can safely access waterways and park marine vessels.

Out of 1010
harbours in Canada
Only 1
is in Nunavut
despite having
about 40%
of Canada's shoreline.

Nunavut is the only province or territory where there is no access* to

internet speeds over 25 Mbps

In 2018, the weighted average of residential internet speeds for Canadians was **126 Mbps**

*residential access

TERRESTRIAL FIBRE LINES

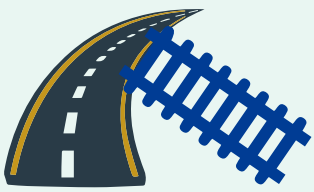
Nunavut is the only Canadian province or territory without access to broadband delivered by fibre cable. GEO satellite internet is the *only* way Nunavut Inuit can connect to the web, despite its being significantly slower and less reliable than fibre-delivered internet.

HERITAGE & MUSEUM INFRASTRUCTURE

Article 33.2.4 of the *Nunavut Agreement* states, "there is an urgent need to establish facilities in the Nunavut Settlement Area for the conservation and management of a representative portion of the archaeological record." Yet essential collections of Inuit heritage are kept in the South for lack of space to house and display them.

Nunavut has **no heritage centre** to protect our collections, our culture.

More than **140,000 artifacts** are housed outside of the territory



Nunavut is the only province or territory with **no highways or railways**

HIGHWAYS, RAILWAYS & NATIONAL LINKAGES

Unlike other provinces and territories, Nunavut has no connection to the national highway system or to any rail network. Moreover, no roads connect any of Nunavut's communities with any other.

Cross-cutting factors

Addressing the infrastructure gap will require not only substantial investment and collaboration, but also the consideration of the contexts in which infrastructure is developed. The following six cross-cutting (or system-wide) factors are included in this report to explain this system-wide context.

Skills & human capacity

- A skilled labour market and adequate infrastructure are interdependent. Infrastructure cannot be built and maintained without trained workers. In turn, Inuit training and education cannot take place without the infrastructure to support it.
- Because of a shortage of local labour, many infrastructure projects in Nunavut face unique limitations and cost pressures.
- Articles 23 to 26 of the *Nunavut Agreement* are designed to improve Inuit participation in the waged labour market. But despite these obligations, Inuit participation in the workforce remains disproportionately low.

Climate change

- Canada's Arctic faces the potential for extreme change under a range of scenarios, including warming at two to three times the global average.
- Climate change impacts the effectiveness and lifespan of buildings, transportation, and marine infrastructure.
- The risk to Nunavut infrastructure is greater than the Canadian average given the unique nature of Nunavut's geography and economy (e.g. permafrost, coastal communities). Resilient infrastructure is key to mitigating these risks.
- A 2018 report from the Auditor-General of Canada found that Nunavut was not adequately prepared to respond to climate change.
- The risks to Nunavut's infrastructure include greater repair needs, the need to bury pipes at deeper and deeper depths, damage to paved airport runways, and flash floods.
- The significant backlog of infrastructure needs and limited financial and planning capacity makes it more difficult to secure climate-resilient infrastructure – even if that investment would save money in the long-term through lowered maintenance costs and extended asset life.

Energy efficiency & environmental sensitivity

- Infrastructure in Nunavut is less energy-efficient and more likely to have negative environmental impacts than in communities elsewhere in Canada. The extent to which Nunavut's infrastructure is sensitive to the local Arctic ecosystem is important for a range of public policy goals.
- Energy-efficient infrastructure can help reduce local pollution while supporting broader territorial efforts to address climate change.

Accessibility

- Accessibility "means that everyone can get to and use information and spaces and places", regardless of disability or impairment. In Nunavut, people with disabilities face a number of barriers across many types of infrastructure.
- These include a lack of barrier-free housing options, an absence of sidewalks and paved roads, and limited accessible ground transportation. The limited options and services can push individuals and families to make difficult choices about their ability to thrive in Nunavut.

State of repair

- Much of Nunavut infrastructure is operating close to or beyond its projected useful lifespan, including essential services like power stations, water pipes, and health centres. Nunavut faces particular challenges to keep infrastructure in good repair. Mould, fires, leaks, and shifts in permafrost can render infrastructure unusable until repairs are made.
- Waiting for necessary supplies to be ordered and then shipped via sealift can prolong the amount of time a facility or asset is out of commission. State of repair challenges can also compound. A struggling ventilation system will contribute to the spread of mould, which can spread across entire rooms and structures. A broken or underperforming furnace may cause a pipe to freeze and then break, leading to flooding or spilled sewage.
- In 2012, a single burst pipe near the Iqaluit high school spilled nearly 20 million litres of water, effectively draining the city's reservoir. With limited resources and capacity, repair needs compete directly with new investment.

Governance & ownership

- Implementation of the *Nunavut Agreement* calls for an approach to infrastructure that includes a focus on promoting Inuit self-determination. Efforts to close the infrastructure gap without recognizing the particular governance and ownership context of the territory would fail to allow Nunavut Inuit to determine their future.
- Other aspects of governance and ownership include the limited role of the private sector and the impact of other orders of government. The unique governance and ownership environment makes it more difficult to secure investment and effectively manage assets, as some communities and institutions have significant scale and capacity challenges.

Closing the gap

The infrastructure gap between Nunavut and the rest of Canada is clear to anyone who lives in or visits the territory. It is felt by Nunavut Inuit in every aspect of their lives. The legacies of colonial approaches and under-investment create barriers that make it difficult for Nunavut Inuit to thrive today. In turn, the investment (and under-investment) decisions made today will impact Nunavut and Canada for decades to come.

Nunavut stands out in Canada in many ways. It is Canada's newest, youngest, and fastest-growing territory. It is also Canada's only Indigenous-majority territory defined by a unique structure created by the *Nunavut Agreement* to ensure Inuit self-determination.

But as this study illustrates, Nunavut too often stands out because of the infrastructure gap faced by Nunavut Inuit. Through the Inuit-Crown Partnership Committee and other processes, the federal government has acknowledged and committed to close that gap. However, without clarity on the scale of the gap, and what it will take to close that gap, these commitments may not drive concrete, measurable action.

The 55 indicators across 18 priority areas in this report provide a comprehensive picture of the scope and scale of the infrastructure gap between Nunavut and the rest of Canada. While some gaps are more acute then others, they are interlinked and add pressure to one another.

It is clear that the gap makes every aspect of life in Nunavut more expensive, undermines health and education outcomes for Nunavut Inuit, and threatens Arctic ecosystems. It is also clear that significant attention, investment, and action is needed now to close the gap.

Nunavut Inuit are ready to build a long-term infrastructure plan that lays a foundation for a thriving future. By partnering with Nunavut Inuit to develop an infrastructure plan to close these gaps, Canada can live up to the promises of the *Nunavut Agreement*, expand economic opportunity that benefits all of Canada, and show real leadership as an Arctic nation.

READ NEXT >

To learn more about the unique circumstances of Nunavut that contribute to the territory's infrastructure gap, see Nunavut's infrastructure gap in context on the following page.

To review the summary of report findings by infrastructure priority area, see page 17.

Nunavut's infrastructure gap in context

Geography

- Nunavut Inuit live in 25 separate communities. Every community in Nunavut is fly-in, fly-out, and is inaccessible to elsewhere in Nunavut or to the rest of Canada by car or train. Communities can be accessed by boat (sealift), but only in the summer when shipping paths are clear of ice. For comparison, only about 9 percent of people in the Northwest Territories (NWT), 0.8 percent of the population in Yukon, and 0.18 percent of Ontarians live in fly-in only communities.[11]
- The distances between these communities are vast. The distance between Nunavut's northernmost and southernmost communities is 2,214 km (about the distance between Ottawa and Miami), and between Nunavut's easternmost and westernmost communities is 2,096 km, spanning three time zones.
- Nunavut has a population of about 38,400. Only three of Nunavut's 25 communities have a population greater than 2500 people (most notably, Iqaluit has about 8,250). As of 2018, ten communities had a population of fewer than 1,000 residents.[12]

Image by Maximilian Dörrbecker (Chumwa) - Own work, using this file by Flappiefh, CC BY-SA 2.5, https://commons.wikimedia.org/w/index.php?curid=46895498

Implications of geography

- Because of these distances and the lack of transportation links, **Nunavut communities cannot share infrastructure assets or resources.** Each community must have its own local infrastructure: for example, a power plant, a drinking water plant, an ice skating rink, or a bank branch — or go without.
- Any item brought in from outside (from construction-grade rebar to cars to a bag of apples) must arrive either via plane or sea freight (which arrives once or twice a year during the summer months). The added cost of shipping and logistics makes almost every facet of infrastructure development more expensive in Nunavut.
- Because of these geographic constraints and the small population, there are few economies of scale to be found in Nunavut. This makes per-capita infrastructure spending much higher and makes it less likely that the private sector will provide infrastructure in areas they typically do elsewhere (such as housing or telecommunications).

11 Government of Canada, "Status of Remote/Off-Grid Communities in Canada," August 2011.
12 Government of Nunavut, "Population Data - Population Estimates by Sex, Age Group, Region and Community, 2018," accessed July 31, 2020, https://www.gov.nu.ca/executive-and-intergovernmental-affairs/information/population-data.

Governance

- The population of Nunavut is 85 percent Inuit. Inuit living in Nunavut are citizens of both a Canadian and Inuit democracy.[13] Nunavut is both a sub-national political jurisdiction of Canada and a sovereign Inuit jurisdiction protected through the *Nunavut Agreement*. In Nunavut, a territorial government represents the interests of both Inuit and non-Inuit residents of Nunavut. There are also powerful, constitutionally-recognized Inuit organizations that represent Inuit as sovereign people.
- Within Nunavut, three Regional Inuit Associations (RIAs) represent Inuit in each of Nunavut's three regions. The RIAs are the Kitikmeot Inuit Association, the Kivalliq Inuit Association, and the Qikiqtani Inuit Association. Both NTI and RIAs actively work with governments and industries on behalf of Nunavut Inuit, including on infrastructure development. Inuit organizations are often directly involved in the planning and development of regional infrastructure through their subsidiary organizations, such as development corporations.
- For example, in 2019, the Qikiqtani Inuit Association and the Government of Canada signed the Tallurutiup Imanga and Tuvaijuittuq agreements. These agreements not only set out plans to establish new marine conservation areas, they also included more than $190 million in associated infrastructure funding for the region, including small craft harbours and multi-use facilities.[14]

Infrastructure gap as a colonial legacy

- Nunavut is one of four Inuit regions that make up Inuit Nunangat. Inuit have inhabited Inuit Nunangat for millennia. Inuit have a distinct cultural identity and a relationship with the land that exists outside Western colonial frameworks and market systems.
- In the mid-20th century, colonial interference with Inuit ways of life increased significantly. In the 1940s, the Crown designated Inuit as "wards of the state." Inuit were compelled to move into permanent settlements and to abandon Inuit societal values, including semi-nomadic migration.
- The locations of these settlements were largely determined by Canada's trade and military interests, and sometimes resulted in Inuit being relocated thousands of kilometres away from where they lived.[15] For example, the Government of Canada relocated several Inuit families from Inukjuak in Northern Quebec to Grise Fiord, on Ellesmere island. Because of these displacements, families needed to adjust — often in desperate circumstances to different weather, wildlife migration patterns, and survival needs.
- Inadequate infrastructure was put in place. What existed was not well-adapted for Inuit societal realities or Northern climate realities.

13 Natan Obed, "Our Inuit Democracy in Canada ," Arctic Journal, February 28, 2018, http://arcticjournal.ca/inuit-forum/inuit-democracy-canada/.
14 Qikiqtani Inuit Association, "Tallurutiup Imanga and Tuvaijuittuq Agreements ," 2019, https://www.qia.ca/tallurutiup-imanga-and-tuvaijuittuq-agreements/.

15 Qikiqtani Inuit Association, Qikiqtani Truth Commission Final Report: Achieving Saimaqatigiingniq , 2013, https://www.qtcommission.ca/sites/default/files/public/thematic_reports/thematic_reports_english_final_report.pdf.

About our research

The research for the report was completed between fall 2019 and spring 2020, and included data analysis, research interviews, circumpolar case studies, and literature review. The main approach is to compare the state of infrastructure in Nunavut with that in other provinces and territories and, where possible, to a Canadian average. The research was guided by input from an external advisory panel and the participation of the Qikiqtani Inuit Association, the Kitikmeot Inuit Association, and the Kivalliq Inuit Association.

DATA GAPS

This research highlighted a number of data gaps. Some are Canada-wide. Nunavut, and the North more broadly, are frequently overlooked and excluded from national data.

For example, Nunavut is left out of regularly reported data on solid waste; Environment Canada's own policy guidance on solid waste management in the North simply assumes the average from the rest of Canada applies and relies on a one-time waste audit of Whitehorse.[16]

Other data sets report on Nunavut in categories combined with the other territories or other regional groups. Data gaps also emerge where policymakers use a minimum population or other threshold to decide what to track; the Canada Mortgage and Housing Corporation reports on housing starts only for local areas with populations of more than 10,000, which excludes all Nunavut communities.

These gaps make comparisons more challenging and policymaking and infrastructure planning for Nunavut Inuit more difficult.

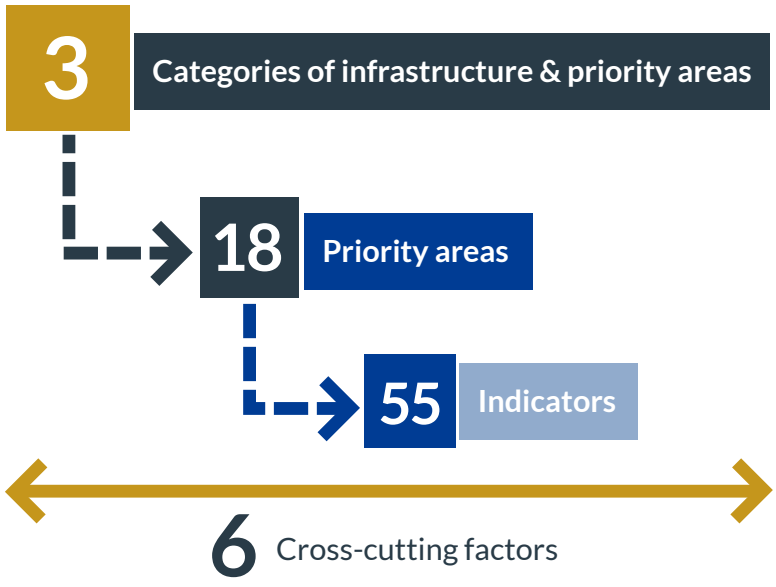
16 Environment and Climate Change Canada, "Solid Waste Management for Northern and Remote Communities," 2017, http://publications.gc.ca/collections/collection_2017/eccc/En14-263-2016-eng.pdf.

Summary of findings by priority area

The report uses 55 indicators across 18 infrastructure priority areas to measure the gap between Nunavut and rest of Canada, drawing on a wide variety of data sources.

The study groups the infrastructure areas into three categories: **energy and environment**; **people and communities**; and **connections**.

The report also includes analysis on key "**cross-cutting factors**" which impact all areas. These cross-cutting factors help to explain both the overall state of the infrastructure (e.g. readiness for climate change adaptation) and the capacity to effectively serve Nunavut Inuit (e.g. the accessibility of public-facing infrastructure to Nunavut Inuit with disabilities).



Categories of infrastructure & priority areas

Energy & environment

- > Power
- > Drinking water
- > Wastewater
- > Solid waste
- > Emergency response & protection

People & communities

- > Housing
- > Food sovereignty
- > Health
- > Education
- > Community, culture & recreation
- > Community justice

Connections

- > Ports & harbours
- > Telecommunications
- > Roads & sidewalks
- > Air
- > Customs & tourism
- > Banking
- > Rail

Cross-cutting factors of infrastructure

- > Skills & human capacity
- > Energy efficiency & environmental sensitivity
- > State of repair
- > Accessibility
- > Climate change adaptation
- > Governance & ownership

Energy & environment

Communities rely on a variety of infrastructure to interact safely with their environment. This includes core public infrastructure that provides power and water and disposes of waste. The difference between Nunavut and the rest of Canada in this type of infrastructure is glaring.

Some of these differences are shaped by geography or environment. For example, Nunavut does not have the same access to potential hydro-electric power sources as other jurisdictions. Above-ground "utilidor" systems are a unique adaptation used to prevent pipes from freezing in Arctic environments.

In many of Nunavut's communities, sewage and water trucks replace concealed pipes and sewers. High fixed-costs to build infrastructure and deliver services, such as power plants or water treatment facilities for 25 communities that cannot share any infrastructure is an added challenge.

But many differences, such as unlined dump sites with open burning of waste, reflect under-investment that leaves Nunavut Inuit with poorer quality infrastructure than their Canadian or circumpolar neighbours.

The fact that Nunavut's power stations cannot rely on a transmission grid is a result of regional and Arctic limitations; the fact that so many power stations have been allowed to age beyond their projected lifespan is not.

The limits of water treatment infrastructure, including a heavy reliance on trucked water supplies, leave Nunavut Inuit with less reliable access to clean water than people in other Canadian provinces or territories.

Power

- Nunavut is the only territory with no regional power grid. Each of the 25 communities relies on its own diesel plant.
- Nunavut has the second lowest power generation per capita of provinces and territories. PEI has lower local capacity but is able to rely on imported power from New Brunswick.[17] Limited power is an obstacle to economic development, especially for energy-intensive industries.
- Nunavut is the only territory or province with no substantial source of renewable energy. Two-thirds of electricity produced nationally comes from renewable sources.[18] The federal government has committed to moving all remote communities off diesel by 2030.[19]
- Nunavut has the lowest electricity consumption per capita, coupled with the highest prices (before subsidies are taken into account).[20]

17 Canada Energy Regulator, "Provincial and Territorial Energy Profiles," accessed June 4, 2020, https://www.cer-rec.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/index-eng.html.
18 Canada Energy Regulator.
19 Prime Minister of Canada, "Minister of Natural Resources Mandate Letter," 2019, https://pm.gc.ca/en/mandate-letters/2019/12/13/minister-natural-resources-mandate-letter.
20 Canada Energy Regulator, "Provincial and Territorial Energy Profiles - Nunavut," 2020, https://www.cer-rec.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/nu-eng.html.

Drinking water

- Nunavut is distinct from the rest of Canada in that it is largely reliant on trucked water. Only 14 percent of Nunavummiut (Nunavut residents) are served by piped water.[21]
- While 92 percent of Nunavummiut are served by drinking water plants (above the Canadian average), the capacity of facilities is lower, relying on chlorination rather than the multi-barrier standard endorsed by the Canadian Council of Ministers of Environment.[22]
- Approximately 85 percent of water treatment infrastructure in Nunavut is in poor condition. Nationally the majority of water infrastructure is in good or very good condition.[23]
- Nunavut faces by far the highest cost of operating and maintaining drinking water infrastructure, spending ten times the Canadian average to maintain drinking water plants with a lower standard of water service.[24]

Wastewater

- Twenty-two communities in Nunavut have trucked wastewater systems. They are among only 0.5 percent of Canadians who are served by sewage haulage.[25]
- Nunavut's pipes are more likely to be in poor repair. Nationally, ten percent of pipes are rated in poor or very poor condition, while in Nunavut 40 percent are.[26]
- Nunavut communities generally rely on lagoon systems rather than wastewater treatment plants. These can be effective but are also in disproportionately poor condition. Only 22.5 percent of Nunavut lagoons are reported to be in good or very good condition, compared to 60 percent nationally.[27]

Solid waste

- All communities except three in Nunavut practice some open burning of waste, given limited infrastructure.[28] This process exposes residents to harmful pollutants and is banned in most of Canada and the circumpolar Arctic.
- Basic dumps, many of which were not professionally designed, make up 88 percent of Nunavut's waste disposal infrastructure, nearly double the 46 percent national average.[29]
- More than half of dumps in Nunavut are in poor or very poor condition, compared to one-in-eight Canada-wide.[30]

21 National Collaborating Centre for Environmental Health, "Small Drinking Water Systems: Who Does What in Nunavut?," March 2014, https://www.ncceh.ca/sites/default/files/SDWS_Who_What_Nunavut.pdf.
22 Statistics Canada, "Population Served by Drinking Water Plants," 2019, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3810009301. ; Kiley Daley et al., "Municipal Water Quantities and Health in Nunavut Households: An Exploratory Case Study in Coral Harbour, Nunavut, Canada," International Journal of Circumpolar Health 73, no. 1 (January 31, 2014): 23843, https://doi.org/10.3402/ijch.v73.23843.
23 Infrastructure Canada and Statistics Canada, "Inventory Distribution of Publicly Owned Potable Water Assets by Physical Condition Rating," 2018, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410019601.
24 Statistics Canada, "Operation and Maintenance Costs of Drinking Water Plants," Biennial Drinking Water Plants Survey, accessed June 11, 2020, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3810010301.
25 Canadian Water Network, "Canada's Challenges and Opportunities to Address Contaminants in Wastewater Supporting Document 2 ," 2018, http://cwn-rce.ca/wp-content/uploads/projects/other-files/Canadas-Challenges-and-Opportunities-to-Address-Contaminants-in-Wastewater/CWN-Report-on-Contaminants-in-WW-Supporting-Doc-2.pdf.
26 Infrastructure Canada and Statistics Canada, "Inventory Distribution of Publicly Owned Wastewater Assets by Physical Condition Rating," 2016, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410022601.
27 Infrastructure Canada and Statistics Canada.
28 Laurie Giroux, "State of Waste Management in Canada Prepared for: Canadian Council of Ministers of Environment," 2011.
29 Infrastructure Canada and Statistics Canada, "Inventory of Publicly Owned Solid Waste Assets," 2018, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410023601.
30 Infrastructure Canada and Statistics Canada, "Inventory Distribution of Publicly Owned Solid Waste Assets by Physical Condition Rating," 2018, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410024001.

Emergency response & protection

- The Canadian Arctic has no year-round dedicated marine search and rescue assets.[31]
- Of the 26 Inshore Rescue Boat Stations operated by the Canadian Coast Guard, only one is in Nunavut.[32]
- Two-thirds of Nunavut communities identified a need for new fire halls or major renovations to existing fire halls.[33] Some communities have no room for equipment or personnel, or have stations without running water.
- Limited water supply also makes it more challenging to fight fires. Nunavut experiences fire damage that is much higher than other provinces and territories.[34]

People & communities

Nunavut is the country's only Indigenous-majority territory, has the youngest and fastest-growing population in Canada, and has one of the country's fastest-growing economies. If properly resourced and empowered, Nunavut Inuit will have an important role in shaping the future of both Nunavut and Canada. However, without meaningful interventions and investments in social infrastructure, the benefits of Nunavut's growth will be uneven and leave its people even further behind.

Housing

- A shortage of housing means that Nunavummiut face by far the highest rate of overcrowding in Canada. Thirty-five percent of households do not have enough bedrooms, compared to 5 percent nationally.[35] Overcrowding affects health, safety, and education outcomes and contributes to the spread of tuberculosis.
- Two in five homes in Nunavut are in need of major repair, nearly six times the national average.[36] Exposure to mould, malfunctioning heating, and other challenges can make for unsafe living conditions.
- Without an active private housing market, 75 percent of renter households live in public housing.[37] Nunavummiut households are 12 times more likely to be on waitlists for public housing (24 percent compared to 1.9 percent nationally).[38]

31 Senate of Canada, "When Every Minute Counts: Maritime Search and Rescue," 2018, https://sencanada.ca/en/info-page/parl-42-1/pofo-sar-maritime/.
32 Canadian Coast Guard, "Station Locations," 2019, https://www.ccg-gcc.gc.ca/search-rescue-recherche-sauvetage/irb-esc/station-location-emplacement-eng.html.
33 From ICSP plans, see for example: ICSP Toolkit, "Infrastructure Plan for Grise Fiord," 2019, http://toolkit.buildingnunavut.com/en/Community/Plan/b17ac5f3-8273-41ec-9982-a1f700f2d229.
34 Government of Nunavut, "Department of Community and Government Services OFFICE OF THE FIRE MARSHAL 2017 ANNUAL REPORT," 2017.; Mahendra Wijayasinghe, "Fire Losses in Canada Year 2007 and Selected Years," 2011.
35 Statistics Canada, "Housing Suitability and Dwelling Condition, by Tenure Including Social and Affordable Housing," accessed June 3, 2020, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=4610004301.
36 Statistics Canada.
37 Statistics Canada, "The Daily — First Results from the Canadian Housing Survey, 2018," accessed June 3, 2020, https://www150.statcan.gc.ca/n1/daily-quotidien/191122/dq191122c-eng.htm.
38 Statistics Canada, "Waitlist Status Including Length of Time, by Tenure Including Social and Affordable Housing," accessed June 3, 2020, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=4610004201.

- Despite police-reported intimate partner violence at a rate 14 times the national average, Nunavut has only five emergency shelters for victims of abuse, with 113 percent occupancy during a recent national survey (the Canada-wide average was 78 percent).[39]

Food sovereignty

- Nunavummiut experience the highest rate of food insecurity in Canada by a wide margin; 58 percent face food insecurity compared with 13 percent nationally.[40]
- Even after subsidies from the Nutrition North Canada program, the price of staple foods in Nunavut is significantly higher than the Canadian average. [41] In 2017, 2.5kg of flour cost almost $14 in Nunavut, compared with about $5 nationally.[42]
- With only three CFIA-licensed food manufacturing establishments, much of the seafood harvested in Nunavut waters is processed offshore or in either Newfoundland and Labrador or Kalaallit Nunaat (Greenland).[43]
- Many communities also have shortages of infrastructure to support country food, such as community freezers, community kitchens, and heated warehouse space for snowmobiles and harvesting equipment.

Health

- Nunavut has the fewest staffed and operational hospital beds per capita in the country, with 1,095 persons per bed, compared to a national average of 409.[44] All of these beds are located in Iqaluit.
- With few services available in communities, Nunavut spends the most on out-of-jurisdiction healthcare and travel by a wide margin. Per capita spending is twice that of the Northwest Territories and 43 times that of Manitoba.[45] Little cancer screening is available, and half of births take place out-of-territory.
- With a shortage of mental health options, Nunavut has the highest suicide rate in Canada, more than five times higher than the national average, at 54.7 persons per 100,000, compared with 10.3 per 100,000 persons nationally.[46] Nunavut's first addictions treatment centre remains years away from opening.
- Nunavut residents are the least likely in Canada to have a regular healthcare provider, at 13.9 percent compared to the national average of 84.9 percent.[47]

39 Statistics Canada, "35-10-0051-01: Victims of Police-Reported Violent Crime and Traffic Violations Causing Bodily Harm or Death, by Type of Violation, Sex of Victim and Age of Victim," 2018, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3510005101&pickMembers%5B0%5D=1.14&pickMembers%5B1%5D=6.20180101&pickMembers%5B2%5D=5.2. Highest percentage reported experiencing both physical and sexual abuse (although comparable information was unavailable for both territories on sexual abuse). ; Statistics Canada, " Occupancy for Short-Term Facilities, by Urban or Rural Area, Province or Territory, April 18, 2018," 2018, https://www150.statcan.gc.ca/n1/pub/85-002-x/2019001/article/00007/tbl/tbl07-eng.htm.

40 Statistics Canada, "The Daily — Canadian Community Health Survey: Household Food Insecurity in Canada, 2017/2018," 2020, https://www150.statcan.gc.ca/n1/daily-quotidien/200218/dq200218e-eng.htm.

41 Government of Nunavut, "Economic Data, Food Price Survey 2017," accessed July 23, 2020, https://www.gov.nu.ca/executive-and-intergovernmental-affairs/information/economic-data.

42 Government of Nunavut. "Economic Data, Food Price Survey 2017"

43 List available at Canadian Food Inspection Agency, "Safe Food for Canadians Licence Registry," 2020, https://www.inspection.gc.ca/webapps/foodlicenceregistry/en/.

44 Canadian Institute for Health Information, "Hospital Beds Staffed and In Operation, 2018-2019," 2020, https://www.cihi.ca/en/quick-stats.

45 Data on spending on out-of-jurisdiction health care is sourced from the Health Canada, "Canada Health Act Annual Report 2018-2019 - Canada.Ca," 2020, https://www.canada.ca/en/health-canada/services/publications/health-system-services/canada-health-act-annual-report-2018-2019.html.

46 Centre for Suicide Prevention, "Cross-Canada Comparison Statistics - Centre for Suicide Prevention," 2019, https://www.suicideinfo.ca/resource/cross-canada-comparison-statistics/.

47 Canadian Institute for Health Information, "Nunavut - Has a Regular Health Care Provider," accessed June 9, 2020, https://yourhealthsystem.cihi.ca/hsp/indepth?lang=en#/indicator/074/2/C191/.

Education

- With schools and community learning centres in each of the 25 communities, Nunavut Inuit can complete high school and some adult education in their communities. [48]
- However, Nunavut Inuit have few post-secondary options close to home, and no Inuit-led university or research centre. More than 39 percent of Nunavummiut aged 20–24 are out of formal education and the labour force, compared to 7 percent nationally.[49]
- Nunavut has childcare spaces for only 18 percent of children younger than 6 (compared with 29 percent nationally) and 11 percent of all children 0–12 (compared with 27 percent nationally).[50] This makes it harder for Nunavut Inuit to pursue education and employment.
- The share of the working age population with less than high school education in Nunavut is 42 percent compared with 8 percent nationally.[51] This reflects both infrastructure gaps and legacies of colonial approaches to education.[52]

Community, culture & recreation

- Without connections between communities, Nunavut communities cannot use regional models to provide services, which is typical elsewhere in Canada.
- More than 11,000 people in Nunavut, or just under a third of the total population, live in a community with no access to a bricks-and-mortar library.[53]
- A shortage of adequate community spaces makes it difficult to hold cultural events like community feasts and support the transmission of Inuit cultural knowledge through the generations.
- Despite the objectives of Article 33 of the *Nunavut Agreement*, the Government of Nunavut pays to house many of Nunavut's cultural collections at the Canadian Museum of Nature in Ottawa or the Winnipeg Art Gallery.[54]

Community justice

- Nunavut has a higher rate of incarcerated persons than any jurisdiction in Canada, spending ten times as much per capita as the Canadian average.[55] Nunavut's prisons have had significant over-crowding, requiring prisoners to be transferred out of territory.

48 Auditor General of Canada, "Support for High School Students and Adult Learners," 2019, https://www.oag-bvg.gc.ca/internet/English/nun_201906_e_43388.html.
49 Statistics Canada; Council of Ministers of Education, "Education Indicators in Canada : An International Perspective 2019," 2019, https://www150.statcan.gc.ca/n1/en/catalogue/81-604-X.
50 Martha Friendly et al., Early Childhood Education and Care in Canada 2016, 2018, https://www.childcarecanada.org/sites/default/files/ECEC-in-Canada-2016.pdf.
51 Statistics Canada; Council of Ministers of Education, "Education Indicators in Canada : An International Perspective 2019."
52 Statistics Canada; Council of Ministers of Education. Data for extended time graduation rates not available for Nunavut. Data not available for Yukon or Nova Scotia.
53 Based on calculations from list of libraries from the Nunavut Library Service "Nunavut Public Library Services," accessed June 7, 2020, https://www.publiclibraries.nu.ca/ and 2016 population estimates from the Government of Nunavut here: Government of Nunavut, "Population Estimates," 2016, https://www.gov.nu.ca/sites/default/files/population_estimates_report_july_1_2016.pdf.
54 Government of Nunavut, "Heritage Collection," accessed June 8, 2020, https://www.gov.nu.ca/culture-and-heritage/information/heritage-collection.
55 Nunatsiaq News, "Nunavut Has the Highest Incarceration Rate for Adult Offenders in Canada: Statistics Canada," March 14, 2017, https://nunatsiaq.com/stories/article/65674nunavut_home_to_highest_rate_of_adult_offender_in_canada_stats_can/.

- There are no federal corrections facilities in Nunavut, meaning those serving sentences of more than two years are housed far from home, typically in Gravenhurst, ON or Laval, QC.[56] This arrangement falls outside international standards for the treatment of prisoners.
- Nunavut's traveling circuit court lacks appropriate places to meet, often meeting in school gyms or community halls in which the safety and privacy of victims cannot be ensured. The need to travel and the lack of broadband options cause significant delays in the justice system.[57]

Connections

The infrastructure that connects Nunavut with Canada and the world — and the absence of that infrastructure — defines many of the challenges and opportunities that Nunavut Inuit experience in their daily lives. The difficulty and cost of getting people and goods to and from Nunavut's communities undermines food security and other aspects of quality of life, and limits the opportunity for Inuit-led economic development.

Ports & harbours

- Today Nunavut has no public ports, compared with 95 across the rest of Canada (one is under construction in Iqaluit).[58] With ocean-going ships unable to unload directly, all cargo has to be "double-handled" using transport barges.
- The state of community harbours undermines community resupply and fishing. Of the 1,010 small craft harbours overseen by Fisheries and Oceans Canada, Nunavut has only one.[59]

Telecommunications

- Nunavut is the only province or territory entirely reliant on satellite internet. As a result, the fastest possible speed available in Nunavut (15 Mpbs) is eight times slower than the Canada-wide average, as of 2018.[60] The national target is 50 Mpbs for download speeds.
- 86 percent of Canadian households have access to unlimited data packages and 94 percent have access to broadband speeds of at least 25 Mbps.[61] No Nunavut households have access to this level of service.
- It would cost a single Nunavut Inuit household at least $7,000 in annual fees to access the level of data use in the average Canadian household.[62]

56 Correctional Service Canada, "Institutional Profiles," accessed June 11, 2020, https://www.csc-scc.gc.ca/institutions/index-eng.shtml.
57 Department of Justice Canada, "Canada's Court System," 2015, https://canada.justice.gc.ca/eng/csj-sjc/ccs-ajc/pdf/courten.pdf.
58 Government of Nunavut, "Nunavut Small Craft Harbours Report" 2006, https://www.gov.nu.ca/economic-development-and-transportation/documents/nunavut-small-craft-harbours-report.
59 Fisheries and Oceans Canada, "Harbours List," 2019, https://www.dfo-mpo.gc.ca/sch-ppb/list-liste/harbour-list-liste-port-eng.html.
60 All numbers in this paragraph from Open Government Portal (CRTC).
61 Open Government Portal.
62 Calculations based on advertised plans from Northwestel and Qiniq.

Road & sidewalks

- Nunavut is the only territory with no connections to the National Highway System and no roads between communities. On average, other provinces and territories have 200 times more roads than Nunavut.[63]
- With no paved sidewalks, Nunavut Inuit have high exposure to dust (creating respiratory health problems and poor pedestrian safety).[64]
- About 2 percent of the Nunavut road network is paved, compared with a national average of 40 percent.[65]

Air

- Nunavut relies heavily on air travel to move people and goods, including perishable foods, while limited infrastructure makes travel times longer, arrival times less reliable, and journeys more costly.
- Nunavut has only two paved runways. The number of jet aircraft certified to land on gravel is dwindling as older jets reach the end of their service lives. By comparison, the Northwest Territories has six paved runways.
- Only four Nunavut runways are longer than 6,000 feet, the typical distance needed for modern narrow-body jets.[66]

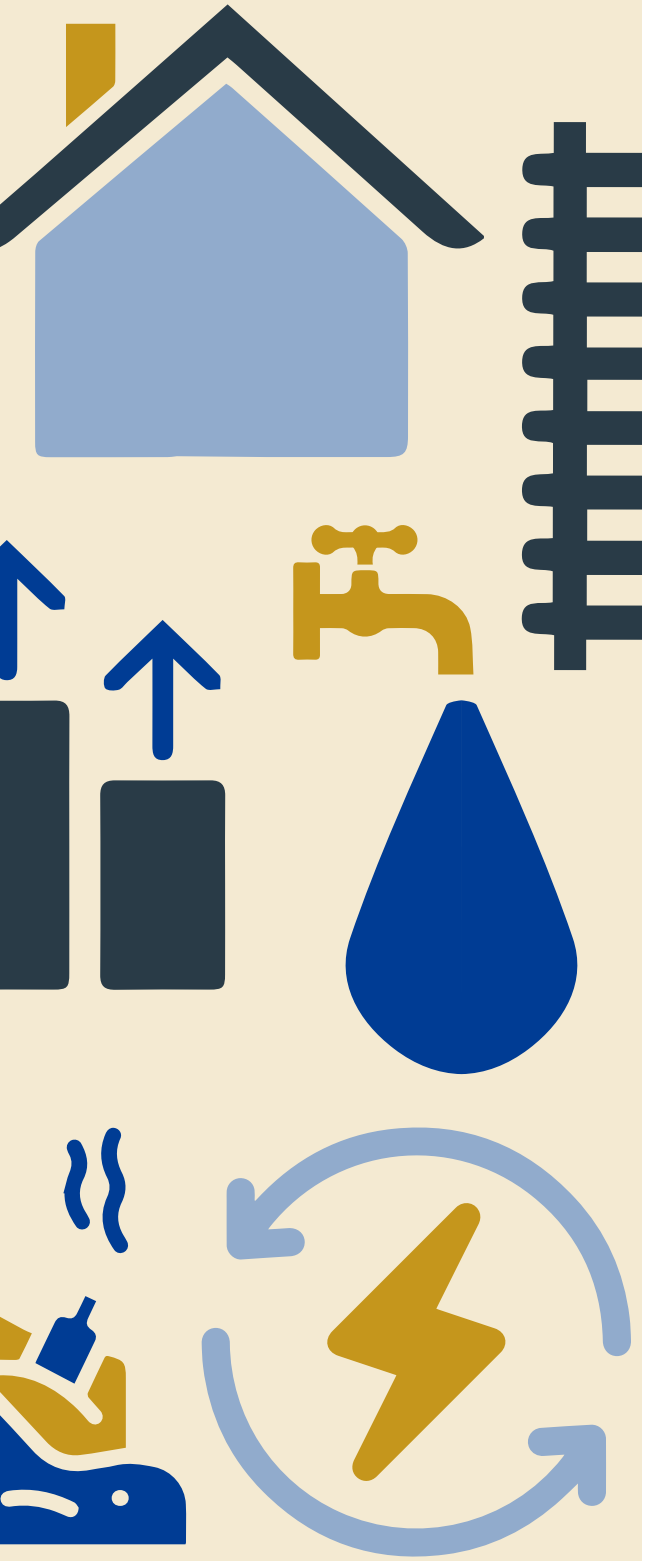
Customs & tourism

- Nunavut has the fewest businesses providing travel accommodation,[67] and they are disproportionately small (typically less than 30 rooms).[68]
- The territory is served by only one Canadian Border Services Agency office out of 1,100 nationally. The Northwest Territories has eight, Yukon nine, and PEI ten.[69]
- Tourism contributes less of a share of the territory's GDP than anywhere else in Canada.[70]

Banking

- Nunavut has 2.9 bank branches per 10,000 people, near the Canadian median, but fewer than one-third of communities have branches.[71] Nunavut has the fewest ATMs per capita of any province or territory.[72]

63 Transport Canada, "Transportation in Canada 2018," accessed June 5, 2020, https://www.tc.gc.ca/eng/policy/transportation-canada-2018.html. Statistical Addendum, Table R02
64 Raihan K. Khan and Mark A. Strand, "Road Dust and Its Effect on Human Health: A Literature Review," Epidemiology and Health (Korean Society of Epidemiology, 2018), https://doi.org/10.4178/epih.e2018013.
65 Research Interviews, 2020.
66 Based on data from NAV Canada
67 Innovation Science and Economic Development Canada, "Canadian Industry Statistics," accessed June 7, 2020, https://www.ic.gc.ca/app/scr/app/cis/search-recherche.
68 HLT Advisory, "Branded Hotel Inventory in Canada," 2015, https://www.hlta.ca/hlt-case-study-branded-hotel-inventory-canada-2015/.
69 Canada Border Services Agency, "Nunavut - Directory of CBSA Offices and Services," accessed June 10, 2020, https://www.cbsa-asfc.gc.ca/do-rb/provinces/nu-eng.html.
70 Statistics Canada, "The Daily — Provincial and Territorial Tourism Satellite Account, 2014," 2018, https://www150.statcan.gc.ca/n1/daily-quotidien/181010/dq181010b-eng.htm.
71 Canadian Bankers Association, "Bank Branches in Canada by Province," 2018, https://cba.ca/bank-branches-in-canada.
72 Canadian Bankers Association, "Number of ABMs in Canada by Province," 2018, https://cba.ca/abms-in-canada.



- Driven by a lack of competition and service, average spending on financial services in Nunavut is 30 percent higher than the Canadian average.[73]
- With fewer bank branches, Nunavut Inuit are far less likely to benefit from government-assisted savings plans. Take-up of Canada Education Savings Grants is one-tenth the national average; for Canada Learning Bonds targeted to low-income children it is one-twentieth.[74] Nunavummiut are half as likely to contribute to RRSPs as other Canadians, which makes it harder to access home ownership.[75]

Rail

- Nunavut is the only province or territory without some form of rail connection. By comparison, half of surface freight arriving in the Northwest Territories comes by rail from Alberta.[76]

73 Statistics Canada, "Household Spending, Canada, Regions and Provinces," accessed June 6, 2020, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1110022201.; Statistics Canada, "Household Spending, Three Territorial Capitals," accessed June 6, 2020, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1110023301.
74 Employment and Social Development Canada, "Canada Education Savings Program: 2018 Annual Statistical Review," accessed June 6, 2020, https://www.canada.ca/en/employment-social-development/services/student-financial-aid/education-savings/reports/statistical-review.html#h2.4.3.
75 Statistics Canada, "Registered Retirement Savings Plan Contributors - Canada, Provinces and Territories," accessed June 11, 2020, https://www150.statcan.gc.ca/n1/daily-quotidien/180216/t001d-eng.htm.
76 Government of Yukon, "Northern Connections: Multi Modal Transportation for the North," accessed June 17, 2020, https://gov.nu.ca/sites/default/files/files/Northern_connections.pdf.

INTRODUCTION

Infrastructure forms the bones of any society, the basis on which 21st-century communities are built. Infrastructure is the water we drink, the power that heats our homes, our roads and sidewalks, our ports and airports, our health care and education systems. It is the telecommunications that connect us to our neighbours and to the wider world—seen more clearly than ever during the COVID-19 pandemic.

Infrastructure is a key driver of economic growth and of social development. But it is also a measure of a country's fairness. How is it prioritized? That says a lot about what our elected officials think is most important.

Nunavut struggles with a sizable, growing, infrastructure gap compared with the rest of Canada. Its housing stock is overcrowded and often dilapidated. Internet access depends on unreliable satellites. All 25 communities rely for power generation on diesel, although political commitments specific to changing this situation have been made. Port and harbour infrastructure is bare bones or absent, despite communities' reliance on sealifts for supplies. These infrastructure gaps block the path to a diversified economy for Nunavut—one that includes mining, fisheries, hunting, and harvesting and a range of other opportunities.

Infrastructure is a key driver of economic growth and of social development. But it is also a measure of a country's fairness. How is it prioritized? That says a lot about what our elected officials think is most important.

The federal government has promised to make infrastructure from sea-to-sea-to-sea more equitable, signalling its intentions in various intergovernmental forums, including the Inuit-Crown Partnership Committee. In the 2019 Arctic and Northern Policy Framework, Ottawa set as a goal for the North: "Strengthened infrastructure that closes gaps with other regions of Canada."[77]

Nunavut Tunngavik Inc. (NTI), which represents the territory's 33,000 Inuit and their rights under the *Nunavut Agreement*, has pursued infrastructure development as a priority. The elected Board's 2018–21 work plan includes a commitment to "work with the Governments of Canada and Nunavut to make substantial progress in narrowing housing and other infrastructure gaps in Nunavut and raising infrastructure standards in Nunavut up to national levels."[78]

As part of this goal, NTI began work in mid-2019 on a comprehensive study of the infrastructure gap between Nunavut and the rest of Canada. This report is the result.

The insights in this report—for example, that 25 percent of Nunavut residents are on a waiting list for public housing compared with 2 percent nationally—represent merely the beginning of the journey toward jurisdictional fairness.

This report focuses on measuring the infrastructure gap. What is needed next is a plan to close that gap. Developing that long-term infrastructure plan will depend on a detailed needs assessment grounded in projected demand and need and an Inuit vision for the future of the territory.

77 Government of Canada, "Canada's Arctic and Northern Policy Framework," 2019, https://www.rcaanc-cirnac.gc.ca/eng/1560523306861/1560523330587.
78 Nunavut Tunngavik Inc., "Niriuttaarijat – Nunavut Tunngavik Incorporated 2018–2021 Priorities," 2018, https://www.tunngavik.com/2019/09/27/niriuttaarijat-nunavut-tunngavik-incorporated-2018-2021-priorities/

The report focuses on 18 priority areas of infrastructure across three categories—energy and environment (such as power, wastewater, and solid waste); people and communities (such as health, education, and community justice); and connections (such as ports and harbours, roads and air). In many cases, the comparisons are jarring. These sectoral analyses are supplemented with information on key "cross-cutting factors" that impact all infrastructure, such as the availability and capacity of skilled workers, or the degree to which infrastructure is accessible to Nunavut residents with disabilities, or readiness for climate change adaptation.

Comparing the quality and quantity of infrastructure in the territory to what is available in other parts of the country is not a simple exercise. Data are often lacking, for two main reasons. First, Canada has no central hub of infrastructure information and data; a particular weakness is with regard to state-of-repair data. Some data are available through Statistics Canada or sector-based repositories, but much needs to be pieced together manually. Second, Nunavut is often overlooked in national data for a variety of reasons, including the small size of the territorial population or special circumstances regarding the North more generally.

This was not an exercise in comparing apples to apples. Infrastructure in the Arctic is often different from that in the South because of the Arctic climate, which makes construction and maintenance more expensive. Nunavut's remoteness also makes it logistically more difficult to access supplies on a timely basis. And Nunavut's remoteness and small market means that the private sector, which plays a significant role in infrastructure development in southern Canada, is most evident by its absence.

This project also focuses on the distinct circumstances of Inuit life in Nunavut and the degree to which infrastructure can support and strengthen this distinctiveness. As an obvious example, food prices are much higher than elsewhere in Canada. More particularly, Inuit culture and lifestyle places a high value on hunting, trapping, and fishing "country food" and sharing the harvest among all members of the community. More work is necessary to strengthen and support the harvesting economy. This requires publicly held facilities, such as community freezers available to all as well as heated facilities where harvesters can repair their harvesting equipment. Food sovereignty forms a separate section in the report but, more generally, Inuit Qaujimajatuqangit, or Inuit societal values, are reflected in other sections, too.

Finally, this project reflects the regional realities of the territory and the distance between individual communities. Nunavut is divided into three administrative regions (Qikiqtaaluk, Kivalliq, and Kitikmeot). Each has its own Regional Inuit Association which works in coordination with NTI to reflect the interests of all Nunavut Inuit.

Nunavut's 25 communities are widely dispersed. There are no roads between them; air is the usual means of travel. This means that communities cannot share infrastructure in the way that nearby towns in southern Canada might share, say, an arena or a pool. Nunavut infrastructure must be self-sufficient, community by community.

Simply put, this report highlights a Canadian unfairness; the differences in lived experience between the people of Nunavut and that of other Canadians because of a striking inequality of access to the kinds of modern infrastructure taken for granted in much of the country.

About the report

The research for the report was completed between fall 2019 and spring 2020 and included data analysis, research interviews, circumpolar case studies, and a literature review. Research interviews were conducted on a background basis to allow current officials (including Government of Nunavut employees) to speak freely.

The main approach in this report to measuring the infrastructure gap is to compare the state of infrastructure in Nunavut with that of other provinces and territories and with the Canadian average. For each of the 18 infrastructure priority areas identified based on Inuit priorities and availability of data, anywhere from one to four indicators are used. These indicators include direct measurements of the state of infrastructure (e.g., how many homes are in need of repair) and measurements of impact (e.g., educational outcomes).

The first section of the report puts the **infrastructure gap in context**, to understand how the gap emerged, why it persists, and the imperative to close it.

The second provides a **measurement of the infrastructure gap**. The 18 infrastructure priority areas are divided into three categories: infrastructure for energy and environmental services; infrastructure that serves people and communities; and infrastructure that connects people, businesses, and institutions. Along with analysis for each indicator, this section synthesizes what these measurements reflected about each area and highlights the impact of the gap on the lives of Nunavut Inuit.

The third highlights **six cross-cutting factors** that relate to a range of infrastructure areas, such as the accessibility of public-facing infrastructure, state of repair, and readiness for climate change adaptation.

A full list of indicators and data sources and an overview of methods can be found in the Appendix.

This report was prepared on behalf of Nunavut Tunngavik Inc. by a team consisting of Drew Fagan, a professor at the Munk School of Global Affairs and Public Policy at the University of Toronto, and a team from Springboard Policy including Noah Zon, Michael Pelz, Jasmine Irwin, Jamie Van Ymeren, and Adrienne Lipsey.

The project team is grateful for the advice of an external advisory panel: Madeleine Redfern (President of Ajungi Group), Lori Kimball (Associate Vice-President, University of Guelph and former Deputy Minister of Community and Government Services, Government of Nunavut) and Jessica Shadian (President and CEO, Arctic360 and Distinguished Senior Fellow, Bill Graham Centre for Contemporary International History). Advice from the Kitikmeot Inuit Association, Qikiqtani Inuit Association, and Kivalliq Inuit Association was also appreciated and strengthened analysis in this report.

In addition, this project benefited from the input of officials from the Government of Nunavut and the Nunavut Association of Municipalities, who provided input in background interviews.

THE INFRASTRUCTURE GAP IN CONTEXT

Supporting Inuit aspirations

The *Nunavut Agreement* is built around secure self-determination for Inuit over economic, social, and cultural development. However, the new territory began with a significant infrastructure gap that has impeded the achievement of that goal. This gap persists today.

Closing the infrastructure gap has been identified by Inuit organizations as a priority that is integral to other objectives. The board of NTI committed in its 2018–21 priorities "to work with the Governments of Canada and Nunavut to make substantial progress in narrowing housing and other infrastructure gaps in Nunavut, and raising infrastructure standards in Nunavut up to national levels."[79] Inuit Tapiriit Kanatami has identified eliminating the infrastructure deficit as a core priority for Inuit Nunangat more broadly.[80] Closing the infrastructure gap is also one of the shared priorities of the Inuit-Crown Partnership Committee.[81]

The infrastructure gap is a barrier to Inuit social and cultural well-being and the strengthening of Inuit Qaujimajatuqangit. The lack of museum and cultural infrastructure in Nunavut means that essential collections of Inuit heritage are kept in the South for lack of space in Nunavut to house and display them.[82] A lack of space to store or prepare country food undermines food sovereignty. And many communities lack adequate spaces for the intergenerational transfer of cultural knowledge or for hosting community feasts.[83]

The infrastructure gap that stands in the way of fulfilling the *Nunavut Agreement* is in many ways a legacy of the past. As Qikiqtani Inuit Association (QIA) President P.J. Akeeagok stated at the announcement of the Tallurutiup Imanga and Tavaujuittuq marine protected areas: at the same time that the federal government worked to connect the country with infrastructure like the Trans-Canada Highway, Inuit families were forcibly relocated to communities and left behind from this investment.[84] Among the damages inflicted on Inuit by the colonial approach of the Crown, Inuit were forced into new homes where the minimal infrastructure was often of poor quality and mismatched to Inuit needs and culture.

Ensuring Inuit participation and leadership, in alignment with the principles of the *Nunavut Agreement*, is necessary to ensure the success of any investment to improve Nunavut Inuit well-being. In the past, decisions by governments and private industries about infrastructure served to erode the cultural infrastructure of Inuit life, leaving legacy implications that shape Nunavut today. Infrastructure and industry investments have shaped how and where Inuit live, rather than the other way around.

79 Nunavut Tunngavik Inc. "Niriuttaarijat – Nunavut Tunngavik Incorporated 2018–2021 Priorities,"
80 Inuit Tapiriit Kanatami, "Arctic and Northern Policy Framework: Inuit Nunangat," 2019, https://www.itk.ca/wp-content/uploads/2019/09/20190907-arctic-and-northern-policy-framework-inuit-nunangat-final-en.pdf.
81 Inuit Tapiriit Kanatami, "Inuit-Crown Partnership Committee Continues Progress on Shared Priorities—Inuit Tapiriit Kanatami," 2020, https://www.itk.ca/inuit-crown-partnership-committee-continues-progress-on-shared-priorities/
82 Research interview, 2020. Note that all research interviews for this project were conducted on a background basis and are cited anonymously.
83 Research interview, 2020.
84 Michele LeTourneau, "Inuit impact and benefit agreement signed for North Baffin: Millions in infrastructure over seven years announced," Nunavut News, August 1, 2019, https://nunavutnews.com/nunavut-news/inuit-impact-and-benefit-agreement-signed-millions-in-infrastructure-over-seven-years-announced/

According to the Qikiqtani Truth Commission, many communities in that region were chosen as administrative hubs by RCMP, missionaries, and trading companies, rather than by Inuit themselves.[85] The disruption and trauma of colonial imposition on Inuit mirrors, in some ways, patterns that harmed Indigenous populations across Canada: forced relocations, mandatory residential school education, a purposeful dismantling of Inuit ways of life. However, in the case of many Inuit, these processes were accelerated, intensified, and most of all, *recent*. Some Inuit transitioned to permanent settlements only in the mid-20th century, an upheaval within the lived memory of Elders today.

INFRASTRUCTURE GAPS AND COVID-19

Efforts to prevent the spread of COVID-19 into Nunavut have brought to the forefront some of the key challenges of infrastructure in the territory. In some ways, the crisis has given all Canadians some experience of the infrastructure pressures Nunavut Inuit experience on a regular basis.[86] But the COVID-19 crisis has also widened the existing infrastructure gap by placing acute pressures on Nunavut residents in certain areas of response.

The limits of trucked water have sparked emergency investments by NTI in increased water service—but this increase must still be paired with guidance on preserving water while promoting handwashing.[87] Preventative measures such as working and schooling from home put in place by other jurisdictions are impossible in Nunavut with its broadband infrastructure and service limitations.[88] The overcrowded living conditions caused by housing shortages increase the risk of COVID-19 transmission and place Nunavut Inuit at greater risk if infected, given high TB rates driven by the same challenges.[89] And the limited health care infrastructure—a single hospital and only seven ventilators for the whole territory at the outset of the crisis—provide a limited toolkit to respond.[90]

The isolation measures combined with the short construction season may also compound the infrastructure gap. The Government of Nunavut has funded additional costs to quarantine Southern workers for two weeks before entering the territory, and the effects have slowed the $600 million in capital projects scheduled for summer 2020, including a 34 percent reduction in the number of public housing units to be built in Iqaluit this year.[91]

85 Qikiqtani Inuit Association, Qikiqtani Truth Commission Final Report: Achieving Saimaqatigiingniq, 2013, https://www.qtcommission.ca/sites/default/files/public/thematic_reports/thematic_reports_english_final_report.pdf.
86 Jessica Shadian, "COVID-19 has given most Canadians a taste of what Northerners face on a daily basis," National Post, 2020, https://nationalpost.com/opinion/jessica-shadian-covid-19-has-given-most-canadians-a-taste-of-what-northerners-face-on-a-daily-basis.
87 Nunavut Tunngavik Inc., "Immediate investment towards handwashing made by NTI," 2020, https://www.tunngavik.com/news/immediate-investment-towards-handwashing-made-by-nti/Nunavut Tunngavik Incorporated, "Wash your hands and home while conserving water," 2020, https://www.tunngavik.com/news/wash-your-hands-and-home-while-conserving-water/
88 Jessica Penney and Patricia Johnston-Castle, "COVID-19 and Inuit Nunangat: Research, Responsibility & Infrastructure Inequality – Yellowhead Institute," Yellowhead Institute, 2020, https://yellowheadinstitute.org/2020/03/31/covid-19-and-inuit-nunangat-research-responsibility-infrastructure-inequality/
89 Penney and Johnston-Castle, "COVID-19 and Inuit Nunangat."
90 Derek Neary, "Is Nunavut's health department ready for a COVID-19 outbreak?" Nunavut News, April 15, 2020, https://nnsl.com/nunavut-news/is-nunavuts-health-department-ready-for-a-covid-19-outbreak/ Additional portable ventilators were purchased by the Department of Health in response to the pandemic.
91 Beth Brown, "Nunavut extends public health emergency until June 11," CBC News, 2020, https://www.cbc.ca/news/canada/north/nunavut-update-covid-19-may-28-1.5588095.; Rajnesh Sharma, "Construction of Public Housing Units Reduced by 24 amid Covid-19 - Nunavut News," Nunavut News, July 23, 2020, https://nunavutnews.com/nunavut-news/construction-of-public-housing-units-reduced-by-24-amid-covid-19/.

Connecting to other policy priorities

Beyond the direct emphasis of the Inuit-Crown Partnership Committee, a number of other public policy frameworks from the federal government include commitments to closing the infrastructure gap. At a broad level, the Arctic and Northern Policy Framework released in 2019 commits the federal government to "close the gaps that exist between this region, particularly in relation to its Indigenous peoples, and the rest of the country."[92] Commitments to close the gap also feature in policy commitments specific to certain priority areas including:

- to connect all Canadians to high-speed Internet by 2030[93];
- to eliminate reliance on diesel fuel for all Indigenous communities by 2030[94];
- to close the housing gap between Inuit Nunangat and the rest of Canada.[95]

Other initiatives, like the Oceans Protection Plan, include significant investment commitments related to the infrastructure gap, even if they do not name it explicitly.

The infrastructure gap is also closely tied to reconciliation and the renewal of Inuit-Crown relationships. It is no coincidence that the significant infrastructure gap experienced in Nunavut is in Canada's only Indigenous-majority province or territory—and the one with the least local control over its own affairs. The disproportionate socio-economic and cultural inequity facing Inuit that is at the core of the shared priorities in the Inuit Nunangat declaration on Inuit-Crown partnership cannot be addressed without closing the infrastructure gap.[96]

It is no coincidence that the infrastructure gap experienced in Nunavut is in Canada's only Indigenous-majority province or territory - and the one with the least local control over its own affairs.

Economic context

The infrastructure gap significantly limits Nunavut's economy today and threatens its future. The Canadian Arctic as a whole makes up one-quarter of the area of the global circumpolar region but less than 2 percent of its economy.[97] The underbuilt connective infrastructure—from ports and harbours to broadband—mean a lack of access to opportunities and markets. Limited infrastructure to serve people's health and community needs makes it difficult to create the conditions to thrive.

92 Government of Canada, "Canada's Arctic and Northern Policy Framework."
93 Government of Canada, "High-Speed Internet for All of Canada," 2020, https://www.ic.gc.ca/eic/site/139.nsf/eng/home.
94 Rajnesh Sharma, "Trudeau promises to eliminate diesel during Iqaluit visit," Nunavut News, 2019, https://nunavutnews.com/nunavut-news/trudeau-promises-to-eliminate-diesel-during-iqaluit-visit/
95 Inuit Tapiriit Kanatami and Government of Canada, Inuit Nunangat Housing Strategy, 2019, https://www.itk.ca/wp-content/uploads/2019/04/2019-Inuit-Nunangat-Housing-Strategy-English.pdf.
96 Canada et al., "Inuit Nunangat Declaration on Inuit-Crown Partnership," 2017, https://pm.gc.ca/en/news/statements/2017/02/09/inuit-nunangat-declaration-inuit-crown-partnership.
97 Senate of Canada, "Northern Lights: A Wake-up Call for the Future of Canada," 2019, https://sencanada.ca/en/info-page/parl-42-1/arct-northern-lights/

The Qikiqtani Inuit Association has highlighted infrastructure as an "absolutely foundational element of economic development."[98] Underinvestment in infrastructure is linked to substantially lower economic growth[99] and studies of trade,[100] transportation,[101] and broadband[102] infrastructure underscore what is obvious to all living with the infrastructure gap—that substantial investments in infrastructure are needed for Nunavut's economy to thrive.

The impacts of the infrastructure shortage on the economy can be seen in a number of ways. Most of Nunavut's fisheries are processed offshore due to a lack of marine infrastructure. The proposed Grays Bay Road and Port Project represents an attempt to unlock significant mining potential that is currently inaccessible because of the infrastructure gap. Air travel, customs, and tourism infrastructure shortages limit the potential of the tourism economy. And the reliance on infrequent sealifts and limited broadband limit the possibilities to bring goods or services to market.

Demographic context

The economic context of the infrastructure gap in Nunavut also includes the territory's unique demographic profile. Nunavut has a young and fast-growing population. The Inuit population of Nunavut grew by more than 22 percent between 2006 and 2016; double the rate for the Canadian population as a whole.[103] Nunavut also has by far the youngest population—with nearly 32 percent of the population under the age of 14, double the Canadian average and far higher than any other province or territory.[104]

The Nunavut Inuit population grew by more than 22 percent between 2006 and 2016, double the rate of the Canadian population.

Taking into account this demographic context in closing the infrastructure gap is not only about building sufficient housing or municipal infrastructure to support a growing population. It is also about ensuring that young Nunavut Inuit have the infrastructure to support their economic aspirations within their community. For example, this could mean increased opportunities to pursue postsecondary education or training closer to home; today, most opportunities to pursue university or training on heavy machinery to work in mining require people to leave Nunavut. It also means having the cultural infrastructure (e.g., for country food processing) that allows the language, Inuit practices, and the harvesting economy to be passed on to younger generations.

98 Qikiqtani Inuit Association, "A New Approach to Economic Development in Nunavut," 2018, www.qia.ca.
99 David Stiff and Paul Smetanin, "Public Infrastructure Underinvestment: The Risk to Canada's Economic Growth," Canadian Centre for Economic Analysis, 2010, https://www.cancea.ca/cancea/reports/47/public-infrastructure-underinvestment-risk-canadas-economic-growth.
100 Canadian Chamber of Commerce and Canada West Foundation, "The Infrastructure That Matters Most: The Need for Investment in Canada's Trade Infrastructure," 2016, https://cwf.ca/research/publications/the-infrastructure-that-matters-most/
101 Minoo Farhadi, "Transport infrastructure and long-run economic growth in OECD countries," Transportation Research Part A: Policy and Practice 74 (April 1, 2015): 73–90, https://doi.org/10.1016/j.tra.2015.02.006.
102 Syed Muhammad Atif, James Endres, and James Macdonald, "Broadband infrastructure and economic growth: A panel data analysis of OECD countries," EconStor Preprints, October 24, 2012, https://www.econstor.eu/bitstream/10419/65419/1/Broad%20Infrastructure%20and%20Economic%20Growth.pdf
103 Inuit Tapiriit Kanatami, "Inuit Statistical Profile 2018," 2018, https://www.itk.ca/wp-content/uploads/2018/08/Inuit-Statistical-Profile.pdf.
104 Statistics Canada, "Canada's Population Estimates: Age and Sex, July 1, 2019," 2019, https://www150.statcan.gc.ca/n1/daily-quotidien/190930/dq190930a-eng.htm.

Fairness in the federation

The infrastructure gap that Nunavut faces is amplified by the context of Nunavut's place within the federation and the federal government's approach to funding for infrastructure. As Canada's newest and fastest-growing territory, Nunavut did not have an opportunity to benefit from the major waves of infrastructure investment in the 20th century. That era of significant national investment was marked by neglect and colonial approaches towards Nunavut that gave little attention to the economic interests or self-determination of Inuit. The period that included the signing of the *Nunavut Agreement* and the creation of the territory had the lowest levels of public infrastructure investment in modern Canadian history.[105]

As the least-devolved government in Canada, a significant share of the funding and policy decisions that shape infrastructure outcomes in Nunavut are made in Ottawa—more than for any other province or territory. In addition to undermining the principle of Inuit self-determination in Nunavut, the federal government's approach has often been inadequate or inappropriate for Nunavut.

In the period of increased federal infrastructure investment during the last 15 years, federal programs distribute funding through a combination of application-based programs and block funding to provinces and territories. In both cases, programs designed to balance the interests of Western, Eastern, and Central Canada often overlook the North.

- **Funding levels do not take into account the size of the infrastructure gap**
  The National Aboriginal Economic Development Board warned that many of the existing funding mechanisms for the North get overwhelmed by the magnitude of infrastructure deficits.[106] Local officials consulted for this project emphasized that urgent priorities are constantly in conflict for limited resources, and that repair needs often crowd out new infrastructure spending.[107] Funding levels also fail to take into account the higher cost of building and maintaining infrastructure in Nunavut—itself a product of the infrastructure gap.
- **Funding allocations do not reflect the reality of 25 geographically separate communities**
  Unlike in the South, where many types of infrastructure can be shared regionally, each community in Nunavut requires its own power plant, solid waste facility, drinking water plant, and community infrastructure. The "base" funding in federal infrastructure funding to provinces and territories is meant to offset the inadequacy of a "per-capita" approach for jurisdictions with small populations by providing a minimum amount regardless of population. However, the regional approach allows that base funding to go much farther in small provinces than in Nunavut, given its separate communities, large territory, and small population. The federal funding approaches do not take into account Nunavut's needs and realities.[108]

105 Chiara Cautillo, Noah Zon, and Matthew Mendelsohn, "Rebuilding Canada: A New Framework for Renewing Canada's Infrastructure," Mowat Centre, 2014, accessed August 4, 2020, https://munkschool.utoronto.ca/mowatcentre/wp-content/uploads/publications/92_rebuilding_canada.pdf
106 National Aboriginal Economic Development Board, "Study on Addressing the Infrastructure Needs of Northern Aboriginal Communities," 2014, http://www.naedb-cndea.com/reports/northern-infrastructure-report.pdf.
107 Research Interviews, 2020.
108 Jennifer Spence, "How to Get Northern Infrastructure on Track," 2018, https://www.cigionline.org/articles/how-get-northern-infrastructure-track.

- **Federal program administration is designed with the realities of larger provinces and communities in mind.** Federal infrastructure funding generally requires detailed applications and matching funding from provinces and territories (and in some cases, municipalities). While the requirements for matching funding are generally lower for the territories than for the provinces, they nonetheless represent a substantial challenge. Timelines often fail to account for short Arctic building seasons. Beyond funding, the requirements for detailed applications and process-laden reports can overburden communities and Government of Nunavut departments that face staffing challenges. There are also structural challenges, as the vast majority of federal infrastructure funding flows through the Government of Nunavut, leaving little opportunity for NTI, RIAs and municipalities to participate in funding decisions. This limits the extent that Inuit infrastructure priorities and regional needs shape investments.

Challenges in infrastructure delivery

Any discussion of the infrastructure gap between Nunavut and the rest of Canada needs to take into account the overarching challenges of infrastructure delivery and asset management in Nunavut. In addition to the bottlenecks that arise from the infrastructure gap itself (e.g., delays in accessing materials by sealift, siting near limited road infrastructure), other factors also make it more challenging to maintain existing infrastructure and to close the gap.

A critical local bottleneck is the human one—the people who design, assess, build, and operate infrastructure. The heavy reliance on fly-in labour, is costly, and limits the ability of Inuit to benefit from infrastructure investments.

Another contributor is the very limited private-sector role in infrastructure in Nunavut. Many publicly tendered construction projects have few bidders, as national firms forgo what they see as overly risky opportunities. A competitive private sector is also absent in many areas of typically *private* infrastructure, such as banking or broadband. These gaps put additional pressure on the public sector and make it harder to close the gap.

Infrastructure development in Nunavut must also contend with the fastest-changing climate on the planet. The effects of changing permafrost conditions, precipitation, and weather patterns create both engineering challenges and significant uncertainty which add costs and risks to infrastructure construction and maintenance.

Global context

Canada has made leadership and cooperation in the circumpolar Arctic a foreign policy priority. But Canada's underinvestment in infrastructure compared with its Arctic peers undermines Canada's strategic position in the region.[109] Military presence is important, but civil infrastructure, particularly with respect to the Arctic coast and waterways, is also of strategic importance. The infrastructure gap risks ceding influence over the Arctic to other countries and undermines Canada's Arctic priorities.

As part of the Arctic and Northern Policy Framework, Canada committed to reducing barriers to mobility across the Canada-Greenland boundary.[110] But with no active air routes connecting Nunavut and Kalaallit Nunaat (Greenland), limited port and harbour infrastructure, and sparse customs infrastructure, infrastructure barriers are at least as prominent as the policy barriers. As part of Canada's recent chairing of the Arctic Council, Canada sought to influence improved mental wellness in Arctic communities.[111] But with infrastructure and service gaps for mental health so prominent in Nunavut and the broader Canadian Arctic, Canada is not well-positioned to lead.

The infrastructure gap risks ceding influence over the Arctic to other countries and undermines Canada's Arctic priorities.

Closing the infrastructure gap is also essential to Canada's commitments to the UN Sustainable Development Goals. Many of the targets set by Canada link closely to the infrastructure gap—on housing, broadband access, renewable energy, drinking water, education, climate change, and food security.[112] In Canada's national strategy to meet these goals, the Government of Canada has committed to ensuring the agenda is consistent with reconciliation and takes into account the needs and distinct challenges faced by Inuit.[113]

109 Jessica Shadian, "Brief to the Standing Committee on Foreign Affairs and International Development Canada's Sovereignty in the Arctic," 2018, www.arctic360.org/brief-to-the-standing-committee.
110 "Arctic and Northern Policy Framework International Chapter," accessed June 7, 2020, https://www.rcaanc-cirnac.gc.ca/eng/1562867415721/1562867459588.
111 Arctic Council, "Arctic Council – Canada," accessed June 7, 2020, https://arctic-council.org/en/about/states/canada/
112 Government of Canada, "Towards Canada's 2030 Agenda National Strategy," accessed June 7, 2020, https://www.canada.ca/en/employment-social-development/programs/agenda-2030/national-strategy.html#h2.06.
113 Government of Canada, "Towards Canada's 2030 Agenda National Strategy."

CASE STUDY:

INFRASTRUCTURE IN IQALUIT, NUNAVUT & NUUK, KALAALLIT NUNAAT (GREENLAND)

Iqaluit and Nuuk are circumpolar capitals and the largest cities of Nunavut and Greenland, respectively. A comparison between them shows many common challenges in delivering infrastructure in northern climates and the potential for infrastructure that better serves Inuit in a comparable context. The cities each face a shortage of public housing and a lack of health care facilities for persons requiring specialized care.

However, in a number of areas, Nuuk residents can rely on better or more advanced infrastructure, including a larger deep-water port, a hydroelectric plant, more paved roads, and a greater range of cultural and education facilities. Not all of these differences can be explained by Nuuk's larger size, at about 10,000 more people than Iqaluit's 7,700, or its more moderate climate.

Some of the differences in infrastructure are related to different policy decisions taken by Nunavut and Greenland. In Greenland, infrastructure investment has typically been uneven, with the majority of recent investments occurring in Nuuk at the expense of smaller communities.[114] Migration from outlying communities to Nuuk has also been encouraged since the Second World War, with some smaller communities deemed too expensive to maintain, and later abandoned, including Kangeq and Qoornoq.[115] This means that while infrastructure in Nuuk is generally of higher quality than Iqaluit, investment in Nunavut is more balanced between communities.

Culture, recreation, and food sovereignty

Residents of Nuuk benefit from a larger number of cultural and recreational facilities compared with Iqaluit residents. The Katuaq Cultural Centre, which opened in 2009, is a large multi-use space for exhibitions and conferences, and includes a movie theatre and café. Iqaluit lacks a cultural venue of similar size, as the Nunatta Museum is much smaller. This means a significant portion of Nunavut's art collection has to be displayed in museums in Southern Canada.[116] Iqaluit also lacks a performing arts centre, which is found in Nuuk.

Nuuk's access to year-round community supply means the city is less vulnerable to food insecurity. In Iqaluit, many non-perishable foods can be brought up only during summer sealifts, leading residents to turn to Amazon for faster and, in some cases, more affordable access to non-perishable goods.[117] Both cities have several

114 Anthony J Dzik, "Nuuk, Greenland: Site, situation, and 'The Law of the Primate City,'" The Northern Review 48 (2018): 3–32, https://doi.org/10.22584/nr48.2018.001.

115 Dzik, "Nuuk, Greenland."
116 Research interviews, 2020.
117 Thomas Rohner, "Why people in Canada's remote Arctic capital are obsessed with Amazon Prime," The Guardian, December 13, 2019, https://www.theguardian.com/world/2019/dec/13/canada-iqaluit-amazon-prime.

grocery stores, as well at least one country food market. However, Nuuk is distinct in having a grocery store within a larger indoor shopping complex, providing greater access to a range of goods in one location to residents.[118]

Education and health

Nuuk has more postsecondary education infrastructure than Iqaluit, allowing residents more program options in their community. The University of Greenland is based in Nuuk, and in 2019 had slightly more than 200 students enrolled in its undergraduate and graduate courses.[119] The Ilimmarfik campus, where the University is based, includes the national research library and the national archive, as well as conference facilities available to researchers and the public.[120]

There are two other postsecondary facilities in the city, including the Greenland Institute of Natural Resources, which offers science-based education in conjunction with the University of Manitoba and Aarhus University in Denmark.[121] The College of Social Education is also based in Nuuk.[122] In Iqaluit, there is only one postsecondary facility, the Nunavut Arctic College.[123] The Government of Nunavut conducted a feasibility study for an Inuit-led university in Iqaluit in 2016.[124]

Nunavut Arctic College has partnered with Memorial University in Newfoundland and Labrador to offer degree programs in law, nursing, and teachers' education.[125]

Both Iqaluit and Nuuk serve as major centres for health care; however, Nuuk's Queen Ingrid's Hospital, at 185 beds, is proportionally larger than the Qikiqtani General Hospital in Iqaluit. Both cities have experienced difficulty recruiting doctors and nurses, which can affect the quality of patient treatment.[126] Limited local resources also means that patients requiring specialized care, such as for cancer treatment, are required to travel to Denmark in the case of Nuuk, or southern Canada for Iqaluit residents.

Housing

Iqaluit and Nuuk each face housing shortages and affordability challenges. In Iqaluit, more than 60 percent of the population cannot afford market-based rentals or homeownership.[127] Demands on public housing have led to a shortfall in public housing stock of about 35 percent, and contribute to severe overcrowding.[128]

In Nuuk, a lack of affordable housing combined with migration to the city from other Greenland communities has contributed to a waiting list

118 Nuuk Center, "Home – Nuuk Center," accessed June 12, 2020, https://nuukcenter.gl/.
119 Ilisimatusarfik, "Enrolled Students," accessed June 12, 2020, https://uk.uni.gl/about-us/in-numbers/enrolled-students.aspx.
120 Ilisimatusarfik, "Campus Ilimmarfik," accessed June 12, 2020, https://uk.uni.gl/about-us/campus-ilimmarfik.aspx.
121 See UArctic, "UArctic Education – Greenland Institute of Natural Resources," 2020, https://education.uarctic.org/universities/greenland/23857/greenland-institute-of-natural-resources.
122 Social Pædagogisk Seminarium, "Social Pædagogisk Seminarium," accessed June 12, 2020, http://pi.sps.gl/
123 Nunavut Arctic College, "Programs," accessed June 12, 2020, https://arcticcollege.ca/programs.
124 Government of Nunavut, "University Feasibility Study," accessed July 20, 2020, https://gov.nu.ca/information/university-feasibility-study.
125 UArctic, "Nunavut Arctic College selects Memorial University as partner," 2018, https://www.uarctic.org/news/2018/10/nunavut-arctic-college-selects-memorial-university-as-partner/.
126 Birger Aaen-Larsen, "Health care in the circumpolar world: Greenland," International Journal of Circumpolar Health 63 Suppl 2 (2004): 49–53, https://doi.org/10.3402/ijch.v63i0.17785.
127 Canada Mortgage and Housing Corporation, "Housing Market Outlook – Northern Housing," 2019, https://assets.cmhc-schl.gc.ca/sf/project/cmhc/pubsandreports/housing-market-outlook-highlights/northern-housing/housing-market-outlook-northern-65446-2019-en.pdf?rev=e6d5a540-8893-463d-8938-0837a8a99a54.
128 Canada Mortgage and Housing Corporation, "Housing Market Outlook – Northern Housing."

for housing of up to 15 years.[129] Nuuk's private market is described as "both expensive and in short supply," however, the average rent of $1,360 CAD for a 900 sq. ft. apartment is more affordable than for those looking for homes on the private market in Iqaluit.[130] By comparison, a 528 sq. ft. apartment in Iqaluit rents for approximately $2,510 CAD.[131]

Ports

Nuuk's deep-water port has served for many years as an important infrastructure asset, supporting year-round community resupply, exports, and tourism. The port is Greenland's largest, and is particularly important for fisheries, which account for more than 90 percent of Greenland's total exports.[132] The port also supports tourism, with more than 18,000 visitors passing through the port on cruise ships in 2019.[133] The ocean surrounding Nuuk and Southwest Greenland is ice-free year round, making it easier for vessels to access Nuuk any time of the year.[134]

In contrast, Iqaluit has significant marine limitations. The absence of a deep-water port means that large ocean-going vessels used for

community resupply cannot dock directly, and must rely on smaller vessels to transfer goods to land. At present, this activity can occur only at high tide and during daylight hours.[135] The absence of a deep-water port also makes it harder for local fishers to export goods, or for visiting cruise ships to disembark passengers.

Both cities have recently embarked on major port projects. In Iqaluit, an approximately $85-million CAD deep-water port is currently under construction, and will significantly expand possibilities, including 24-hour all-tide access for ships to dock.[136] The new Iqaluit port will still be smaller than the Nuuk's port, and lacks features found in Nuuk, such as a container terminal and the ability to dock multiple ships at a time.[137] The port in Nuuk was also recently expanded as part of a $82-million CAD project, which included construction of the container terminal.[138]

Roads

Nuuk has more advanced road infrastructure than Iqaluit, with particular benefits for pedestrians. As of 2007, there were about 110 km of paved roads and two traffic lights in Nuuk, with sidewalks present along many

129 Julia Christensen et al., "Homelessness across Alaska, the Canadian North and Greenland: A review of the literature on a developing social phenomenon in the circumpolar north," Arctic 70, 4 (2017): 349, https://www.researchgate.net/publication/321495294_Homelessness_across_Alaska_the_Canadian_North_and_Greenland_A_Review_of_the_Literature_on_a_Developing_Social_Phenomenon_in_the_Circumpolar_North.
130 Christensen et al. "Homelessness across Alaska, the Canadian North and Greenland"; data on Nuuk housing costs from Expatistan, https://www.expatistan.com/price/rent-normal-area/nuuk-greenland.
131 "Astro Hill 6-Storey," accessed July 17, 2020, https://www.astrohill.ca/find-a-home?&types=mid-rise-apartment.
132 Kevin McGwin, "New Nuuk port facility open for business," High North News, September 27, 2017, https://www.highnorthnews.com/en/new-nuuk-port-facility-open-business; Statistics Greenland, Greenland in Figures, 2019, www.stat.gl.
133 Statistics Greenland, "Number of Cruise Passengers for Each Harbour," 2019, http://bank.stat.gl/pxweb/en/Greenland/Greenland__TU__TU10/TUXKRH.px/?rxid=TUXKRP06-05-2020 16:35:40.
134 Arne Villumsen et al., "Road construction in Greenland: The Greenlandic case," 2007, http://www.roadex.org/wp-content/uploads/2014/01/The-Greenlandic-Case-RIII.pdf.

135 Nunavut Impact Review Board, "Iqaluit Marine Infrastructure – Deep Sea Port," accessed June 6, 2020, https://www.nirb.ca/project/125103.
136 Nunavut Impact Review Board, "Iqaluit Marine Infrastructure"; IPolitics, "Ottawa announces $64M for deepwater port in Iqaluit," 2015, https://ipolitics.ca/2015/07/30/ottawa-announces-64m-for-deepwater-port-in-iqaluit/
137 Sikuki Nuuk Harbour A/S, "Port of Nuuk," accessed June 12, 2020, https://www.sikuki.dk/the-port/port-of-nuuk/
138 Kevin McGwin, "New Nuuk port facility open for business."

major roads.[139] By contrast, Iqaluit has a large number of unpaved roads, and no traffic lights or sidewalks. The absence of sidewalks puts pedestrians at risk and increases the health risk from dust.

Residents of Nuuk also have access to a public transit network, with 40 buses serving five routes, including an airport connection.[140] Local bus services in Iqaluit last operated in 2004.[141] Neither city's road network connects with other communities.

A more moderate climate makes it easier and less costly to maintain a road network in Nuuk than in Iqaluit. Winters are warmer in the Nuuk, with average January lows of about -10°C, compared with -29°C in Iqaluit, a level that is less damaging to roads.

Air

Iqaluit is better served by air infrastructure than Nuuk. Nunavut's capital recently expanded its airport with a larger terminal and repaved runway built with techniques to mitigate the impacts of melting permafrost.[142] The runway length of more than 8,000 feet means the airport can accommodate wide-body aircraft travelling from Southern Canada, as well as to international destinations.

In contrast, Nuuk's current airport has a short runway, of slightly more than 3,000 feet. This means the airport can only handle small planes travelling limited distances within Greenland and to Iceland. Residents of Nuuk wanting to travel to Denmark, North America, or other parts of Europe must change planes. In 2018, more than 90 percent of air travellers leaving Nuuk flew to Kangerlussuaq, the only airport in Greenland with a sufficiently long runway for large planes and longer flights.[143]

The runway in Nuuk is currently being extended to make it possible for international flights to land.

Solid waste and wastewater

Iqaluit has a wastewater treatment plant; in Nuuk, wastewater is discharged into the ocean untreated.[144] However, Iqaluit's wastewater treatment plant is aging, and experienced a major breakdown for more than a month in spring 2019, leading to the release of more than 30 million litres of untreated sewage into Frobisher Bay.[145] The plant is currently being upgraded, including the addition of a secondary treatment facility, and is expected to be online by winter 2021.[146]

In Nuuk, solid waste is incinerated, with some of the heat generated from waste incineration used to fuel the district heating system used within the city.[147] In contrast, Iqaluit relies on an aging landfill for solid waste disposal. The facility first opened in 1995 and was meant to last only five years; however, a new facility is not expected to be ready until 2023.[148] A fire that lasted more than four months at the facility in 2014 exposed residents to many harmful pollutants, and earned the name "Dumpcano."[149]

139 Nunatsiaq News, "Greenland capital boasts deep-water port, hydro-electric dam and much more," 2007, https://nunatsiaq.com/stories/article/Greenland_capital_boasts_deep-water_port_hydro-electric_dam_and_much_more/
140 Villumsen et al., "Road construction in Greenland," p. 18. For details on Nuuk Transit, "Timetable—Nuup Bussii A/S," accessed June 15, 2020, http://bus.gl/en/timetable/ Statistics Greenland, Greenland in Figures. Pg 20
141 CBC News, "Iqaluit cuts $17-a-ride bus service," 2004, https://www.cbc.ca/news/canada/iqaluit-cuts-17-a-ride-bus-service-1.497261.
142 See Air chapter.
143 Statistics Greenland, "Tourism Statistics Report 2018, Capital Region," accessed June 12, 2020, http://www.tourismstat.gl/ Slide 2
144 Journal of the Northern Territories Water and Waste Association, "Greenland Infrastructure," 2017, http://ntwwa.com/wp-content/uploads/2020/05/Journal_2017_Web.pdf
145 See Wastewater chapter.
146 City of Iqaluit, "City Awards Contract to Upgrade Wastewater Treatment Plant," 2018.
147 Journal of the Northern Territories Water and Waste Association, "Greenland Infrastructure."p. 9.
148 Chris Purdy, "Iqaluit's long-smouldering 'Dumpcano' garbage fire finally out," The Globe and Mail, September 16, 2014, https://www.theglobeandmail.com/news/national/iqaluits-long-smouldering-dumpcano-garbage-fire-finally-out/article20620273/
149 Jackie McKay, "New Iqaluit dump 2 years behind schedule," CBC News, February 25, 2020, https://www.cbc.ca/news/canada/north/iqaluit-new-landfill-dump-1.5474478.

Power

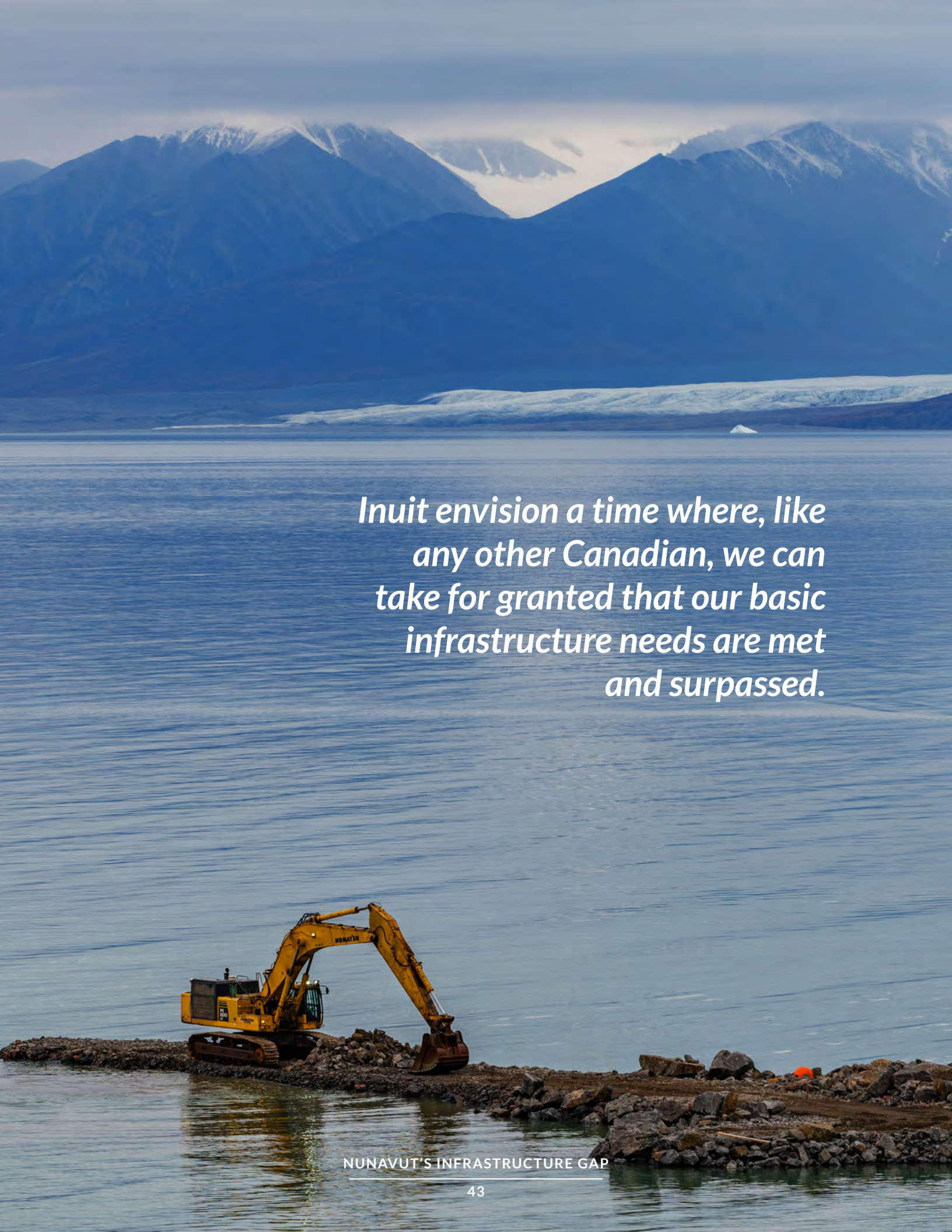
Historically, electricity in Nuuk was provided by fossil-fuel power generation. In 1993, Greenland's first hydroelectric plant opened in Nuuk. A third turbine was added to the facility in 2008, which raised maximum output to 45 megawatts[150] The facility in Nuuk is one of five hydroelectric plants in Greenland.

Iqaluit is powered by a recently expanded diesel power plant with a maximum generating capacity of 13.6 megawatts.[151] The reliance on diesel power means the government of Nunavut must import significant quantities of diesel fuel. There are some modest local initiatives to use renewable energy, such as using thermal energy produced by the plant to power the Iqaluit Aquatic Centre. The federal government has also committed to working with Indigenous communities, including Iqaluit, to transition from diesel power to renewable energy by 2030.[152]

150 Government of Greenland, "Existing Hydroelectric Power Plants in Greenland," accessed June 12, 2020, https://www.businessingreenland.gl/en/Erhverv/Vandkraft/Eksisterende-vandkraftvaerker; Canada Energy Regulator, "Canada Energy Regulator, Provincial and Territorial Energy Profiles," accessed June 4, 2020, https://www.cer-rec.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/index-eng.html.

151 Qulliq Energy Corporation, "Corporate Documents," accessed June 4, 2020, https://www.qec.nu.ca/about/corporate-documents. Quilliq Energy Corporation, 2018-2019 Annual Report, p. 14; Qulliq Energy Corporation, "Project Brief: Iqaluit Bulk Fuel Storage Farm Upgrade," 2017, https://www.nirb.ca/portal/dms/script/dms_download.php?fileid=315218&applicationid=125250&sessionid=9p7fvf4ukau3e1ihc0n4mu6vi6.

152 See for example Prime Minister of Canada, "Minister of Natural Resources Mandate Letter," 2019, https://pm.gc.ca/en/mandate-letters/2019/12/13/minister-natural-resources-mandate-letter.



Inuit envision a time where, like any other Canadian, we can take for granted that our basic infrastructure needs are met and surpassed.

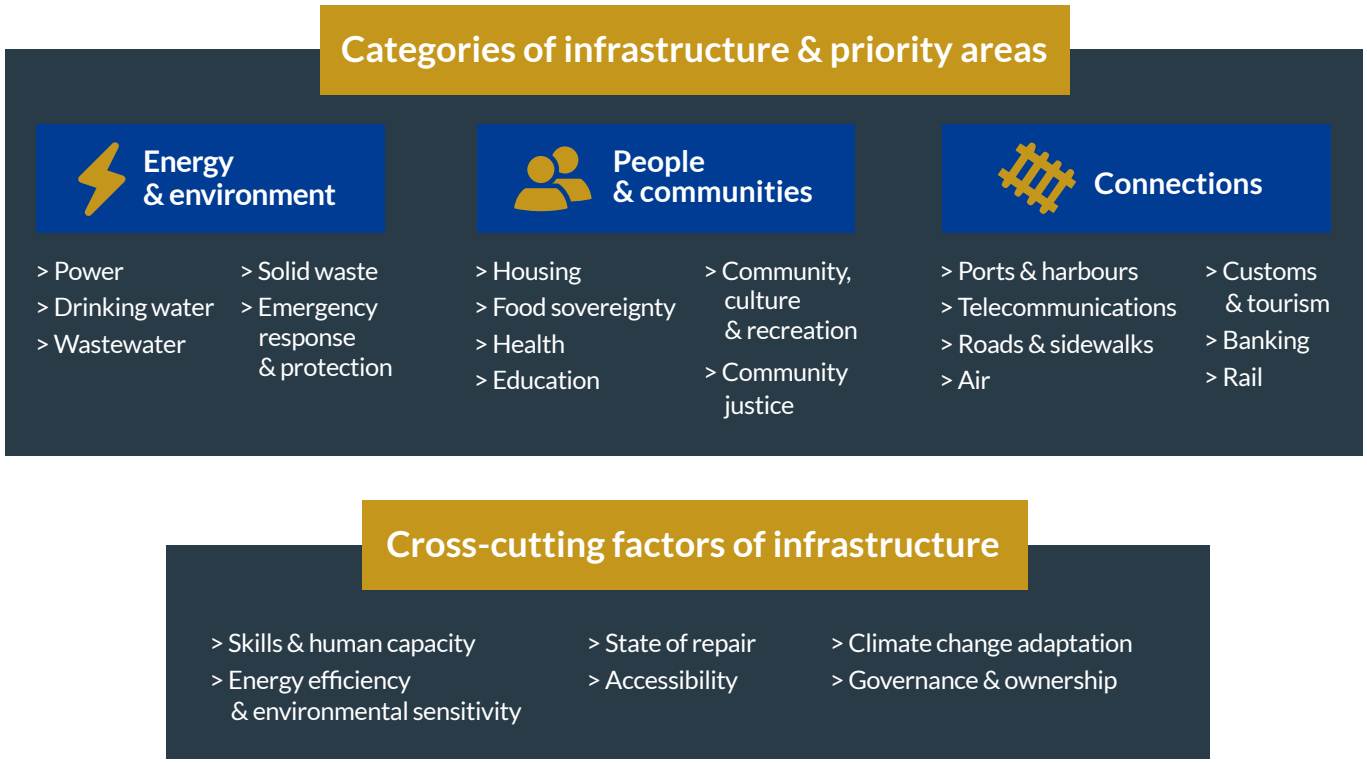
MEASURING NUNAVUT'S INFRASTRUCTURE GAP

The infrastructure gap between Nunavut and the rest of Canada has been acknowledged repeatedly by the Government of Canada. Closing the gap has been the focus of numerous policy commitments in the Inuit-Crown relationship, Canada's Arctic and Northern Policy Framework, and in national strategies for various policy areas. Yet in most cases, this gap has not been defined or measured, a critical step in building plans to close the gap.

The focus of this report is on measuring Nunavut's infrastructure gap using 55 indicators in 18 areas that compare Nunavut with experiences elsewhere in Canada. There is no consistent set of standards for the "appropriate" quantity or type of infrastructure to serve a community. Instead, the research focused on indicators where the infrastructure gap can be quantified and compared with the rest of Canada. Indicators and research approaches were reviewed by an advisory panel and subject matter experts.

This part of the report measures the size of the gap and identifies its impact on Inuit self-determination, Nunavut's economic development, and quality of life for Nunavut Inuit. Together, these indicators paint a stark picture. Nunavut Inuit are faced with overcrowded housing at seven times the Canadian average and more than three times the rate of the next highest province or territory. The fastest broadband Internet speed available in the territory is eight times slower than the Canadian average.

The 18 infrastructure areas are divided into three categories: energy and environment; people and communities; and connections. Each section uses from one to four indicators to measure the gap, and places that gap in context in the state of infrastructure in Nunavut, regional variations, and the impact of those indicators.



Some indicators are *physical* infrastructure indicators—they measure the length of pipes or number of buildings available or their physical condition. Others are *impact* indicators—they capture the *outcomes* of the infrastructure shortages, such as long waiting lists for public housing. While the impact of the infrastructure gap is felt across all aspects of life for Nunavut Inuit, this report focuses on areas where the impact is clearly linked to infrastructure and where comparable data are available.

There are limits, of course, to comparisons with the South. An infrastructure standard in southern communities (e.g., piped water or paved runways) may be difficult to apply in the Arctic. The context of Inuit priorities, isolated communities, climate, and other factors often make for different optimal choices in Nunavut. Measuring the gap with a Canada-wide baseline does not mean applying solutions designed in the South.

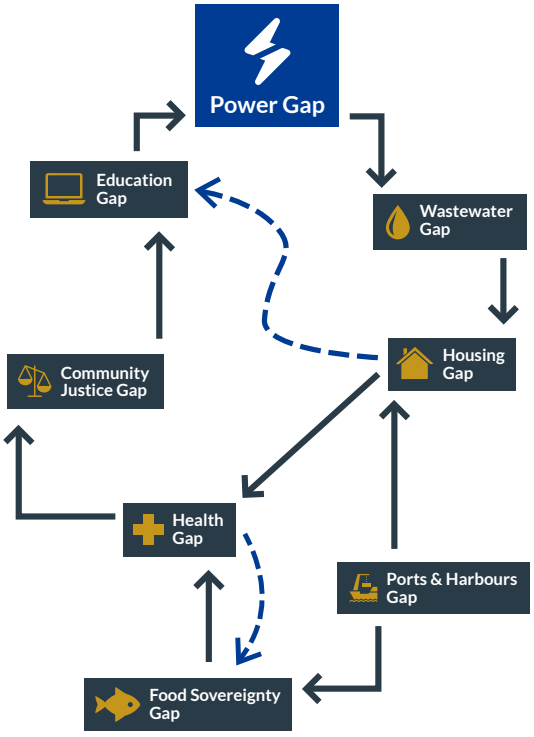
Simple comparisons with Canada can overlook the importance of unique types of infrastructure or approaches to infrastructure for Nunavut Inuit. Having a community hall large enough to support a community feast is fundamental to Inuit needs, allowing for knowledge transfer from Elders and strengthening Inuit knowledge and culture. Small craft harbours and multi-use facilities are key to supporting a robust harvesting economy.

Key themes

Individual indicators do not tell the whole story. The indicators are "snapshots" tied to available data that do not capture their interconnectedness. Conditions in each area of infrastructure intersect with one another and make it harder to close the gap.

Compounding challenges

The infrastructure gaps that Nunavut Inuit live with reinforce one another, amplifying the impact of each gap in a combined experience. The graphic below is an illustrative example of how infrastructure gaps have compounding and even cyclical effects, creating an infrastructure "trap" that makes it harder to close the gap and makes life more challenging for Nunavut Inuit.



Nunavut's true infrastructure deficit cannot be measured or fully addressed as an aggregate of isolated deficits: the system-level impacts are greater than the sum of each area. These gaps also make it harder to build and maintain new infrastructure to close the gap. For example:

- Housing shortages are a major barrier both to hiring housing workers in construction and expanding services (e.g., instructors for postsecondary education and training facilities).
- A 2015 fire at Pangnirtung's power plant required leasing special heavy-lift helicopters to deliver replacement equipment, increasing costs and extending repair times by weeks.[153]

153 Nunatsiaq News, "Permanent power solution for Pangnirtung on its way: Nunavut Government," April 2015, https://nunatsiaq.com/stories/article/65674permanent_power_solution_for_pangnirtung_on_its_way_nunavut_government/

Inadequate drainage management can cause flooding and erosion, thereby increasing maintenance costs and shortening the life of assets.

The high rate of fire damage from insufficient emergency protection and response infrastructure and limited supplies of water mean that the public infrastructure owners cannot insure certain assets.[154]

The pervasive infrastructure gap also means that potential solutions that could offset the limitations are unavailable. For example, telemedicine solutions that could be used to access improved care closer to home are often impossible with the current state of broadband connectivity. And country food economies that would reduce sealift dependence are themselves limited by the lack of community freezers, spaces for preparation, and markets.

The gap is growing

In many cases, the infrastructure gap between Nunavut and the rest of Canada is growing. Average Internet speeds have risen by 700 percent since 2013 across the rest of Canada, leaving Nunavut further behind. As other regions turn to online education, remote work, and telemedicine, especially during the COVID-19 pandemic, the opportunity gap in economic development and quality of life grows. The National Aboriginal Economic Development Board called this "cycles of underdevelopment feeding underdevelopment."[155]

This means that "net new" infrastructure does not necessarily close the gap—in terms of what it takes for Inuit to thrive, serving a growing population, and keeping pace with infrastructure investment elsewhere. Because most comparisons rely on "point-in-time" data that are not collected or reported regularly, it is not possible to get a comprehensive picture of how the gap is changing over time. But in a number of areas, the analysis for this project found that the infrastructure gap has been growing. For example:

- The share of homes in need of major repair in Nunavut doubled between 2006 and 2018 (to 41 percent) while the Canadian average fell to 7 percent during the same period.[156]
- As other provinces and territories have increased waste diversion and eliminated the open burning of waste, all communities except for three in Nunavut continue the open burning of waste without the infrastructure to support safer approaches.[157]
- As of 2020, Yukon now has a university, leaving Nunavut as one of two provinces or territories without one.[158]
- As significant investment has increased coverage of terrestrial broadband to 84 percent of Canadian households, Nunavut remains the only territory with none of this infrastructure.[159]

154 Nick Murray, "6 Nunavut schools are uninsurable because of past arsons," CBC News, 2018, https://www.cbc.ca/news/canada/north/nunavut-schools-insurance-arson-1.4622872.
155 National Aboriginal Economic Development Board, "Study on Addressing the Infrastructure Needs of Northern Aboriginal Communities," 2014, http://www.naedb-cndea.com/reports/northern-infrastructure-report.pdf.
156 Statistics Canada, "Core Housing Need, 2016 Census," accessed June 3, 2020, https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/chn-biml/index-eng.cfm; Statistics Canada, "The Daily—First Results from the Canadian Housing Survey, 2018," accessed June 3, 2020, https://www150.statcan.gc.ca/n1/daily-quotidien/191122/dq191122c-eng.htm.
157 Laurie Giroux, "State of Waste Management in Canada," prepared for Canadian Council of Ministers of Environment," 2011, https://www.ccme.ca/files/Resources/waste/wst_mgmt/State_Waste_Mgmt_in_Canada%20April%202015%20revised.pdf
158 Canadian Press, "Yukon College will become the first university in Canada's territories," CTV News, December 1, 2019, https://www.ctvnews.ca/canada/yukon-college-will-become-the-first-university-in-canada-s-territories-1.4710317.
159 CRTC, "Communications Monitoring Report 2019 – Retail Fixed Internet Sector and Broadband Availability," accessed June 2, 2020, https://crtc.gc.ca/eng/publications/reports/policymonitoring/2019/cmr9.htm.

Living with the infrastructure gap

Because of the infrastructure gap, Nunavut Inuit are often forced to leave the territory altogether to access critical services:

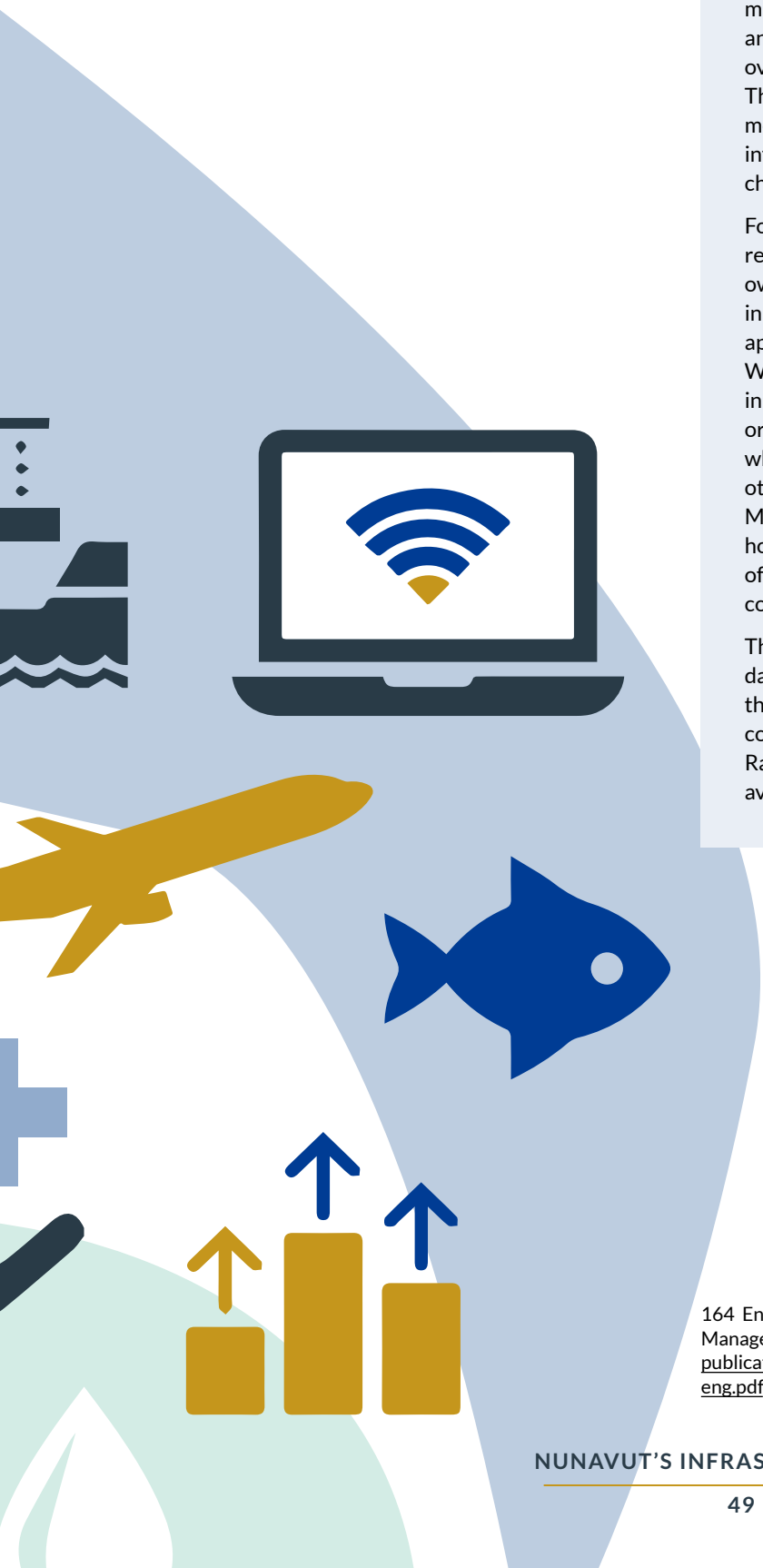
- A shortage of health care infrastructure and services means that approximately half of the children born to Nunavummiut are delivered in Southern hospitals.[160] Mothers are forced to leave weeks before their due date and welcome their child to the world far from the supports offered by their community. Infrastructure in the territory is limited to the Qikiqtani General Hospital in Iqaluit and a birthing centre in Rankin Inlet. Since 2017, funding has been available from the federal Non-Insured Health Benefits program for a family member or friend to accompany expectant mothers, but this still means being separated from other children, family, and community for weeks at a major life moment.[161]
- Getting treatment for a serious or chronic illness can mean living away from home (e.g., in Ottawa) for a long stretch of time. For parents, accompanying one child may mean separation from other children for months. There are currently no addictions or trauma treatment centres in Nunavut.
- Nunavut Inuit have limited opportunities to pursue postsecondary education or training in their communities or in the territory. For example, heavy equipment training for mining and infrastructure is concentrated in Morrisburg, Ontario.
- For Nunavut Inuit with disabilities, this can mean a heartbreaking choice to leave their community behind altogether to access reliable supports for themselves or their family members.[162]
- For those who enter the federal corrections system, a lack of facilities in the territory mean serving a custodial sentence far from home with little connection to family.

The infrastructure gap also contributes more broadly to a poverty gap and quality of life gap for Nunavut Inuit. It is felt in food insecurity, overcrowded housing, and limited economic opportunity. Young men in Nunavummiut aged 20–24 die at six times the rate of Canadians of the same age cohort.[163]

The gap is experienced differently throughout Nunavut

While the overall measurement of the gap is focused on Nunavut as a whole compared with the rest of Canada, the results reveal significant differences between regions. Communities vary in how well-served they are by existing infrastructure and by their priorities for improvement. Iqalung have a different experience compared with that of residents of regional centres like Rankin Inlet and Cambridge Bay, and in turn with smaller communities like Whale Cove or Taloyoak. Sanikiluaq has unique challenges with salination in the water supply. The report highlights regional variations and context behind the territory-wide figures.

160 Michele LeTourneau, "Bring birthing home to communities, say advocates," Nunavut News, accessed June 9, 2020, https://nunavutnews.com/nunavut-news/bring-birthing-home-to-communities-say-advocates/
161 Hilary Bird, "In swift policy change, pregnant Nunavut women to get escorts when travelling to give birth," CBC News, April 2017, https://www.cbc.ca/news/canada/north/pregnant-women-health-canada-nunavut-1.4067761.
162 Research interview, 2020—for more information, see the section on Accessibility in Part III, Cross-cutting factors.
163 Mackenzie Scott, "N.W.T. and Nunavut continue to have highest workplace death rate in country," CBC News, April 28, 2020, https://www.cbc.ca/news/canada/north/nwt-nunavut-day-of-mourning-1.5547391



DATA GAPS

Research to measure the infrastructure gap highlighted a number of data gaps. In many cases, there are no national data available, as Canada trails many peer countries on this front. But Nunavut and the North more broadly are also systematically overlooked and excluded from national data. This problem not only makes comparisons more challenging, it makes policymaking and infrastructure planning for Nunavut Inuit more challenging.

For example, Nunavut is left out of regularly reported data on solid waste; Environment Canada's own policy guidance on solid waste management in the North simply assumes the Canadian average applies and relies on a one-time waste audit of Whitehorse.[164] Other data sets report on Nunavut in categories combined with the other territories or other regional groups. Data gaps also emerge where policymakers use a minimum population or other threshold to decide what to track; the Canada Mortgage and Housing Corporation reports on housing starts only for local areas with a population of more than 10,000, thereby excluding all Nunavut communities.

The research also revealed weaknesses in national data. For example, Transport Canada reports that there are no paved roads in Nunavut—which would come as a surprise to the residents of Iqaluit or Rankin Inlet. This report relies on the best data available, and highlights limitations as appropriate.

164 Environment and Climate Change Canada, "Solid Waste Management for Northern and Remote Communities," 2017, http://publications.gc.ca/collections/collection_2017/eccc/En14-263-2016-eng.pdf.

COUNTRY FOOD MARKETS IN ARVIAT, NUNAVUT, AND QAQORTOQ, KALAALLIT NUNAAT (GREENLAND)

One of the challenges of defining the infrastructure gap between Nunavut and other jurisdictions in Canada is that any assessment must take Inuit-specific infrastructure needs into account, as well as regional differences between communities within the territory. Given their geographic isolation, smaller communities cannot easily rely on broader territorial resources, which can contribute to ongoing challenges that include food insecurity.

Greenland's country food markets have attracted attention as an Inuit-specific infrastructure asset that could be beneficial in Nunavut, for communities both large and small. For example, Arviat, Nunavut (pop. 2,800), and Qaqortoq, Greenland (pop. 3,050) are communities of similar size and latitude. While Qaqortoq's climate is milder, both Arviat and Qaqortoq have Inuit hunters who harvest many of the same country foods, including seals, whales, and fish.

Qaqortoq has a dedicated market space near the harbour where hunters and fishers can sell fresh country food almost every day. The space includes a building for cutting and harvesting as well as open-air stainless steel tables for sales, and is popular with locals and visitors. Arviat is located in the "food basket" of Nunavut, and has a newly built country freezer and a greenhouse, and recently received federal support for its young hunters program. Unlike Qaqortoq, however, Arviat has no dedicated space for local people (or a growing tourist population) to buy and sell country food.[165]

Markets for country food in Greenland have existed in some form for 150 years, although the first record of a formally established structure was in 1958 in Nuuk.[166] Some Greenlandic communities have permanent spaces to support a country food market, built and maintained by the local municipality, while other, smaller communities hold semi-regular country food markets without a dedicated market building or structure.[167] Country food markets in Greenland combine Inuit hunting and socialization practices with European-influenced market customs. The hyper-local markets are well suited to support both food sovereignty and regional economic activity in remote Inuit communities, where expensive alternatives to country food must be shipped from hundreds of kilometres away.

No permanent infrastructure for a country food market has been built or maintained in Nunavut. Research indicates that the idea shows promise in countering food insecurity. However, a report from the Nunavut Food Security Coalition cautions that implementing country food markets would also require a strong focus on ensuring community input, the consideration of Nunavummiut approaches to food as a shared resource, and an effective regulatory regime for sustainable wildlife management.[168] A few temporary country food markets previously held in Iqaluit and Rankin Inlet were met with enthusiasm—one market sold out "within a few minutes."[169]

Greenlandic examples show that investments into permanent country food market infrastructure can help facilitate access to country foods, even in smaller communities. Communities like Arviat could benefit from further thoughtful investments into Inuit-specific infrastructure both to help ensure access to food and to sustain local economic activity.

165 Government of Nunavut, "2015–16 Annual Report Country Food Distribution Program," accessed June 18, 2020, https://www.gov.nu.ca/sites/default/files/edt-2017-cfdp-ar_eng.pdf.
166 Ole Marquardt and Richard A. Caulfield, "Development of West Greenlandic markets for country foods since the 18th century," Arctic 49, 2 (1996): 107–9, https://doi.org/10.14430/arctic1189.
167 James D. Ford et al., "Food policy in the Canadian North: Is there a role for country food markets?" Social Science and Medicine 152 (2016): 35–40, https://doi.org/10.1016/j.socscimed.2016.01.034.
168 Ford et al., "Food policy in the Canadian North."
169 Source: photo caption Nunatsiaq News, "Photo: Country food sells quickly in Iqaluit," 2012, https://nunatsiaq.com/stories/article/65674photo_country_food_sells_quickly_in_iqaluit/

⚡ Energy & environment

Infrastructure associated with energy and the environment, such as power generation and distribution, waste collection and disposal, and wastewater treatment are vital to human and environmental health, and to economic development. These are areas of classic "utility" infrastructure—often unseen, but essential for modern life.

This type of infrastructure often looks quite different in Nunavut from the way it does in the rest of Canada. Some differences are shaped by geography or environment. For example, Nunavut does not have the same access to potential hydroelectric power sources as other jurisdictions. Aboveground "utilidor" systems are a unique adaptation used to prevent pipes from freezing in Arctic environments. In many of Nunavut's communities, sewage and water trucks replace underground pipes and sewers.

But many differences, such as unlined dump sites with open burning of waste, reflect underinvestment that leaves Nunavut Inuit with poorer-quality infrastructure than their Canadian or circumpolar neighbours. The fact that Nunavut's power stations cannot rely on a broader transmission grid is a result of regional and Arctic limitations; the fact that so many power stations have been allowed to age beyond their projected lifespan is not.

This section of the report includes 17 infrastructure indicators across five infrastructure priority areas.

Priority area	Indicators
Power	> Total annual power generation > Maximum generating capacity > Share of electricity produced by renewable sources > Annual electricity consumption per capita
Drinking water	> Length of drinking water pipes per capita > Share of population served by drinking water systems > Physical condition of drinking water infrastructure > Investment in drinking water infrastructure per capita
Wastewater	> Kilometres of publicly owned sewer pipes <450mm > Sewer pipes state of repair > Sewage lagoons state of repair
Solid waste	> Dumps as a share of waste disposal sites > Waste diversion infrastructure per capita > State of repair of solid waste infrastructure
Emergency response and protection	> Coast guard search and rescue stations > Firefighting infrastructure > Fire damage

Unaddressed gaps within energy and environment infrastructure have far-reaching impacts, especially on the expansion of infrastructure more broadly. The fact that Nunavut has the costliest electricity generation in the country makes all activity more expensive, especially large-scale industrial projects. Limited firefighting equipment and a lack of available piped water to fight fires means that communities can be ill-equipped to deal with fires effectively; the risk of fire has rendered some buildings uninsurable.[170]

170 Research interview, 2020.

Nunavut's energy and environment infrastructure gaps also have more immediate effects on the safety and wellbeing of Nunavut Inuit. Although Nunavut's lakes, rivers, and streams contain 21 percent of Canada's freshwater, it is a constant challenge to ensure enough safe drinking water for communities.[171] Nunavummiut have the lowest drinking water usage rate in Canada; the spread of COVID-19 in Canada has raised concerns about water availability for hygienic practices like frequent handwashing. Most communities in Nunavut use open burning to dispose of landfill waste, exposing residents to airborne pollutants.

Nunavut's rapidly growing population will continue to put a strain on existing energy and environment infrastructure assets, some of which are already nearing or at their limit.[172] Long-term infrastructure with fixed capacity constraints, such as sewage lagoons, must be built to accommodate this growth. Finding and developing large tracts of land for assets like wastewater facilities, water treatment facilities, and dumps can be difficult for Nunavut communities. These sites must be sited near roads, but not be so close to other facilities that they present safety or environmental concerns.

Nunavut's rapidly growing population will continue to put a strain on existing energy and environment infrastructure assets, some of which are already nearing or at their limit.

Additionally, approving new land for development, especially to expand Nunavut's inadequate housing supply, must include plans to connect those buildings to municipal services like water, wastewater, and power. Increased capital investments on their own will not be enough to address challenges presented by infrastructure gaps. Municipalities and regional decision-makers also need resources to support planning and project management processes that allow for sustainable and targeted solutions for their communities' needs.

171 Indigenous and Northern Affairs Canada, "Water Resources," accessed June 16, 2020, https://www.aadnc-aandc.gc.ca/eng/1100100028084/1100100028088.
172 Research interview, 2020.

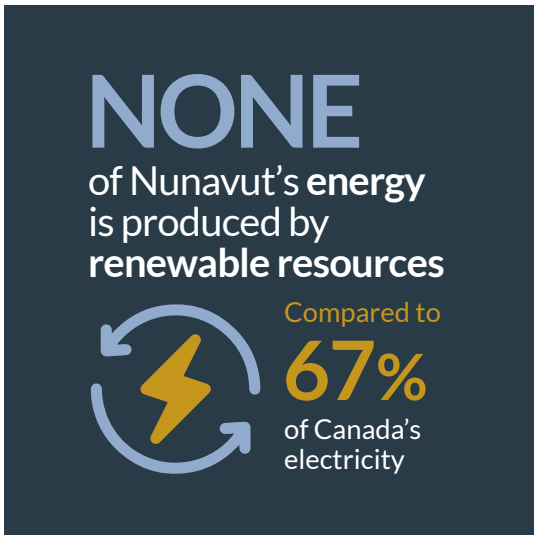
Power

Nunavut generates the smallest amount of power annually in the country, and the second smallest on a per-capita basis.

Nearly all power in Nunavut is delivered from 25 diesel plants in 25 communities. In contrast, across Canada, 60 percent of power is generated from hydroelectricity and most provinces draw on multiple sources of power generation, such as wind, natural gas, or coal.[173] There are both additional expenses and serious environmental risks associated with importing approximately 50 million litres of diesel fuel each year via sealift and storing in communities for electricity generation.[174]

The costs of buying and importing diesel fuel to Nunavut, as well as high fixed costs of serving small communities contributes to baseline electricity prices higher than those elsewhere in Canada. As of February 2020, the average electricity price in Canada is 17.4 cents per kilowatt-hour (kWh).[175] Non-subsidized rates vary tremendously by community in Nunavut, ranging from 58.6 cents/kWh in Iqaluit to as high as 116 cents/kWh in Kugaaruk.[176]

Nunavut's diesel plants are generally reliable. As of 2018–19, Qulliq Energy Corporation was able to maintain a 99.91 percent electricity reliability rate.[177] However, many diesel power facilities are aging, and 11 are operating near the end of (or beyond) their planned lifespan.[178] Aging plants are at greater risk of breakdowns, leaving residents without power and heat.[179] They will need to be replaced in the near future. In the context of a growing population and economic expansion, power infrastructure will be under growing strain in the coming years until aging facilities are replaced.



Unlike other parts of Canada, Nunavut has no regional grid connecting across the territory or to other jurisdictions. This means there are neither transmission lines connecting Nunavut's population centres, nor a backup grid should one community suffer a power loss. With no option to import power from outside the territory or distribute between communities, each community must rely completely on the capacities of local diesel plants.

173 Canada Energy Regulator, "Provincial and Territorial Energy Profiles – Nunavut," 2020, https://www.cer-rec.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/nu-eng.html.
174 Nunavut Climate Change Centre, "Nunavut's Energy System," accessed June 2, 2020, https://www.climatechangenunavut.ca/en/energy/energy-nunavut.
175 Energyhub.org, "Electricity Prices in Canada (updated 2020)," accessed June 4, 2020, https://www.energyhub.org/electricity-prices/
176 Qulliq Energy Corporation, "Customer Rates," accessed June 15, 2020, https://www.qec.nu.ca/customer-care/accounts-and-billing/customer-rates.
177 Qulliq Energy Corporation, "2018–2019 Annual Report," accessed June 15, 2020, https://www.qec.nu.ca/sites/default/files/qec_annual_report_2018-2019_eng.pdf, p. 6
178 Qulliq Energy Corporation, "2018–2019 Annual Report," p. 18, see also Senate of Canada, "Powering Canada's Territories," 2014, https://sencanada.ca/content/sen/Committee/412/enev/rep/rep14jun15-e.pdf.
179 Nunatsiaq News, "Cold, dark western Nunavut town struggles with another power failure," 2014, https://nunatsiaq.com/stories/article/65674cold_dark_western_nunavut_town_struggles_through_another_power_failure/

PANGNIRTUNG POWER PLANT FIRE

In April 2015, a major fire at Pangnirtung's diesel power plant caused a month-long state of emergency, leaving residents in the community of 1,500 without heat, electricity, internet, or running water in freezing conditions. Gaps in Pangnirtung's infrastructure complicated and extended the crisis, with efforts to restore full power delayed for weeks because the local gravel runway was too short to accommodate a cargo plane carrying additional generators.[180] To restore power to the community, the Government of Nunavut instead had to charter an Antonov An-124, one of the world's largest cargo planes, to deliver a special Skycrane helicopter to Iqaluit. The helicopter, which had to be manually reassembled at the Iqaluit airport, then made multiple trips to deliver needed equipment to Pangnirtung.[181] Fighting the fire at the power plant was also made more difficult by a lack of water, as community water pumps depend on power to function.[182]

In contrast, Yukon has more than 900 km of electricity transmission lines that connect the majority of its population centres. The Northwest Territories has two small electrical grids on either side of Great Slave Lake.[183] In addition, both Yukon and Northwest Territories can use road or rail connections to southern Canada to import diesel fuel for off-grid communities, which is cheaper than the sealifts required in Nunavut.

Most residential and commercial consumers receive subsidies which reduce the high costs of electricity in Nunavut. For example, electricity prices for Nunavummiut living in public housing are approximately 6 cents/kWh, while other residents pay closer to 26 cents/kWh.[184] These subsidies apply for electricity consumption of up to 700 kWh monthly from April to September and up to 1,000 kWh monthly from October to March (electricity consumption above this amount is billed at non-subsidized rates). These subsidies come at a significant cost to the Government of Nunavut, estimated at more than $36 million annually.[185] The high costs of non-subsidized electricity may also contribute to Nunavummiut having the lowest energy usage per capita in the country.

Among the initiatives in Nunavut to introduce renewable energy sources of power to the territory is a proposal from the Kivalliq Inuit Association and Anbaric Development Partners to build a 1,200-km hydro and fibre link connecting the Kivalliq region to Manitoba (see box). In 2019, the federal government announced funding of $1.6 million for two years of technical and feasibility work in support of this project, and in 2020, the Canada Infrastructure Bank signed a memorandum of understanding with project partners to advise on the project development.[186]

180 Nunatsiaq News, "Permanent power solution for Pangnirtung on its way: Nunavut Government."
181 APTN News, "Big Plane – Small City, Help Is on the Way to Pangnirtung," 2015.
182 CBC News, "Teamwork helps Pangnirtung residents pull through power outage," 2015, https://www.cbc.ca/news/canada/north/teamwork-helps-pangnirtung-residents-pull-through-power-outage-1.3029395.
183 Canada Energy Regulator, "Canada Energy Regulator, Provincial and Territorial Energy Profiles."
184 Research interviews, 2020.
185 International Institute for Sustainable Development & WWF, "Costing Energy and Fossil," accessed June 4, 2020, https://www.iisd.org/library/costing-energy-fossil-fuel-subsidies-nunavut-mapping-exercise.
186 Government of Canada, "Government of Canada supports Kivalliq hydro-fibre link feasibility work to bring clean energy to Nunavut," accessed June 4, 2020, https://www.newswire.ca/news-releases/government-of-canada-supports-kivalliq-hydro-fibre-link-feasibility-work-to-bring-clean-energy-to-nunavut-833172767.html; see also, Canada Infrastructure Bank, "Canada Infrastructure Bank signs Memorandum of Understanding for the proposed Kivalliq hydro-fibre link project," accessed June 4, 2020, https://cib-bic.ca/en/canada-infrastructure-bank-signs-memorandum-of-understanding-for-the-proposed-kivalliq-hydro-fibre-link-project/

KIVALLIQ HYDRO-FIBRE LINK

The Kivalliq Inuit Assocation and Anbaraic Development partners are proposing to build a land-based power and fibre optic connection to Nunavut. This nation-building project would bring renewable energy to Nunavut for the first time, powering five Kivalliq communities and the Agnico Eagle Mine with hydroelectric power from Manitoba. If built, the project would also create Nunavut's first transmission network, allowing communiites to share power, and would significantly reduce reliance on local diesel power plants.[187]

Qulliq Energy Corporation (QEC) is also working to diversify Nunavut's power sources.[188] Nunavut's first hybrid solar and diesel plant is expected to open in Kugluktuk in 2021. QEC is also expanding the use of district heating solutions that use waste heat from electricity generation as well as programs to allow independently produced renewable energy to be sold into the grid.[189]

Gap analysis

To measure the gaps in power infrastructure between Nunavut and the rest of Canada, this report includes three indicators:

- Total annual power generation
- Maximum generating capacity
- Share of electricity produced by renewable sources
- Annual electricity consumption per capita

Indicator: total annual power generation

In 2018, Nunavut produced 5 megawatt hours of power per capita, the second-lowest amount in the country after PEI.[190] The national average is 17 megawatt hours per capita. Newfoundland and Labrador generated the most power on a per-capita basis, at 81 megawatt hours.[191] Yukon and the Northwest Territories produce 12 and 8 megawatt hours per capita, respectively.[192]

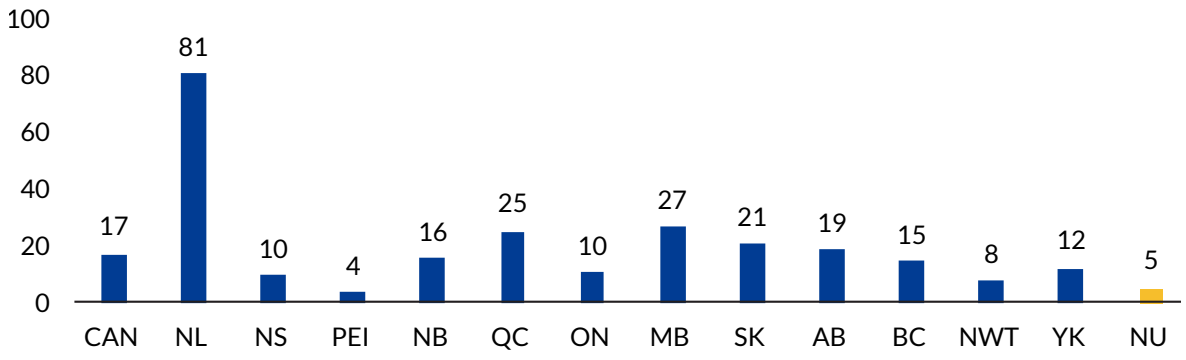
In absolute terms, Nunavut generates the smallest amount of power among the provinces and territories, at 200,000 megawatt hours annually. The Northwest Territories generated the second smallest amount annually, at 350,000 megawatt hours, and Yukon, the third smallest, at 500,000 megawatt hours annually.

The relative importance of total power generation is higher for the territories than for Canadian provinces, which can import or export power as needed. For example, despite a low level of total annual power generation, PEI can reliably import electricity from New Brunswick. A similar option is not available for the territories, as their power grids are isolated.

187 Kivalliq Hydro-Fibre Link, "Kivalliq Hydro-Fibre Link," accessed June 17, 2020, https://www.kivalliqlink.ca/.
188 New diesel plants opened in Kinngait and Grise Fiord in 2018.
189 Qulliq Energy Corporation, "2018–2019 Annual Report," p. 19. In addition, eligible customers receive a credit for the surplus electricity they produce and send to QEC electrical grids.
190 Canada Energy Regulator, "Provincial and Territorial Energy Profiles – Nunavut." Totals rounded to the nearest megawatt.
191 Canada Energy Regulator, "Provincial and Territorial Energy Profiles – Newfoundland and Labrador," accessed June 4, 2020, https://www.cer-rec.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/nl-eng.html.
192 Canada Energy Regulator, "Provincial and Territorial Energy Profiles – Newfoundland and Labrador."

FIGURE 1

Total annual power generation, megawatt hours per capita (2018)



Source: Canada Energy Regulator

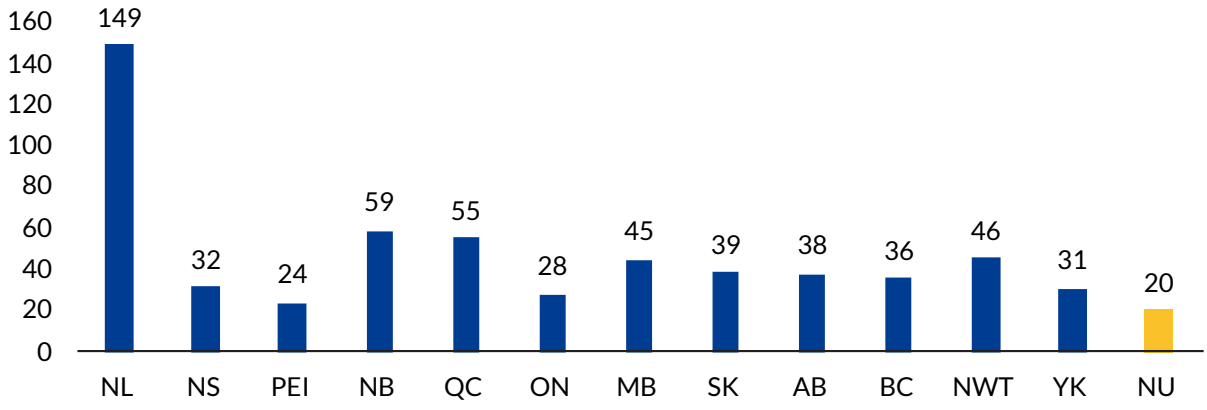
Indicator: maximum generating capacity

The inability to import power and the lack of a regional grid should mean that—on the basis of prudent risk management—Nunavut has excess generating capacity. But Nunavut has the lowest maximum output capacity of any Canadian jurisdiction, at 20 megawatts per 10,000 people. This is less than half the capacity of the Northwest Territories, which can generate 46 megawatts per 10,000 persons. Newfoundland and Labrador has the greatest generating capacity, at 149 megawatts per 10,000 persons, with other provinces falling between 24 and 59 megawatts. Although Nunavut currently does not have energy-intensive industries (such as iron or steel manufacturing), the territory has much less capacity to accommodate this type of industry on local grids, should it be required in the future.

Similar to annual power generation, the relative importance of maximum generating capacity is less for the provinces, which can import and export power. For example, in Newfoundland and Labrador, the Churchill Falls hydroelectric facility, one of the largest power plants in Canada, exports nearly all the power it generates to Quebec.

FIGURE 2

Maximum generating capacity, megawatt hours per 10,000 persons (2018)



Source: Canada Energy Regulator

The impacts of maximum generating capacity are also experienced differently in Nunavut compared with its territorial neighbours. While neither Yukon nor the Northwest Territories can import power, both have some regional grids to redistribute power among communities to meet demand. Yukon has more than 900 km of transmission lines that link the majority of communities, and the Northwest Territories has two small electricity grids. Limits on generating capacity act as a brake on economic development, particularly energy-intensive primary industries.

Indicator: share of electricity produced by renewable sources

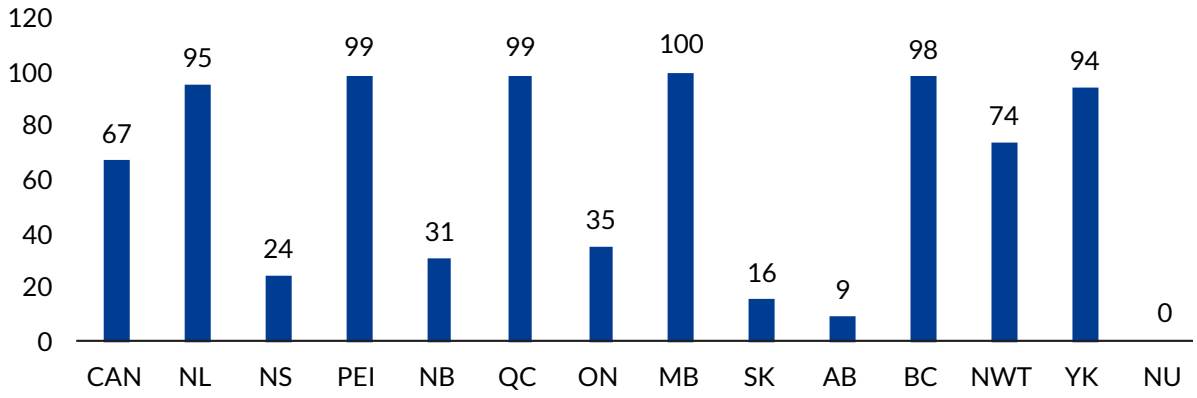
The Government of Canada has committed to support Indigenous communities' transition from diesel to renewable power by 2030.[193] Doing so would reduce emissions and limit exposure to the volatile costs associated with buying fuel on global markets. However, at present, Nunavut is almost entirely dependent on non-renewable fuel for energy.

Nationally, 67 percent of energy is produced from renewable sources, such as water, wind, solar, and geothermal/biomass. Provinces vary in their use of renewable energy sources. Five provinces and Yukon get more than 90 percent of their power from renewable sources, while the other provinces use renewable energy for less than half of their power generation.[194] Among the provinces, Alberta uses the fewest renewable energy sources, accounting for approximately 9 percent of its power generation.

Introducing renewable sources of energy in Nunavut faces certain barriers. For example, while solar, wind, and hydro projects have been considered, the territory would still need to maintain back-up diesel generators in any community with a renewable power source, creating redundancy costs.[195] Geography and climate limit the viability of some renewable energy technologies in Nunavut.

FIGURE 3

Share of electricity produced by renewable sources (2018)



Source: Canada Energy Regulator

193 Prime Minister of Canada, "Minister of Natural Resources Mandate Letter."
194 Canada Energy Regulator, "Provincial and Territorial Energy Profiles – Nunavut."
195 Research interviews, 2020.

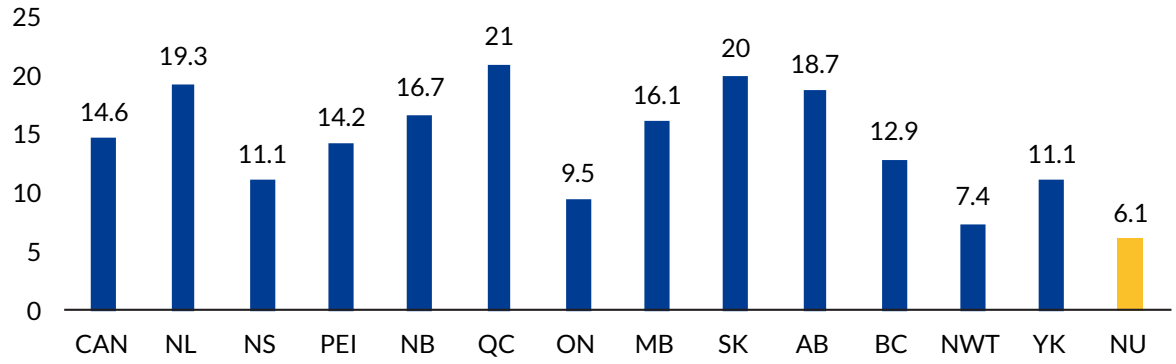
Indicator: annual electricity consumption per capita

Nunavut has the lowest annual electricity consumption per capita at 6.1 megawatt hours in 2018, about 58 percent less than the national average.[196] Quebec has the highest rate of annual electricity consumption, at 21 megawatt hours, followed by Saskatchewan at 20 megawatt hours. Among the provinces, Ontario has the lowest annual consumption, at 9.5 megawatt hours.

Though the relationship is not universal across Canada, some provinces with lower electricity prices, such Quebec and Newfoundland and Labrador, also have annual electricity consumption well above the national average. In the Northwest Territories, which, like Nunavut, has (pre-subsidy) electricity prices above the national average, annual consumption of electricity is the second lowest in the country.

FIGURE 4

Annual electricity consumption, megawatt hours per capita (2017)



Source: Canada Energy Regulator

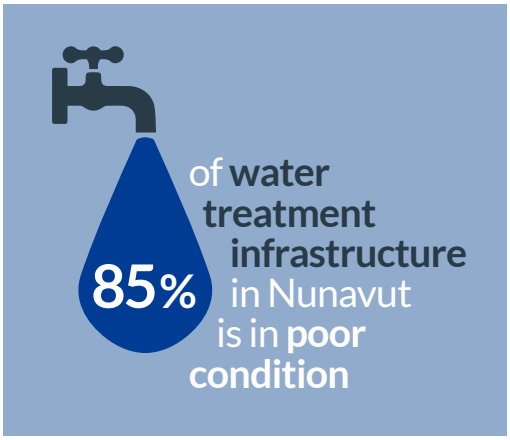
196 Canada Energy Regulator, "Provincial and Territorial Energy Profiles – Nunavut."

Drinking water

Most of Canada has access to safe drinking water treated by municipal water systems, with pipes serving homes and businesses. Nunavut is the only region where the majority of residents rely on trucked water (rather than pipes to their homes or buildings). Relying on trucked water, whether delivered daily or a few times per week, contributes to rationing and lower reliability for Nunavut Inuit.

Nunavut has the lowest per-capita residential water use in Canada, at 153 litres per capita per day compared with the Canadian average of 220 litres per capita per day.[197] While Nunavut has little water-intensive industry today, limited infrastructure is a barrier to future growth.

A study in Coral Harbour found that half of households surveyed experienced water shortages at least once a month.[198] Even with pipes or increased trucked water delivery, limited reservoirs and source water pressures continue to lower the availability of water to Nunavut Inuit in many communities.[199] Nunavut also has limited water treatment systems, instead relying primarily on chlorination.



Canada's territories are home to an estimated 37 percent of Canada's freshwater resources.[200] But geographic, economic, and infrastructure challenges create serious obstacles to ensuring a safe and clean drinking water supply in Nunavut. Climate considerations mean that all communities rely on surface water (i.e., lakes, rivers, and ice), which is subject to seasonal melting, while many communities in the South rely on groundwater resources.

Nunavut's climate also makes piped water much more challenging. Aboveground "utilidor" systems must be heated. Climate change is increasing the pressure placed on both sourcewater (e.g., low precipitation levels) and infrastructure (e.g., breakage of buried pipes in changing permafrost).[201] Communities including Iqaluit, Igloolik, and Grise Fiord have faced water shortages in recent years. Sanikiluaq faces particular challenges with salination and has relied on reverse osmosis units installed in households for several years.[202]

Water shortages and water quality issues, compounded by other infrastructure shortages such as overcrowded housing, combine to create public health risks.[203] Water treatment in Nunavut is less rigorous than in the rest of Canada. EcoJustice's Waterproof drinking water report card gave a "D" grade

197 Statistics Canada, "Survey of Drinking Water Plants," and "Potable Water Use by Sector and Average Daily Use," accessed June 11, 2020, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3810027101.
198 Kiley Daley et al., "Municipal water quantities and health in Nunavut households: An exploratory case study in Coral Harbour, Nunavut, Canada," International Journal of Circumpolar Health 73, 1 (January 31, 2014): 23843, https://doi.org/10.3402/ijch.v73.23843.
199 Research interview, 2020.
200 Ken Johnson, "Arctic water—an abundant resource in short supply," Water Canada, 20, 1 (Jan-Feb 2020), https://www.watercanada.net/feature/arctic-water-an-abundant-resource-in-short-supply/
201 Jane George, "City of Iqaluit says climate change is contributing to its water pipe woes," Nunatsiaq News, accessed June 2, 2020, https://nunatsiaq.com/stories/article/city-of-iqaluit-says-climate-change-is-contributing-to-its-water-pipe-woes/
202 CBC News, "Sanikiluaq residents warned not to drink tap water—even if boiled," 2016, https://www.cbc.ca/news/canada/north/sanikiluaq-advisory-tap-water-sodium-1.3650378.
203 Daley et al., "Municipal water quantities and health in Nunavut households."

to Nunavut as a result of low water treatment standards and an absence of sourcewater protection—the lowest grade of any province or territory.[204] Water shortages also make fire protection more difficult, leading to higher losses from fires (see the section on emergency response and protection).

Gap analysis

To measure the gaps in drinking water infrastructure between Nunavut and the rest of Canada, this report includes four indicators:

- Share of population served by drinking water systems
- Physical condition of drinking water infrastructure
- Investment in drinking water infrastructure per capita
- Length of drinking water pipes per capita

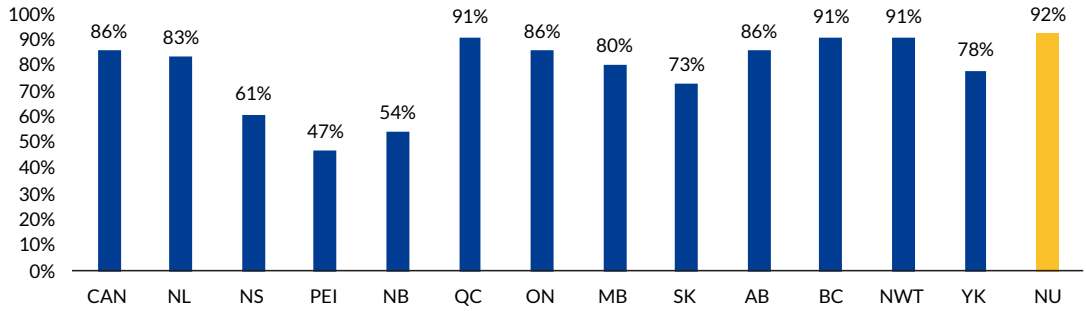
These indicators focus on the infrastructure used to treat and deliver drinking water in communities, rather than on water sources that vary significantly based on geography. However, Nunavut also faces a gap in sourcewater monitoring and management. The Government of Canada has responsibility for national hydrometric (level and flow) and water-quality monitoring programs, and owns and operates the monitoring stations in Nunavut.[205] Nunavut has far fewer monitoring stations than many other provinces or territories (half the number in the Northwest Territories).[206] Increased monitoring could help communities find new reliable sources of drinking water.[207]

Indicator: share of population served by drinking water plants

Statistics Canada tracks the share of the population served by public drinking water plants (rather than local well systems) that treat water before it is delivered to homes and businesses. An estimated 92 percent of Nunavummiut are served by public drinking water infrastructure, compared with 86 percent on average nationally.[208]

FIGURE 5

Share of population served by drinking water plants, Statistics Canada



Source: Statistics Canada, Biennial Survey on Drinking Water Plants

204 EcoJustice, "Waterproof 3: Canada's Drinking Water Report Card," 2014, https://www.ecojustice.ca/wp-content/uploads/2014/11/Waterproof_Essentials_web_corrected_Dec_8.pdf.
205 Government of Canada, "Overview of Freshwater Quality Monitoring and Surveillance," accessed June 11, 2020, https://www.canada.ca/en/environment-climate-change/services/freshwater-quality-monitoring/overview.html.
206 Environment and Climate Change Canada, "National Long-Term Water Quality Monitoring Data," accessed June 11, 2020, http://data.ec.gc.ca/data/substances/monitor/national-long-term-water-quality-monitoring-data/
207 Research interview, 2020.
208 Statistics Canada, "Population Served by Drinking Water Plants," 2019, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3810009301.

But this baseline statistic does not capture how *well* people are served. Limited reservoir and sourcewater infrastructure contribute to rationing and shortages. Iqaluit has faced water emergencies the past two years. Moreover, many of the drinking water systems are unable to treat/remove turbidity (cloudy water), common in Nunavut's systems, leading to boil water advisories.[209] Until recently, many communities have not had the technology to test accurately for turbidity and certain contaminants. While the Canadian Council of Ministers of Environment has endorsed a multi-barrier approach as the most appropriate to ensure safe drinking water, most Nunavut systems rely on chlorination alone.[210]

Nunavut facilities spend ten times the Canadian average to maintain their drinking water plants, while delivering a lower standard of water service.

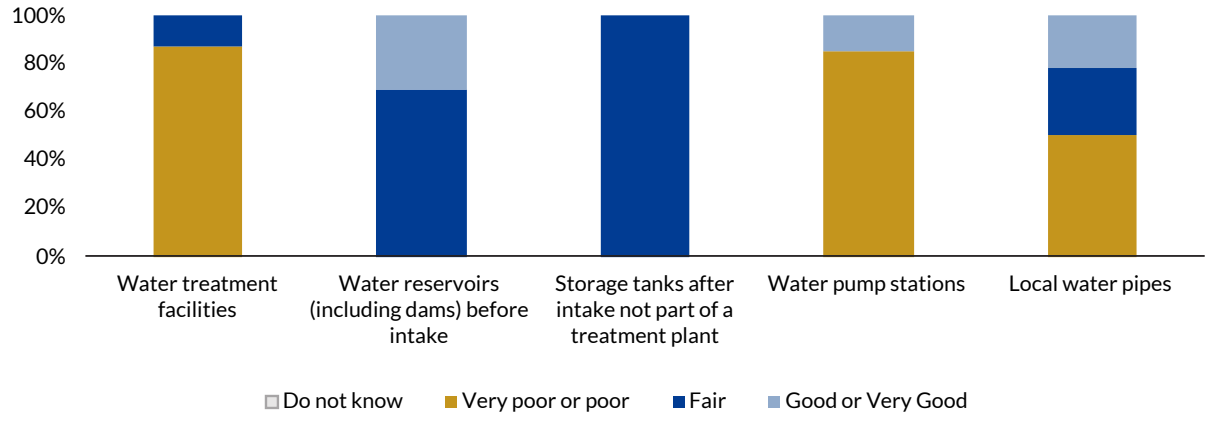
Indicator: physical condition of drinking water infrastructure

The public owners and managers of drinking water infrastructure in Nunavut report that much of the infrastructure is in poor condition. Nationally, the vast majority of drinking water infrastructure of all types is reported to be in good or very good condition. The opposite is true in Nunavut.[211] Approximately 85 percent of water treatment facilities and of water pump stations are reported to be in poor condition.[212]

FIGURE 6

Condition rating of drinking water infrastructure in Nunavut, Infrastructure Canada and Statistics Canada

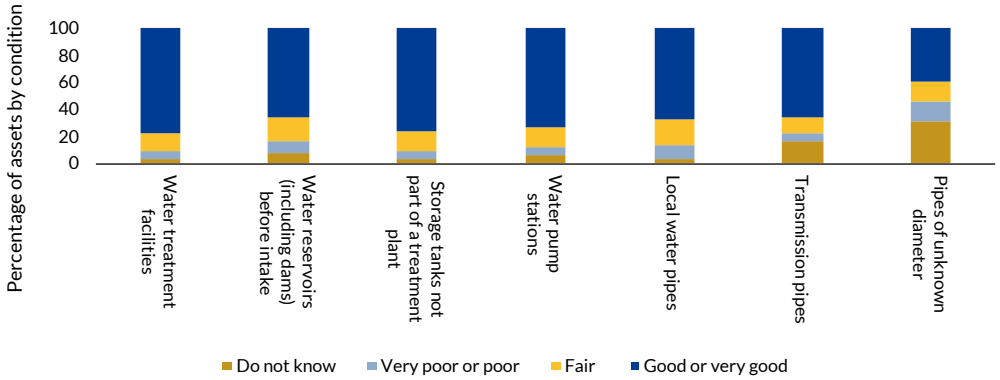
Source: Canada's Core Public Infrastructure Survey



209 Government of Nunavut, "Health Directive Regarding Turbidity in Drinking Water," accessed February 24, 2020, https://gov.nu.ca/health/news/health-directive-regarding-turbidity-drinking-water.
210 Daley et al., "Municipal water quantities and health in Nunavut households."
211 Infrastructure Canada and Statistics Canada, "Inventory Distribution of Publicly Owned Potable Water Assets by Physical Condition Rating," 2018, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410019601.
212 Infrastructure Canada and Statistics Canada, "Inventory Distribution of Publicly Owned Potable Water Assets."

FIGURE 7

Condition rating of drinking water infrastructure (Canadian average), Infrastructure Canada and Statistics Canada



Source: Canada's Core Public Infrastructure Survey

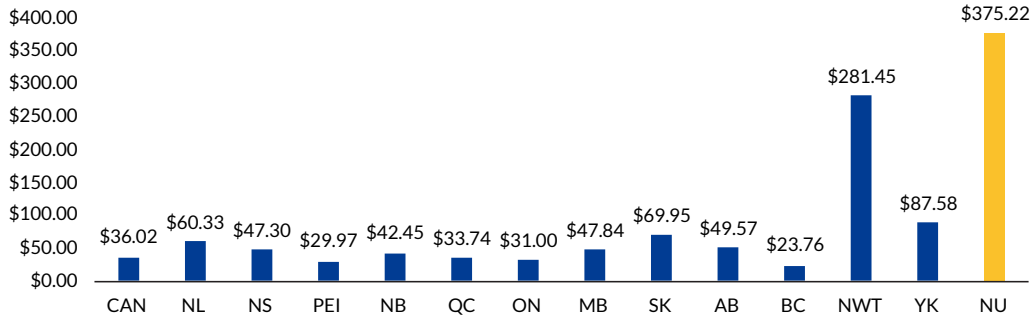
Indicator: investment in drinking water infrastructure per capita (capital and operating)

Nunavut faces by far the highest costs for operating and maintaining drinking water infrastructure. Nunavut facilities spend ten times the Canadian average to maintain their drinking water plants, while delivering a lower standard of water service.[213]

Water costs are also the most significant utility expense for the Nunavut Housing Corporation, with the corporation spending about $8,800 annually per housing unit on water and sewage.[214] These high costs make it difficult to invest in improvements—funds earmarked for infrastructure improvements are often redirected to subsidize high water charges to households.[215] For example, operation and maintenance costs for water in Grise Fiord are 40 times those in Edmonton.[216]

FIGURE 8

Operation and maintenance expenses per capita, Statistics Canada



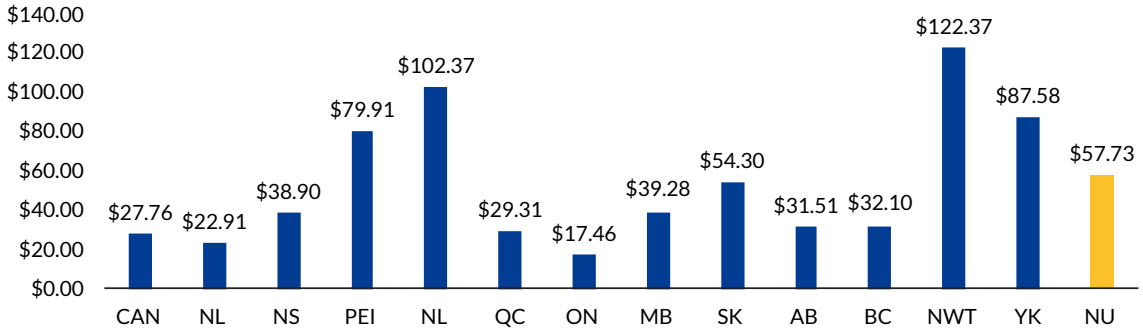
Source: Statistics Canada, Biennial Survey on Drinking Water Plants

213 Statistics Canada, "Operation and Maintenance Costs of Drinking Water Plants," Biennial Drinking Water Plants Survey, accessed June 11, 2020, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3810010301.
214 Nunavut Housing Corporation, "Nunavut Housing Corporation, Annual Report 2018–19," 2019, http://www.nunavuthousing.ca/Publications?filter=AnnualReports&limit=8.
215 CBC News "Iqaluit residential water rates set to triple by July 2021 as subsidy is rolled back," posted Jan 9, 2019, accessed February 24, 2020, https://www.cbc.ca/news/canada/north/iqaluit-water-rates-triple-subsidy-1.4970814.
216 Ken Johnson, "The challenges of water supply in Canada's far north Nunavut communities," accessed February 24, 2020, https://ideas.stantec.com/water/nunavut-communities-water-struggle.

A major driver of higher costs for operation and maintenance in Nunavut is labour—which represents 60 percent of operating expenses in Nunavut compared with the Canadian average of 40 percent.[217] But that is not the only factor; costs for labour, energy, and materials are far higher in Nunavut than in the rest of Canada (e.g., $8 per capita on energy for Canada vs. $55 per capita for Nunavut).[218]

FIGURE 9

Capital expenditure on drinking water plants, Statistics Canada



Source: Statistics Canada, Biennial Survey on Drinking Water Plants

Nunavut's level of spending on capital investment for drinking water plants is close to the middle of the pack—fifth among provinces and territories and lower than Yukon or the Northwest Territories.[219] The high cost in the North of building and maintaining water infrastructure means that, if anything, middle-of-the-pack status widens the infrastructure gap, as underfunded capital budgets force higher maintenance costs to plug holes—sometimes literally.

Indicator: length of drinking water pipes per capita

Only approximately 14 percent of Nunavummiut are served by piped water.[220] The remainder rely on trucked water.

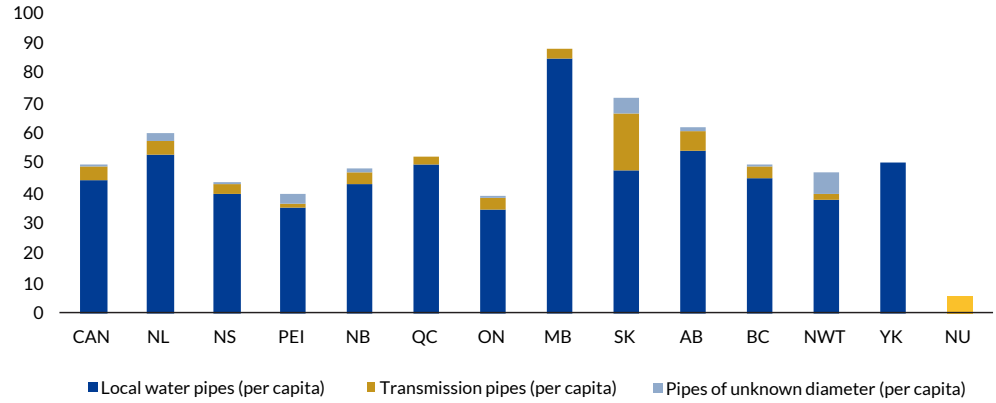
With 6.4 km of drinking water pipes for every 10,000 people, Nunavut has less than one-eighth the Canadian average, and less than one-sixth the amount of the next lowest province or territory.[221] Only three Nunavut communities have a piped water network (Rankin Inlet, Resolute Bay, and portions of Iqaluit).

On its own, the difference in the length of drinking water pipes is not necessarily an infrastructure gap. Experts interviewed for this report made clear that piped systems in Nunavut have their own limitations, including water pressure and maintenance costs.[222] Buried pipes are much more challenging and costly to maintain or repair in the absence of manholes or vaults common in southern systems.[223] Engineering consultants warned that Resolute Bay's utilidor system was at risk of catastrophe a decade ago (upgrades are set to begin in 2020).[224]

217 Statistics Canada, "Operation and Maintenance Costs of Drinking Water Plants."
218 Statistics Canada, "Operation and Maintenance Costs of Drinking Water Plants."
219 Statistics Canada, "Operation and Maintenance Costs of Drinking Water Plants."
220 National Collaborating Centre for Environmental Health, "Small drinking water systems: Who does what in Nunavut?," 2014. http://www.ncceh.ca/sites/default/files/SDWS_Who_What_Nunavut.pdf
221 Infrastructure Canada and Statistics Canada, "Inventory of Publicly Owned Potable Water Assets," 2018, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410019201.
222 Research interview, 2020.
223 Research interview, 2020.
224 Jane George, "Resolute Bay set to see more water and sewer upgrades," Nunatsiaq News, June 9, 2020, https://nunatsiaq.com/stories/article/high-arctic-communitys-piped-system-undergoes-additional-overhaul/

FIGURE 10

Length of drinking water pipes per capita (km), Infrastructure Canada and Statistics Canada



Source: Statistics Canada, Canada's Core Public Infrastructure Survey

However, in the absence of a reliable piped system, Nunavut Inuit have less consistent drinking water delivery systems than people in other parts of Canada. Even with pipes or increased trucked water delivery, limited reservoirs and source water pressures continue to drive lower availability of water to Nunavut Inuit in many communities.[225]

Water shortages and interruptions can have significant health consequences. In Nunavik, the Quebec ombudsman noted that water interruptions compromise care in health facilities.[226] As part of its response to COVID-19, Nunavut Tunngavik Inc. has provided funding to municipalities to support daily water deliveries, something that municipalities cannot support without additional funding.[227]

225 Research interview, 2020.
226 Nunatsiaq News, "Water shortages at Inukjuak clinic compromise quality of care: Quebec ombudsman," August 26, 2019, https://nunatsiaq.com/stories/article/water-shortages-at-inukjuak-clinic-compromise-quality-of-care-quebec-ombudsman/
227 Nunavut Tunngavik Inc., "Immediate investment towards handwashing made by NTI."

Wastewater

Wastewater management can be understood in terms of *conveyance* (moving wastewater) and *treatment* (rendering it safe to go to its next destination, for instance, a lake or river). In Nunavut, the infrastructure that supports both wastewater conveyance and treatment requires adaptation to meet the needs of a sparsely populated region with Arctic conditions that are inhospitable to conventional underground sewage systems. Moreover, as the population in Nunavut grows, pressure on existing wastewater systems and sewage lagoon capacity grows. Climate change and associated changes in permafrost are also affecting communities with piped sewage.

Wastewater conveyance

Twenty-two communities in Nunavut have trucked wastewater systems, whereby sewage is picked up from users by vehicle and taken to a treatment facility. Three communities (Iqaluit, Rankin Inlet, and Resolute Bay) have at least partial use of a "utilidor" system, consisting of shallowly buried or above ground pipes that deliver drinking water and collect wastewater.[228]

Conveyance in densely populated regions of Canada is typically by sewage pipes and sewers: in 2017, slightly more than 30 million Canadians were served by municipal wastewater systems that processed 100 cubic metres per day or more.[229] Only 0.5 percent of Canadians are served by "sewage haulage" (a category that includes trucked sewage).[230] However, sewer systems have serious limitations in the North: pipes are prone to malfunctioning in Arctic conditions, and are expensive to build and maintain. Pipes must be either insulated aboveground or buried deep within the ground to prevent them from shifting or freezing. Introducing more pipes into Nunavut's municipal wastewater systems would come with considerable risks and maintenance needs.

228 Centre for Water Resources Studies and Dalhousie University, "Treatment Performance of Municipal Wastewater Stabilization Ponds in Nunavut," prepared for Community and Government Services (CGS) Government of Nunavut, 2015, http://centreforwaterresourcesstudies.dal.ca/files/documents/Finalreport WSP performance – 18-09-2015.pdf.
229 Statistics Canada, "The Daily—Municipal Wastewater Systems in Canada, 2013 to 2017," 2019, https://www150.statcan.gc.ca/n1/daily-quotidien/190625/dq190625c-eng.htm.
230 Canadian Water Network, "Canada's Challenges and Opportunities to Address Contaminants in Wastewater Supporting Document 2," 2018, http://cwn-rce.ca/wp-content/uploads/projects/other-files/Canadas-Challenges-and-Opportunities-to-Address-Contaminants-in-Wastewater/CWN-Report-on-Contaminants-in-WW-Supporting-Doc-2.pdf.

At the same time, a lack of pipes (and corresponding reliance on trucked systems) exposes municipal wastewater systems to a different set of disruptions, as illustrated by some examples from the last ten years:

- A fire in a warehouse in Baker Lake in 2019 disabled six sewage trucks, leaving the community to be serviced by one truck for nearly a week (new trucks needed to be flown in). As a result, some residents returned to a "honey bucket" system of sewage management, whereby they bagged their own sewage and put it by the road for pickup.[231]
- Blizzards and cold weather advisories can suspend trucked sewage pickup for days at a time. Iqaluit, Cambridge Bay, and other communities have stopped sewage pickup for multiple days in blizzard conditions.[232]
- Pond Inlet declared a state of emergency in 2015 due to sewage truck failures, resulting in diminished water delivery and "sewage overflow."[233]
- In Coral Harbour in 2016, sewage trucks broke down and the town temporarily used a dump truck to transport sewage until that truck also experienced mechanical failure.[234]

Wastewater treatment

Three communities (Iqaluit, Rankin Inlet, and Pangnirtung) have a mechanical wastewater treatment system in place. There are plans to introduce mechanical wastewater treatment plants into other communities, including Resolute Bay, which currently discharges sewage directly into the ocean.[235] Twenty-one communities use Waste Stabilization Ponds (also known as WSPs or sewage lagoons), a passive form of wastewater treatment that relies on "natural purification." Eventually, in warmer months, lagoon contents are either pumped or "released": effluent is eventually discharged through the surrounding landscape (frequently though a wetland system, which acts as an effective natural filter).[236]

Passive systems like sewage lagoons are widely considered the optimal system for small and remote communities: they require relatively little intervention and expertise, and typically deliver safe outcomes, especially when paired with a wetland system for filtration. However, WSPs in the far North have a much shorter time in which the natural processes of anaerobic breakdown of organic matter can occur, as this is only possible during the summer thaw.[237] While WSPs are typically considered resilient in extreme weather (including Arctic climates), environmental factors (e.g., tidal volumes/pathways, algae growth, ice cover) can still affect a WSP's performance in the Arctic.[238]

231 Nunatsiaq News, "Two new sewage trucks to arrive in Nunavut community next week," 2019, https://nunatsiaq.com/stories/article/two-new-sewage-trucks-to-arrive-in-nunavut-community-next-week/
232 Nunatsiaq News, "A good old Nunavut blizzard kick-starts Cambridge Bay's holiday break," 2018, https://nunatsiaq.com/stories/article/a-good-old-nunavut-blizzard-kick-starts-cambridge-bays-holiday-break/; CBC News, "Iqaluit gets 30 emergency calls for water delivery after extreme cold suspends truck services," 2018, https://www.cbc.ca/news/canada/north/iqaluit-cold-services-1.4532370.
233 CBC News, "Pond Inlet declares state of emergency over water, sewage crisis," 2015, https://www.cbc.ca/news/canada/north/pond-inlet-declares-state-of-emergency-over-water-sewage-crisis-1.2953531.
234 CBC News, "Coral Harbour, Nunavut, in 'crisis' after sewage trucks break down," 2016, https://www.cbc.ca/news/canada/north/coral-harbour-sewage-trucks-1.3416445.
235 See announcement from Government of Canada (2017) Infrastructure Canada, "Backgrounder : Governments of Canada and Nunavut Announce Funding for Nine Community Infrastructure Projects Benefitting 19 Communities," accessed June 9, 2020, https://www.canada.ca/en/office-infrastructure/news/2017/05/backgrounder_governmentsofcanadaandnunavutannouncefundingfornine.html.
236 Kiley Daley et al., "Wastewater treatment and public health in Nunavut: A microbial risk assessment framework for the Canadian Arctic," Environmental Science and Pollution Research 25, no. 33 (November 1, 2018): 32860–72, https://doi.org/10.1007/s11356-017-8566-8.
237 Yannan Huang et al., "Removal of Human Pathogens in Wastewater Stabilization Ponds in Nunavut " CSCE 13th International Environmental Specialty Conference, Halifax, Nova Scotia, 2014, https://doi.org/10.13140/2.1.3479.1689.
238 Huang et al., "Removal of Human Pathogens in Wastewater Stabilization Ponds in Nunavut."

In 2012, Environment Canada implemented national standards that apply to municipal wastewater systems called Wastewater Systems Effluent Regulations (known as WSER standards).[239] Nunavut, the Northwest Territories, and other communities north of the 54th parallel are currently exempt from WSER regulations, which set strict targets for effluent quality. This exemption is based on the anticipated difficulty of making Arctic wastewater systems fully compliant with Canadian benchmarks, as well as the understanding that wastewater systems in Arctic contexts have been under-researched and under-monitored.[240] A study commissioned by the Government of Nunavut from the Dalhousie Centre for Water Resource Studies confirmed that while the four "passive" systems studied did demonstrate notable improvements in the quality of effluent, the Nunavut WSPs were consistently unable to meet WSER standards, and occasionally unable to meet Nunavut Water Board standards for effluent.[241]

Resolute Bay is the only community with "direct" release of wastewater into the ocean without either mechanical treatment or WSP treatment (with the exception of the airport, which has its own sewage lagoon).[242] As noted by the Nunavut Water Board in its 2019 annual inspection of Resolute Bay, dumping untreated wastewater contravenes the *Arctic Waters Pollution Prevention Act*.[243] A new water treatment plant is planned for 2020 to address this serious infrastructure gap.[244]

As the population in Nunavut grows, pressure on existing wastewater systems and sewage lagoon capacity grows.

Reliability remains a core concern for wastewater systems in Nunavut. One 2017 paper describes the issue this way "…the consistent performance of wastewater treatment in the far North of Canada, in general, remains an elusive objective and a frustration to engineers, communities, senior governments and regulators."[245]

Mechanical systems of wastewater treatment offer an opportunity to mitigate these environmental variabilities. However, mechanical systems present a different set of challenges, including higher costs and a lack of trained personnel. As of 2016, only five of the 72 wastewater treatment facilities in Nunavut, the Northwest Territories, and Nunavik were mechanical systems (the rest used some configuration of Waste Stabilization Ponds).[246]

239 Government of Canada, "Wastewater Systems Effluent Regulations," 2012, https://laws-lois.justice.gc.ca/eng/regulations/sor-2012-139/fulltext.html.
240 Huang et al., "Removal of Human Pathogens in Wastewater Stabilization Ponds in Nunavut."
241 Centre for Water Resources Studies and Dalhousie University, "Treatment Performance of Municipal Wastewater Stabilization Ponds in Nunavut," prepared for Community and Government Services," 2015, http://centreforwaterresourcesstudies.dal.ca/files/documents/Finalreport WSP performance – 18-09-2015.pdf, p. 33
242 All information on different kinds of systems available from Centre for Water Resources Studies and Dalhousie University, "Treatment Performance of Municipal Wastewater Stabilization Ponds in Nunavut," Appendix 1.
243 Report available through Nunavut Water Board, "Index of Public Registry of Nunavut Water Board," 2014, accessed June 9, 2020, ftp://ftp.nwb-oen.ca/
244 George, "Resolute Bay set to see more water and sewer upgrades."
245 Ken Johnson, Glenn Prosco, and David Lycon, "Mechanical wastewater facility challenges in the Canadian Arctic," 2017, Environment and Ecology Research 5,2 (2017): 100–106, https://issuu.com/cryofront/docs/eer3-14008471_v2.
246 Rob Jamieson et al., "Literature review of wastewater treatment design and performance in the Far North," Centre for Water Resources, 2016, http://centreforwaterresourcesstudies.dal.ca/files/documents/CWRS Literature review for wastewater treatment 04-11-2016docx.pdf.

Gap analysis

To measure the gaps in wastewater infrastructure between Nunavut and the rest of Canada, this report includes three indicators:

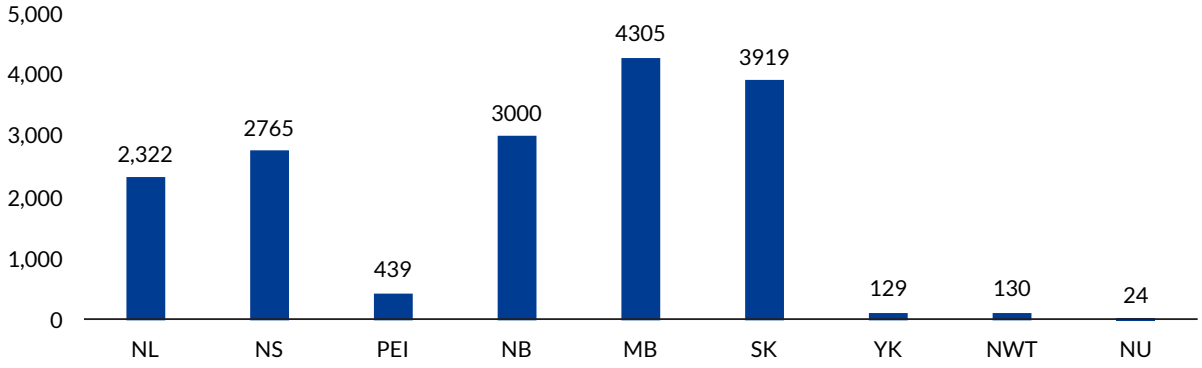
- Kilometres of publicly owned sewer pipes <450mm
- Sewer pipes state of repair
- Sewage lagoons state of repair

Indicator: kilometres of publicly owned sewer pipes <450mm

Statistics Canada keeps track of public wastewater assets, including the number of sewer pipes larger or smaller than 450mm in diameter. Nunavut has no sewer pipes larger than 450 mm. Because most Nunavut communities use trucked sewage, even small sewer pipes are not necessary. Nunavut has only 24 kilometres of small sewer pipes, as measured by Statistics Canada. The recorded total for Canada is 115,188 kilometres of small sewer pipes; no other jurisdiction has fewer than 100 km of sewer pipes.[247]

FIGURE 11

Kilometres of publicly owned sewer pipes <450mm, 2016, Statistics Canada[248]



Source: Statistics Canada, Canada's Core Public Infrastructure Survey

Wastewater pipes come with significant oversight and maintenance responsibilities in the Arctic, and therefore are less commonly used. However, even in comparison with other Canadian territories, which face similar environmental challenges with wastewater management, Nunavut has significantly fewer sewer pipes.[249] Nunavut also has significantly fewer metres of sewage pipe per capita than the Canadian average.

247 Infrastructure Canada and Statistics Canada, "Inventory of Publicly Owned Wastewater Assets," 2016, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410022201, Table: 34-10-0222-01.
248 Infrastructure Canada and Statistics Canada, "Inventory of Publicly Owned Wastewater Assets."
249 Infrastructure Canada and Statistics Canada, "Inventory of Publicly Owned Wastewater Assets."

TABLE 1

Length of sewer pipes per person, 2016, Statistics Canada

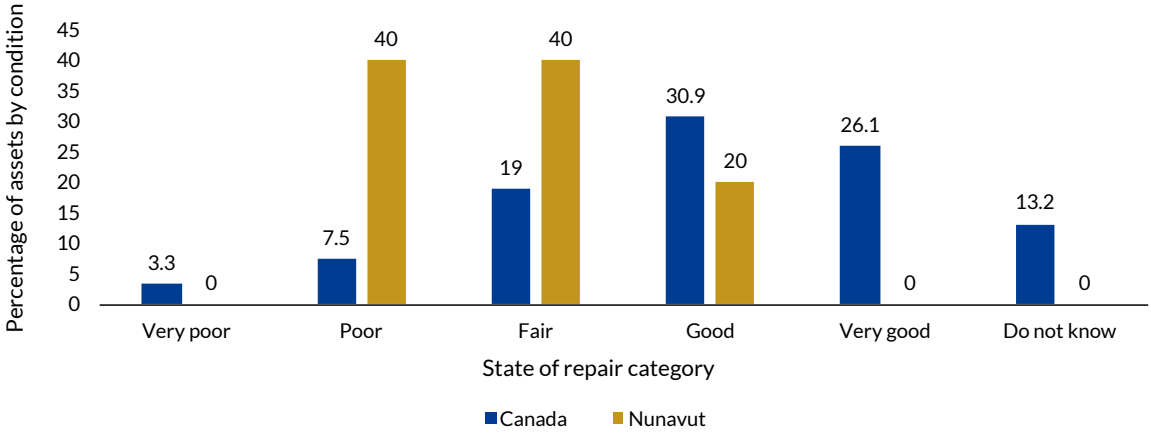
Canada (all pipes)	Canada (pipes < 450mm)	Nunavut (all pipes)
3.59 metres per person	3.06 metres per person	0.8 metres per person

Indicator: sewer pipes state of repair

Like most infrastructure in the North, wastewater infrastructure that malfunctions or breaks is hard to repair quickly. Only 20 percent of Nunavut's sewer pipes of <450 mm is rated as being in "good" repair or better: in contrast, 56 percent Canada-wide is considered "good" or "very good." The Northwest Territories also has 56 percent of small pipes "good" or "very good." Only about 12 percent of small pipes in Canada are "poor" or "very poor": 40 percent of small pipes in Nunavut are "poor" or "very poor."[250]

FIGURE 12

Condition of sewage pipes <450 mm, 2016, Statistics Canada



Source: Statistics Canada, Canada's Core Public Infrastructure Survey

Piped sewage in Nunavut is under threat due to aging infrastructure and changes to permafrost. In recent years, Iqaluit has been burying its underground water and sewer pipes deeper, in the hope of avoiding movement caused by freezing and thawing in the active layer.[251] The city estimated in 2019 that fully replacing its sewage system would cost $58 million.[252]

250 Infrastructure Canada and Statistics Canada, "Inventory of Publicly Owned Wastewater Assets," Table: 34-10-0226-01: Inventory Distribution of Publicly Owned Wastewater Assets by Physical Condition Rating," 2016, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410022601.
251 Kenyon Wallace, "Beyond frozen: Canada's permafrost is turning to mud. Here's why," Toronto Star, 2019, https://projects.thestar.com/climate-change-canada/nunavut/
252 Nunatsiaq News, "SOS to Ottawa: Nunavut capital needs help keeping its water flowing," 2019, https://nunatsiaq.com/stories/article/sos-to-ottawa-nunavut-capital-needs-help-keeping-its-water-flowing/

Even when not caused by changes in the permafrost, problems in Nunavut's piped system can be catastrophic. In spring 2019, Iqaluit's sewage management system stopped functioning for more than a month. For several weeks, an estimated 950,000 litres of sewage per day spilled untreated into Frobisher Bay, for a total of more than 30 million litres.[253] The capital's wastewater treatment plant is currently being upgraded to help address reliability concerns in the system, including through the introduction of a secondary treatment system.[254]

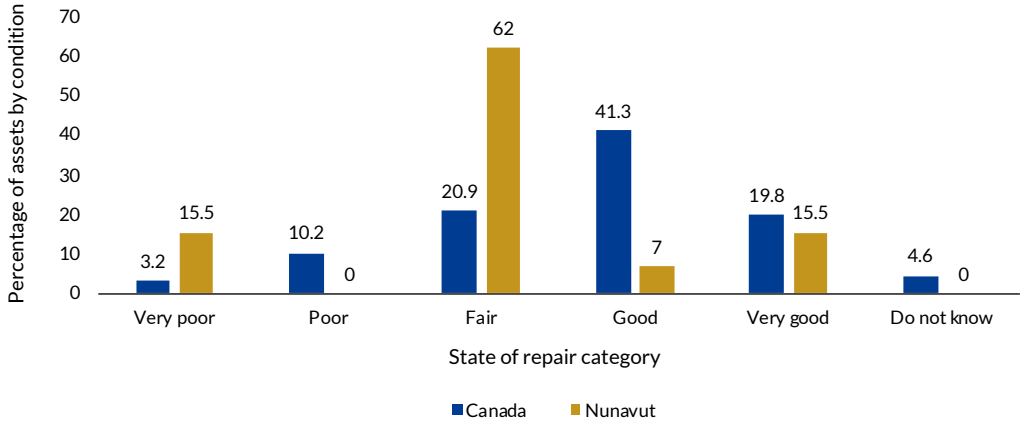
Indicator: sewage lagoon state of repair

Despite increased examination of WSP performance in Nunavut in the past ten years, there has been little comparison in performance to lagoon systems elsewhere. WSPs in Nunavut are generally seen as a safe treatment option, especially those paired with a wetland filtration system.[255] However, some experts argue that improved effluent monitoring within Nunavut is especially necessary in the context of Inuit culture: Nunavut Inuit may be more vulnerable to pathogens because of hunting lifestyle and connection with the land (for example, shellfish harvested from tidal areas may be affected by the concentration of pharmaceutical chemicals in wastewater).[256]

Statistics Canada data represented in the chart below capture only 14 of Nunavut's sewage lagoons, but these data are the most accurate and comprehensive information available. It shows that only 22.5 percent of lagoons in Nunavut are classified as being in "good" or "very good" condition (compared with 60 percent of the 1,244 lagoons captured in Canada-wide data).[257]

FIGURE 13

Sewage lagoons state of repair, 2016, Statistics Canada



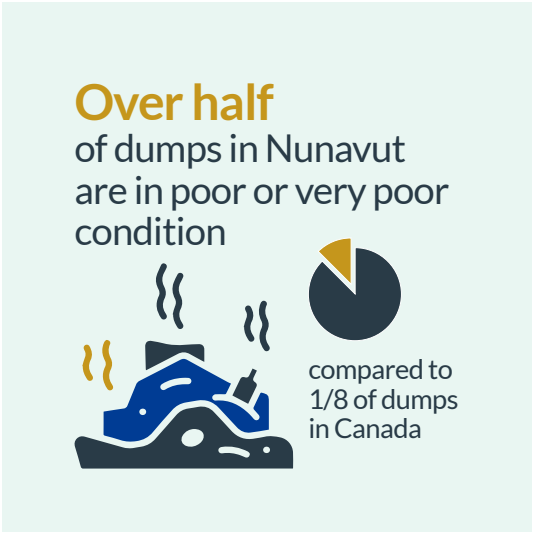
Source: Statistics Canada, Canada's Core Public Infrastructure Survey

253 CBC News, "950,000 Litres of Iqaluit's raw sewage leaking into Frobisher Bay per day," 2019, https://www.cbc.ca/news/canada/north/iqaluit-sewage-leak-1.5096768; CBC News, "Clams being tested in Frobisher Bay after mass sewage dump in the spring," 2019, https://www.cbc.ca/news/canada/north/iqaluit-clams-sewage-testing-1.5250881.
254 City of Iqaluit, "City Awards Contract to Upgrade Wastewater Treatment Plant."
255 Daley et al., "Wastewater treatment and public health in Nunavut: A microbial risk assessment framework for the Canadian Arctic."
256 Daley et al., "Wastewater treatment and public health in Nunavut: A microbial risk assessment framework for the Canadian Arctic."
257 Infrastructure Canada and Statistics Canada, "Inventory of Publicly Owned Wastewater Assets," Table: 34-10-0226-01: Inventory Distribution of Publicly Owned Wastewater Assets by Physical Condition Rating.

Solid waste

Communities across Canada rely on a variety of local infrastructure to effectively manage solid waste, using waste disposal sites (e.g., landfills or incinerators), transfer and sorting infrastructure, recycling plants, facilities to process organic material, and infrastructure to separately collect, process, and dispose of hazardous waste.

Most of this infrastructure does not exist in Nunavut. All communities except for three practise open burning of waste, which exposes residents to harmful pollutants.[258] Communities have expressed concern about exposure to open burning, the potential contamination of water, and the lack of security and safety on the sites.[259] Landfills are typically within a few kilometres of drinking water sources, and typically within one kilometre of marine environments.[260] A 2011 Government of Nunavut study was prompted by reports of batteries leaking hazardous waste directly onto the ground at the Baker Lake dump.[261]



Nunavut has little in the way of initiatives for recycling, extended producer responsibility, or hazardous waste management.

Existing solid waste infrastructure is generally inadequate to meet basic standards. In 2014 a fire in the Iqaluit landfill lasted for four months, exposing residents to harmful air pollutants and earning the name "Dumpcano" (see box).[262] In 2018 the City of Iqaluit secured funding from the federal and territorial governments to construct a new landfill to replace the overtaxed facility.[263] The new facility is now expected to be operational in 2023.[264]

While solid waste management is more challenging in remote and Northern environments, Nunavut communities have few of the best practices identified by the Arctic Council for small communities in Arctic environments (such as safer waste-burning policies, hazardous waste management, and effective landfill and equipment maintenance).[265] For more circumpolar context, see the case study on solid waste in small Arctic communities, on page 75.

258 Giroux, "State of Waste Management in Canada."
259 Arktis Solutions, "Report on Current State of Solid Waste Management and Facilities in Nunavut and Cost-Benefit Analysisof Selected Solid Waste Management Approaches," 2011, https://assembly.nu.ca/library/GNedocs/2011/000359-e.pdf.
260 Arktis Solutions, "Report on Current State of Solid Waste Management."
261 CBC News, "Nunavut to study landfill problems," 2010, https://www.cbc.ca/news/canada/north/nunavut-to-study-landfill-problems-1.870272.
262 Gloria Song, "Lessons from Dumpcano: Governance issues in solid waste management in Nunavut," Arctic Yearbook, October 2016, 249, https://www.researchgate.net/publication/323382669_Lessons_from_Dumpcano_Governance_Issues_in_Solid_Waste_Management_in_Nunavut.
263 Government of Nunavut, "Iqaluit residents to benefit from improved waste management system," July 20, 2018, https://www.gov.nu.ca/community-and-government-services/news/iqaluit-residents-benefit-improved-waste-management-system.
264 McKay, "New Iqaluit dump 2 years behind schedule."
265 Arctic Council Sustainable Development Working Group, "Best Waste Management Practices for Small and Remote Arctic Communities," 2019, https://oaarchive.arctic-council.org/bitstream/handle/11374/2387/sdwg-report__best_waste_practices_small_communities-14-February-2019.pdf?sequence=1&isAllowed=y.

IQALUIT'S DUMPCANO GARBAGE FIRE

The aging and overtaxed landfill in Iqaluit was the site of a four-month garbage fire in 2014 that closed schools and led to public health warnings to Iqaluit residents about the toxic fumes. The fire began deep in a mound of garbage equal to the length of a football field, and as high as 17 metres.[266] The toxic fumes led the city to bring in experts to put out the fire using excavators and by cooling garbage in nearby ponds. Iqaluit is in the process of replacing this landfill with a newer facility.

Solid waste management facilities in Nunavut are managed by local governments, with input from the territorial government and federal guidelines. Like many other types of infrastructure discussed in this report, the dispersed nature of Nunavut communities means that each community requires its own solution. The Nunavut Water Board is responsible for assessing and issuing water licences for each waste management site. The Nunavut Impact Review Board also plays a role in reviewing and approving new projects.

Gap analysis

To measure the gaps in solid waste infrastructure between Nunavut and the rest of Canada, this report uses three indicators:

- Dumps as a share of waste disposal sites
- Waste diversion infrastructure per capita
- State of repair of solid waste infrastructure

Because each of Nunavut's 25 communities requires its own waste disposal site, Nunavut has a much higher number of waste disposal facilities per capita than the rest of Canada (4.14 facilities per 10,000 people compared with 0.24 Canada-wide for those captured by the Infrastructure Canada Core Public Infrastructure Survey).[267] But a simple count of waste disposal infrastructure is misleading—lumping together unlined dumpsites with engineered landfills or modern incinerators, and overlooking regional approaches available to communities with road access. The indicators selected for this project aim to better capture the sophistication and quality of infrastructure.

Indicator: dumps as a share of waste disposal sites

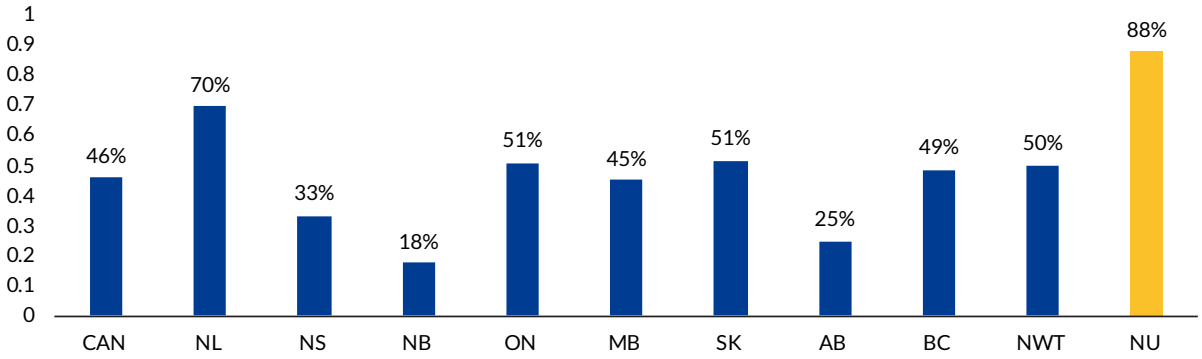
Dumps are the most rudimentary form of solid waste disposal infrastructure. Unfortunately, dumps are twice as prevalent in waste disposal infrastructure in Nunavut as they are in the rest of Canada.[268] Half of communities in Nunavut are operating dump sites that were not initially designed by engineers and lack appropriate operational or maintenance plans.[269]

266 The Globe and Mail, "Iqaluit's long-smouldering 'Dumpcano' garbage fire finally out."
267 Infrastructure Canada and Statistics Canada, "Inventory of Publicly Owned Solid Waste Assets," 2018.
268 Some provinces and territories are excluded from this comparison due to unreliable data. Based on the sample reported as part of the Core Public Infrastructure Survey. Infrastructure Canada and Statistics Canada, "Inventory of Publicly Owned Wastewater Assets."
269 Giroux, "State of Waste Management in Canada."

In other jurisdictions, sophisticated infrastructure exists for waste that cannot be avoided or diverted. Examples include engineered landfills that feature design and barriers to isolate waste from local water and other risks, or incineration facilities that provide controlled environments to manage emissions from burning waste (and in some cases capturing heat for energy).

FIGURE 14

Dumps as a share of waste disposal sites



Source: Canada's Core Public Infrastructure Survey

While burning waste is common in Northern environments, better infrastructure can facilitate cleaner outcomes. Yukon has eliminated open burning in all communities[270] and in Greenland most communities capture energy-from-waste for district heating.[271]

Nunavut's landfills also face capacity limitations, which contribute to fires and windblown litter. The Iqaluit landfill was scheduled to be replaced in 2020, as it has reached full capacity, but the new landfill has been delayed until 2023.[272]

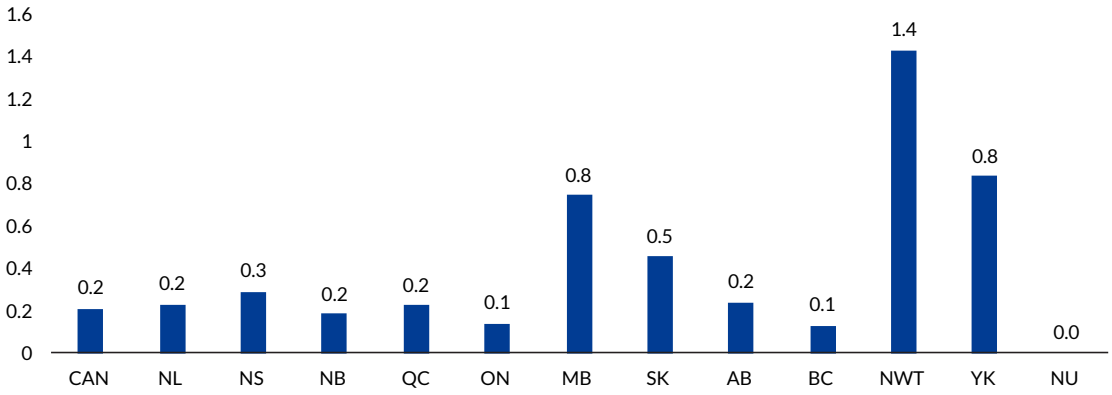
Indicator: waste diversion facilities per capita

Waste diversion assets allow communities to reduce the amount of waste that goes to landfill. They include composting facilities, materials recovery facilities (that support recycling), and anaerobic digestion facilities for organic waste. Nunavut does not currently have any dedicated waste diversion infrastructure. However, a new planned facility in Iqaluit will provide infrastructure for sorting recyclable materials to be shipped south and some limited energy-from-waste processes (to heat the facility).[273] A recycling program was piloted by the Government of Nunavut from 2007–10 but was not continued due to cost.[274] Nunavut has a beverage container recycling program operating in 23 communities run by the Arctic Co-ops.[275]

270 Giroux, "State of Waste Management in Canada."
271 Zenica Gosvig Larsen, "Waste Management Improvements in Greenland," The Journal of the Northern Territories Water and Waste Association, 29 (2019): 1064-70. https://journals.sagepub.com/doi/10.1177/0734242X10395421.
272 CBC News, "New Iqaluit dump 2 years behind schedule"
273 CBC News, "Here's what's going to happen to your garbage in Iqaluit," November 22, 2018, https://www.cbc.ca/news/canada/north/iqaluit-dump-plans-1.4915363
274 Government of Nunavut, "Solid Waste Management in Nunavut: A Backgrounder," accessed June 10, 2020, http://env.gov.nu.ca/programareas/environmentprotection/resources.
275 Giroux, "State of Waste Management in Canada."

FIGURE 15

Number of Waste Diversion facilities per capita, provinces and territories[276]



Source: Canada's Core Public Infrastructure Survey

Hazardous waste management exists at the landfill sites in all communities except Gjoa Haven, but is generally limited to containers for old batteries, lined areas for contaminated soil, and barrels for used oil or other liquids.[277] Many community landfills contain dangerous waste such as car batteries, waste oil, mercury switches from old appliances, and CFCs from old refrigerators and freezers.[278] Improperly stored and handled hazardous waste that ends up in landfill can easily reach the ocean, given the limited barrier systems in place at community dumps and the coastal location of communities.[279]

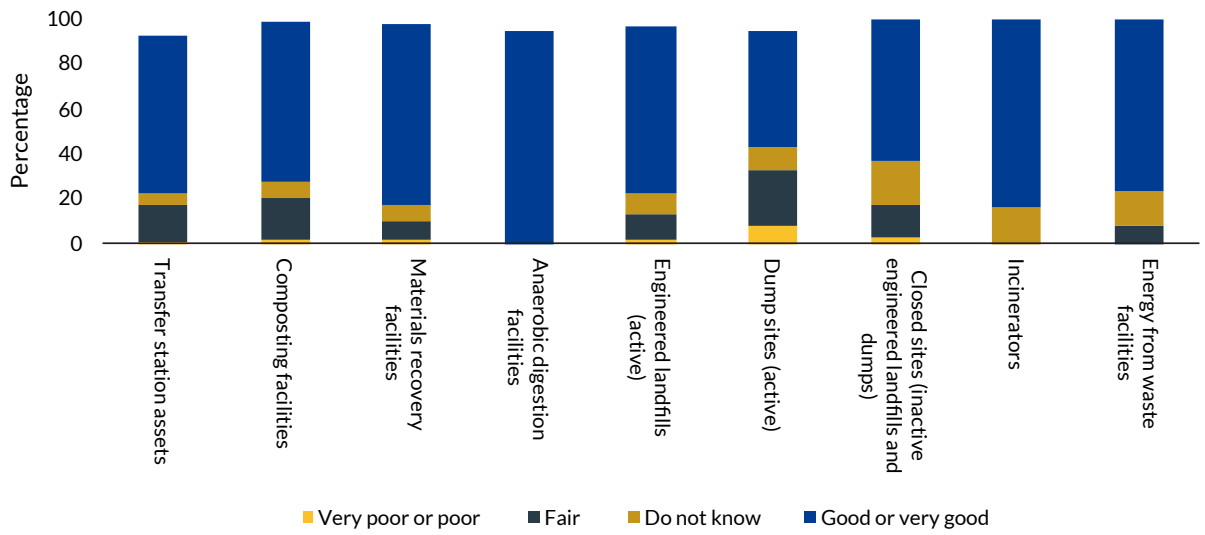
Indicator: state of repair of solid waste infrastructure

Nunavut facilities also face state-of-repair challenges. More than half of dumps (which represent the bulk of waste disposal facilities in Nunavut) were reported to be in poor or very poor condition, compared with one in eight dumps Canada-wide.[280]

276 Infrastructure Canada and Statistics Canada, "Inventory of Publicly Owned Solid Waste Assets."
277 Arktis Solutions, "Report on Current State of Solid Waste Management and Facilities in Nunavut and Cost-Benefit Analysis of Selected Solid Waste Management Approaches."
278 Dillon Consulting, "Evaluation of Recycling Pilot Projects Final Report Evaluation of Recycling Pilot Projects," 2010, https://www.gov.nu.ca/sites/default/files/Evaulation%20of%20Recycling%20Pilot%20Projects%20-%20Final%20Report%20-%20March%202%202010.pdf.
279 Song, "Lessons from Dumpcano: Governance issues in solid waste management in Nunavut."
280 Infrastructure Canada and Statistics Canada, "Inventory Distribution of Publicly Owned Solid Waste Assets by Physical Condition Rating," 2018, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410024001.

FIGURE 16

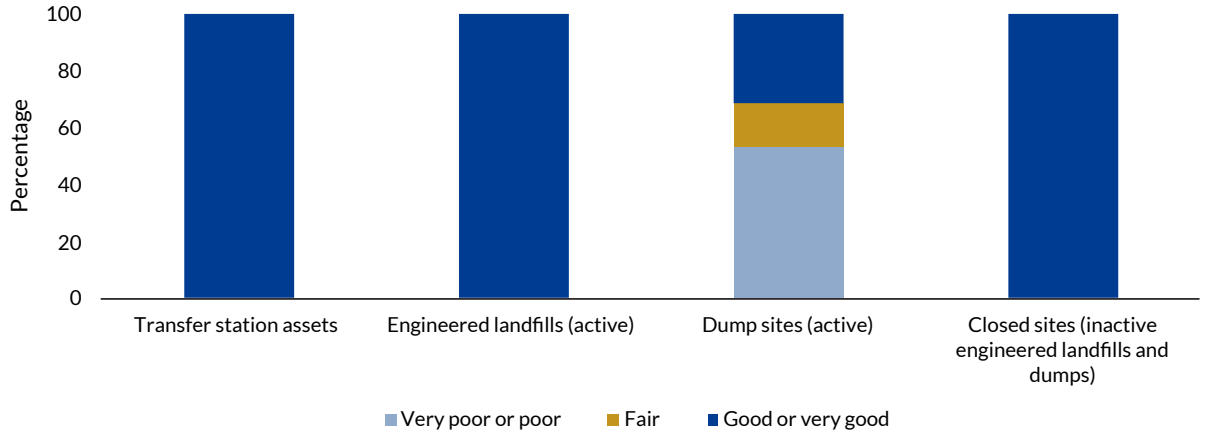
State of repair for solid waste sites: Canada



Source: Canada's Core Public Infrastructure Survey

FIGURE 17

State of repair for solid waste sites, Nunavut



Source: Canada's Core Public Infrastructure Survey

The results of the Core Public Infrastructure Survey are not verified through inspections, which might raise doubts about the accuracy of the data, particularly given the rates of response. For example, all engineered landfills included in the survey were reported to be in very good condition, despite well-known challenges.281 Regardless, there are significant differences in reported conditions between Nunavut and the rest of Canada.

281 Infrastructure Canada and Statistics Canada, "Inventory Distribution of Publicly Owned Solid Waste Assets by Physical Condition Rating."

SMALL COMMUNITY SNAPSHOT

INCINERATORS AND SOLID WASTE MANAGEMENT IN SMALL ARCTIC COMMUNITIES

Solid waste infrastructure in Nunavut communities is limited. Open burning of waste (without facilities to manage emissions) remains a regular practice.[282] A 2011 study commissioned by the Government of Nunavut reported a variety of health and safety concerns, ranging from smoke to capacity and collection issues.[283] Nunavut's Chief Medical Officer of Health has warned against the effects of burning waste on air quality.[284]

These are common challenges elsewhere in the Arctic. Some rural Finnish Lapland communities practise home barrel burning.[285] Many remote Alaskan villages use unlined and unsegregated open dumpsites.[286]

But pan-Arctic comparisons show that safer practices and better infrastructure are possible, even in similar settings. An Arctic Council study that included Arviat and Kinngait alongside communities across Alaska, Northern Canada, and Finland found that Nunavut communities used few of the best practices (e.g., waste burning policies, hazardous waste management, landfill maintenance practices) that were common in other communities.[287]

For example, Sambaa K'e in the Northwest Territories (pop. 120) has eliminated open burning of waste and practises semi-regular landfill maintenance with remediation.[288] In Greenland, six "regional" incinerators in larger centres like Nuuk, Sisimut, and Ilulissat provide extra heat that can be sold locally.[289] Smaller Greenlandic communities installed incinerators in the 1990s to replace open-air burning of waste.[290]

Old Crow (pop. 221) in Yukon invested in new gasifier incineration infrastructure following the ban on burning waste in the territory that took effect in January 2012.[291] The facility is managed by the Vuntut Gwitchin First Nation.[292] A pilot of a similar technology in Iqaluit was limited by performance issues with the machinery.[293] Cambridge Bay has recently explored the purchase of an incinerator with a heat recovery system based on the one used in Utqiavik, Alaska (pop. 4,930).[294]

282 Government of Nunavut, "Environmental Guideline for the Burning and Incineration of Solid Waste," 2012, http://env.gov.nu.ca/programareas/environmentprotection.
283 Arktis Solutions, "Report on Current State of Solid Waste Management and Facilities in Nunavutand Cost-Benefit Analysis of Selected Solid Waste Management Approaches."
284 John Van Dusen, "City of Iqaluit should stop burning cardboard and wood: Nunavut Health Dept.," CBC News, 2016, https://www.cbc.ca/news/canada/north/nunavut-health-iqaluit-stop-burning-cardboard-wood-1.3798929.
285 Arctic Council Sustainable Development Working Group, "Best Waste Management Practices for Small and Remote Arctic Communities"
286 "Alaska begins its future of solid waste management," Waste Advantage Magazine, 2014, https://wasteadvantagemag.com/alaska-begins-its-future-of-solid-waste-management/
287 Arctic Council Sustainable Development Working Group, "Best Waste Management Practices for Small and Remote Arctic Communities""
288 Arctic Council Sustainable Development Working Group, "Best Waste Management Practices for Small and Remote Arctic Communities."
289 Rasmus Eisted and Thomas H. Christensen, "Waste management in Greenland: Current situation and challenges," Waste Management and Research 29, 10 (October 2011): 1064–70, https://doi.org/10.1177/0734242X10395421.
290 Larsen, "Waste management improvements in Greenland."
291 Huang et al., "Removal of Human Pathogens in Wastewater Stabilization Ponds in Nunavut."
292 Jacqueline Ronson, "First Nation to manage Old Crow dump," Yukon News, 2014, https://www.yukon-news.com/news/first-nation-to-manage-old-crow-dump/
293 John Thompson, "Talking trash in the remote Canadian Arctic," Arctic Deeply, 2016, https://www.newsdeeply.com/arctic/articles/2016/11/23/talking-trash-in-the-remote-canadian-arctic.
294 Nunavut News, "Cambridge Bay in talks for garbage-burning incinerator" 2019, https://nunavutnews.com/nunavut-news/cambridge-bay-in-talks-for-garbage-burning-incinerator/

Emergency response and protection

Gaps in emergency response infrastructure, along with shortages of equipment and human resources, have real and critical consequences for Nunavut Inuit. Nunavut has the third-highest number of ground search-and-rescue incidents of any province or territory.[295] Inadequate fire response infrastructure, including a lack of adequate water pressure, leads to a high rate of damage from fires.[296] This lack of preparedness has led to the shutdown of schools, housing, and other critical infrastructure in recent years because of fires, including school fires in Kinngait and Kugaaruk.[297]

The emergence of COVID-19 in the rest of Canada has also laid bare how infrastructure limitations and gaps make it more difficult for Nunavut to respond to public health emergencies. Slow Internet connections mean that videoconferencing, a vital tool for working remotely and a common practice elsewhere in Canada, is impractical in Nunavut. The kind of physical distancing required of those who suspect they might have the virus is virtually impossible in overcrowded homes.

The lack of health care infrastructure poses further risks. Any potential surge of COVID-19 patients in Nunavut would overwhelm primary care capacity and any patients requiring intensive care would need to be transported out of the territory. Indeed, even COVID-19 tests need to be analyzed in the South, causing delays of six to seven days regarding results.[298] Most communities also lack a functional morgue, meaning that, if a COVID-19 outbreak should occur, there would be no safe space to store bodies.[299]

Beyond COVID-19, improved emergency preparedness and response was identified as a critical pillar of the Arctic and Northern Policy Framework, including commitments from the Government of Canada to strengthen search-and-rescue responsiveness to emergencies in the Arctic.[300] Inuit Tapiriit Kanatami has emphasized that Inuit infrastructure should be prioritized to improve Arctic search-and-rescue and emergency preparedness.[301]

As the Arctic and Northern Policy Framework emphasizes, Nunavummiut are on the front lines of climate change.[302] Rapid warming and changing ecological patterns mean new risks of emergencies. Gaps in ability to respond are exacerbated by aging infrastructure, including power plants near the end of their working life and failing wastewater systems. It can also be more difficult for emergency responders to reach incident sites, with only one coast guard base for the entire territory.

While this project scope does not include military infrastructure related to international security, some defence infrastructure is critical to civilian emergency preparedness, such as search-and-rescue efforts in Nunavut waters. These dual-purpose types of infrastructure are a critical part of emergency readiness.

295 Public Safety Canada, "Quadriennial Search and Rescue Review," December 2013, http://www.nss.gc.ca/en/quadrennial-review/quadrennialsarreview-report.page.
296 Kent Driscoll, "A third of Government of Nunavut owned buildings have no replacement insurance because of costs," APTN News, November 16, 2018, https://www.aptnnews.ca/national-news/a-third-of-government-of-nunavut-owned-buildings-have-no-replacement-insurance-because-of-costs/Driscoll.
297 Nunavut News, "6 Nunavut schools are uninsurable because of past arsons."
298 Rajnesh Sharma, "COVID-19 Updates: Equipment, Testing and Viral Infections," Nunavut News, April 22, 2020, https://nunavutnews.com/nunavut-news/covid-19-updates-equipment-testing-and-viral-infections/
299 Nunavut News, "Resting in peace not an option in most Nunavut communities," 2018, https://nnsl.com/nunavut-news/resting-in-peace-not-an-option-in-most-nunavut-communities/
300 Government of Canada and Crown-Indigenous Relations and Northern Affairs Canada, "Canada's Arctic and Northern Policy Framework," 2019, https://www.rcaanc-cirnac.gc.ca/eng/1560523306861/1560523330587.
301 Inuit Tapiriit Kanatami, "Arctic and Northern Policy Framework: Inuit Nunangat."
302 Government of Canada and Crown-Indigenous Relations and Northern Affairs Canada, "Canada's Arctic and Northern Policy Framework," June 14, 2019, https://www.rcaanc-cirnac.gc.ca/eng/1560523306861/1560523330587.

Gap analysis

To measure the gaps in emergency protection and response infrastructure between Nunavut and the rest of Canada, this report includes three indicators:

- Coast guard search-and-rescue stations
- Firefighting infrastructure
- Fire damage

It is challenging to capture the full range of infrastructure needs relevant to emergency preparedness in a comparative way, but there are some key metrics. The indicators chosen are focused on emergency infrastructure not captured elsewhere—the resilience of health, power, and water infrastructure are, of course, also essential elements of emergency preparedness and response.

Indicator: coast guard search-and-rescue stations

Search-and-rescue services in Canada rely on a variety of military and civilian infrastructure and personnel. The Canadian Coast Guard is responsible for marine search and rescue, while provincial and territorial governments are responsible for people lost or in distress on land or inland waters.[303] Parks Canada is responsible for searches in national parks.[304]

TABLE 2

Search-and-rescue services in Nunavut

Search and rescue need	Jurisdiction
Air incidents	Canadian Forces with support from volunteers from Civil Air Search and Rescue Association
Marine	Canadian Coast Guard, with support from volunteers from Canadian Coast Guard Auxiliary
Ground search and rescue and inland waters	Provincial/territorial governments (typically led by police) with support from local volunteers from local Hunters and Trappers Organizations and the Search and Rescue Volunteer Association of Canada
National parks and marine conservation areas	Parks Canada

As all communities in Nunavut are located on water, marine search-and-rescue infrastructure is of particular importance. The Canadian Coast Guard operates a network of stations that includes dedicated lifeboat response infrastructure. Local Coast Guard bases also provide infrastructure and vessels to respond to local incidents. There is one base in Nunavut, in Iqaluit, operating seasonally and focused on marine communications. The Canadian Arctic has no year-round dedicated marine search-and-rescue assets.[305] All Canadian Forces air assets for search and rescue are stationed at bases in the South, delays of seven to fourteen hours for air force jets in Halifax and Trenton to reach Nunavut are common.[306]

303 Public Safety Canada, "National Search and Rescue Program," 2019, https://www.publicsafety.gc.ca/cnt/mrgnc-mngmnt/rspndng-mrgnc-vnts/nss/prgrm-en.aspx.
304 Public Safety Canada, "National Search and Rescue Program."
305 Senate of Canada, "When Every Minute Counts: Maritime Search and Rescue," 2018, https://sencanada.ca/en/info-page/parl-42-1/pofo-sar-maritime/
306 Senate of Canada, "When Every Minute Counts"; Research interviews, 2020.

TABLE 3

Canadian Coast Guard bases and stations, Canadian Coast Guard

	NL	PEI	NS	NB	QC	ON	MB	BC	NT	NU
Stations	6	3	5	2	6	14	1	16	1	1

The Canadian Coast Guard also operates 26 smaller Inshore Rescue Boat Stations across Canada equipped with fast rescue craft for marine response.[307] These are operated seasonally by postsecondary students. The Arctic region has one Inshore Rescue Boat station, based in Rankin Inlet.[308] The station opened in 2018.

TABLE 4

Inshore Rescue Boat Stations, Canadian Coast Guard

	NL	PEI	NS	NB	QC	ON	BC	NU
Stations	3	1	3	2	5	7	4	1

There are also few navigation aids and hydrographic surveys that the Coast Guard can use to assist other vessels in travelling safely through Nunavut's Arctic waters.[309] An estimate from the Canadian Hydrographic Service suggests only one percent of Canadian Arctic waters have been surveyed to modern standards.[310]

The Senate Standing Committee on Fisheries and Oceans completed a study on maritime search and rescue in 2018. It highlighted the need for investments in additional stations in the Arctic as a priority, with decisions on specific locations to be made with local communities.[311] It also highlighted the fact that the limited Coast Guard presence in the Arctic means less Inuit participation. It recommended that the Canadian Coast Guard partner with Nunavut Arctic College to offer maritime and search-and-rescue training programs.[312]

Volunteers play a major role in marine search-and-rescue response. The Canadian Coast Guard Auxiliary has approximately 1,100 vessels (most privately owned) and 4,000 volunteers based in communities across Canada. Recent federal support through the Community Boat Program has provided funding for the purchase of boats; however, they rely on private or community sheds or warehouses to store the boats. Coast Guard Auxiliaries exist in Cambridge Bay, Gjoa Haven, Clyde River, Kugluktuk, Rankin Inlet, Arviat, Pond Inlet, and Taloyoak.[313]

307 Canadian Coast Guard, "Station Locations," 2019, https://www.ccg-gcc.gc.ca/search-rescue-recherche-sauvetage/irb-esc/station-location-emplacement-eng.html.
308 Canadian Coast Guard, "Canadian Coast Guard inshore rescue boat crew in Nunavut completes first season," accessed March 11, 2020, https://www.newswire.ca/news-releases/canadian-coast-guard-inshore-rescue-boat-crew-in-nunavut-completes-first-season-694139711.html.
309 Research interviews, 2020.
310 Auditor General of Canada, "Marine Navigation in the Canadian Arctic," 2014, Chapter 3, https://www.oag-bvg.gc.ca/internet/English/parl_cesd_201410_03_e_39850.html#hd3a.
311 Senate of Canada, "When Every Minute Counts."
312 Senate of Canada, "When Every Minute Counts."
313 Derek Neary, "Coast Guard plans for more search and rescue vessel sites in Nunavut," Northern News Services, January 30, 2020, https://nnsl.com/nunavut-news/coast-guard-plans-for-more-search-and-rescue-vessel-sites-in-nunavut/

Indicator: firefighting infrastructure

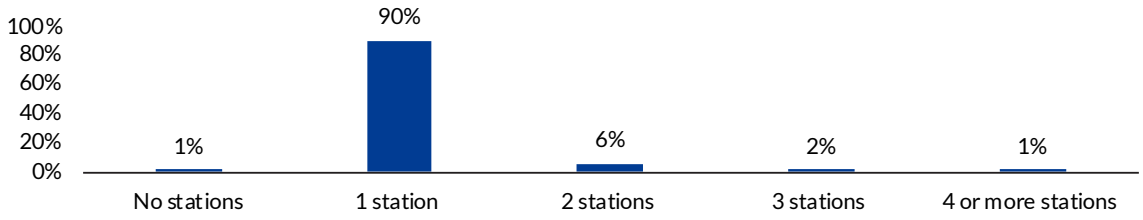
Nunavut's 25 communities rely on a mix of career and volunteer fire fighters. Across Canada, more than 90 percent of communities with populations under 25,000 rely on volunteer firefighters.[314] These firefighters rely on adequate fire halls to store equipment and train.

Adequate fire infrastructure is of particular importance in Nunavut, given both the Arctic climate and the frequency of fires in Nunavut communities. For example, funding was provided to the hamlet of Cambridge Bay for a new fire truck to service the nearby Canadian High Arctic Research Station campus.[315] However, without an adequate fire hall to store the truck, the equipment often froze.[316] When the school in Kugaaruk burned down in 2017, the fire truck could not function because the water was frozen.[317]

It is common for even very small communities across Canada to have their own fire stations and pumpers. According to the National Fire Protection Association's Fire Service Survey of Canada, fewer than one percent of communities with populations under 2,500 lack a fire station of their own.[318]

FIGURE 18

Number of fire stations for Canadian communities with populations under 2,500



Source: National Fire Protection Association

A number of communities in Nunavut fall short of this standard. Because there is no official definition of "fire station" or "fire hall," it is not possible to get clear comparative data broken down by province or territory. However, several communities rely on repurposed or shared infrastructure that is not fit for purpose. Grise Fiord relies on a garage which has no washroom facilities or running water.[319] Kugaraak's current fire hall is a small Quonset hut, housing the fire truck, but lacking room for training or meetings for fire personnel, or all needed fire equipment.[320] Nunavut communities consistently identify firefighting infrastructure among their infrastructure priorities. Of the 25 communities' recent infrastructure plans, 16 identified new fire halls or significant renovations as being needed.[321]

314 Hylton J. G. Haynes and Gary P. Stein, "Canadian Fire Department Profile, 2014–16," National Fire Protection Association, 2014, https://www.nfpa.org//-/media/Files/News-and-Research/Fire-statistics-and-reports/Emergency-responders/oscanada.pdf.
315 Nunatsiaq News, "CHARS Steamrolls into Nunavut's Cambridge Bay," n.d.
316 Research interview, 2020.
317 Legislative Assembly of Nunavut, "Hansard," 2nd Session 5th Assembly, October 31, 2018, https://assembly.nu.ca/hansard.
318 Haynes and Stein, "Canadian Fire Department Profile, 2014–16."
319 Government of Nunavut, "Infrastructure Plan for Grise Fiord," 2019, http://toolkit.buildingnunavut.com/en/Community/Plan/b17ac5f3-8273-41ec-9982-a1f700f2d229.
320 Government of Nunavut, "Infrastructure Plan for Kugaaruk," ICSP Toolkit, 2019, http://toolkit.buildingnunavut.com/en/Community/Plan/78428517-7b83-4bc1-8ed1-a1f700f3102a.
321 "Community Profiles – Government of Nunavut," accessed March 12, 2020, http://www.buildingnunavut.com/en/communityprofiles/communityprofiles.asp.

Communities have also highlighted water supply infrastructure as a challenge for their firefighting needs.[322] Without piped water infrastructure, departments cannot rely on fire hydrants. Even where piped water is available, there are still infrastructure gaps. For example, the utilidor system used in Iqaluit frequently suffers from low water pressure, which can make fighting a fire more difficult.[323]

Indicator: fire damage

In 2017, the Nunavut Office of the Fire Marshall reported that 135 fires caused $41.8 million in damage.[324] The high rate of damage that year (the most recent year for which data are available) was driven in part by the fire that destroyed the Kugaardjuq school in Kugaaruk.[325]

TABLE 5

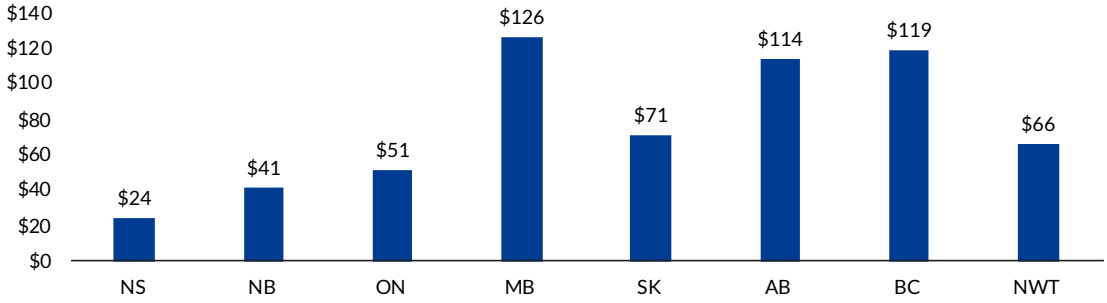
Cost of fire losses per capita in Nunavut, Nunavut Office of the Fire Marshall

Year	2013	2014	2015	2016	2017	5-year average
Non-adjusted loss per capita $CAD current prices	$123	$148	$1,203	$79	$1,093	$529

While a single incident can skew annual statistics in a small jurisdiction like Nunavut, the cost of inadequate fire preparedness in Nunavut is nonetheless consistently above the Canada-wide norm. A 2011 study from the Canadian Council of Fire Marshalls and Fire Commissioners reported on fire losses from eight provinces and territories during the 2003–08 period. The average losses amounted to $127 per capita (when adjusted to 2017 dollars).[326] Nunavut's 2017 fire losses per capita were eight and a half times that national average, and the five-year rolling average from Nunavut was four times the national average.[327]

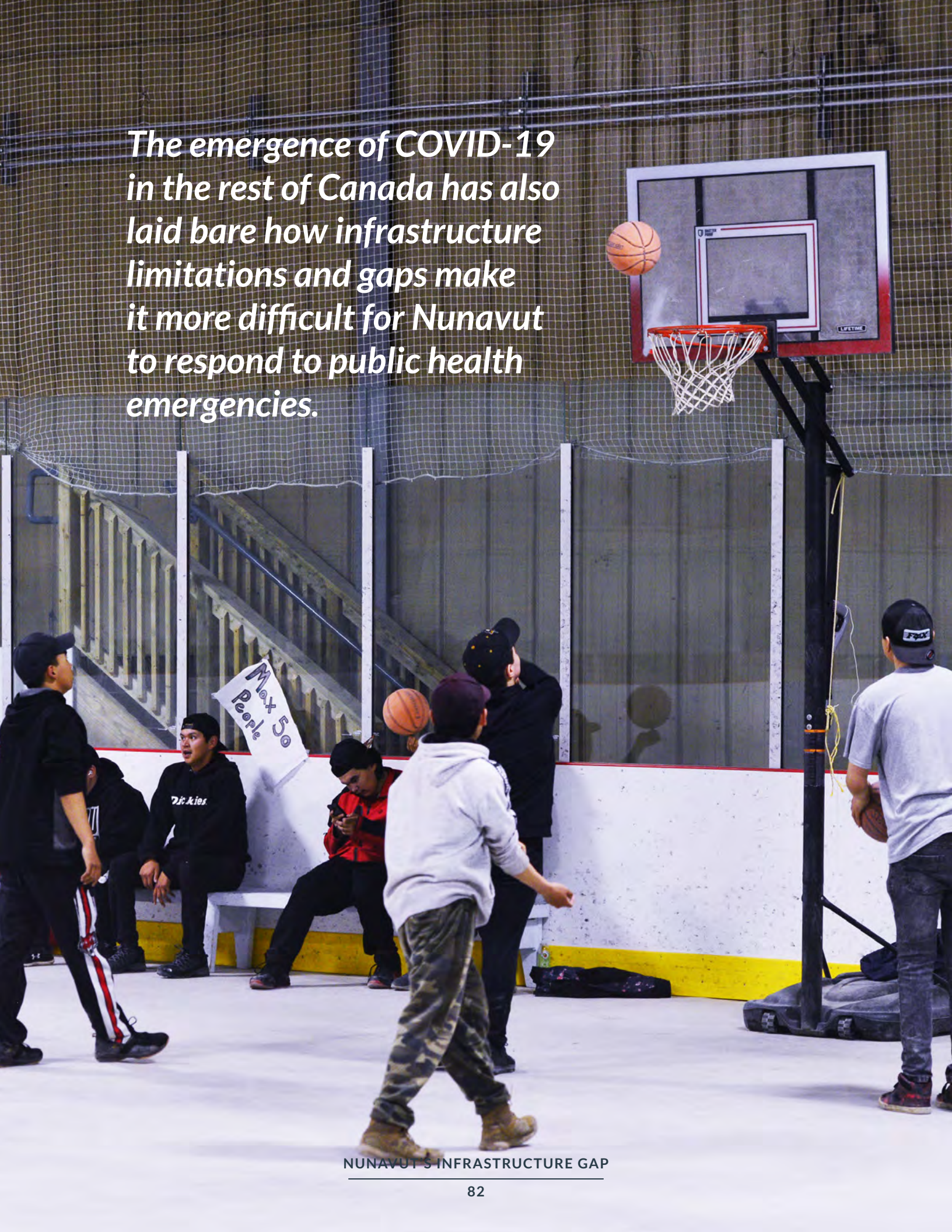
FIGURE 19

Fire losses per capita (2007 and selected years, adjusted to 2017 CAD)



Source: Canadian Council of Fire Marshalls and Fire Chiefs

322 For example, see Government of Nunavut, "Infrastructure Plan for Kimmirut," 2019, http://toolkit.buildingnunavut.com/en/Community/Plan/ff9928c2-eef9-4aeb-8be5-a1f700f2eafe.
323 Research interviews, 2020. See also George, "City of Iqaluit says climate change is contributing to its water pipe woes."
324 Government of Nunavut, "Department of Community and Government Services Office of the Fire Marshal Annual Report," 2017.
325 CBC News, "One year after Kugaaruk school fire, student attendance is up," CBC News," 2018, https://www.cbc.ca/news/canada/north/kugaaruk-school-anniversary-fire-1.4556379.
326 Wijayasinghe, "Fire losses in Canada year 2007 and selected years." Data for jurisdictions other than Nunavut is for 2007, other than Saskatchewan which is for 2008. The cost of losses has been adjusted to 2017 dollars based on inflation data from the Bank of Canada.
327 Wijayasinghe, "Fire losses in Canada." Data for jurisdictions other than Nunavut is for 2007, other than Saskatchewan, which is for 2008. The cost of losses has been adjusted to 2017 dollars based on inflation data from the Bank of Canada.



The emergence of COVID-19 in the rest of Canada has also laid bare how infrastructure limitations and gaps make it more difficult for Nunavut to respond to public health emergencies.

People & communities

Nunavut is the country's only Indigenous-majority territory, has the youngest and fastest-growing population in Canada, and has one of the country's fastest-growing economies. But Nunavut Inuit well-being and opportunity are blocked by the quality and availability of the social infrastructure that directly serves people and communities, such as housing and education.

Food insecurity within Nunavut is by far the highest in the country—nearly a quarter of Nunavummiut experience severe food insecurity. The death rate for young men aged 20–24 in Nunavut is more than six times higher than the average for Canadians of the same age.[328] Nunavummiut have the lowest rates of postsecondary attainment in the country; many Inuit students are unable to access K–12 education in Inuktut, while there is still no high school Inuktut curriculum deployed. Most Nunavut students are currently receiving below the required Inuktut instructional time to support bilingual education. While students should be learning all subject matters in their mother tongue, exposure to Inuktut varies from school to school. In some cases students are exposed to less than three hours of Inuktut instruction a week.

A disastrous shortage of adequate housing in the territory presents barriers to healthy growth, with overcrowding compounding and complicating other challenges. In particular, Nunavut Inuit are at an elevated risk for violence, incarceration, ill health, and economic precarity.

This section of the report includes 21 infrastructure indicators in six infrastructure priority areas. Specific indicators for social infrastructure are harder to isolate and map against national comparators than indicators for sewers or roads. However, the task of measuring social infrastructure gaps, and taking action to remedy the deficit, is no less urgent for being more nuanced.

328 CBC News, "N.W.T. and Nunavut Continue to Have Highest Workplace Death Rate in Country," 2020, https://www.cbc.ca/news/canada/north/nwt-nunavut-day-of-mourning-1.5547391.

Priority area	Indicators
Housing	> Housing suitability (overcrowding) > Housing in need of major repair > Households with a member on a waiting list for public housing > Capacity and adequacy of emergency shelters for victims of intimate partner violence
Food Sovereignty	> Stages of food travel and transfer > Price differences on commercial food items > Number of Canadian Food Inspection Agency (CFIA) licensed establishments
Health	> Number of hospital beds staffed and in operation > Mental health care and addictions infrastructure > Government spending on out-of-jurisdiction health care > Percentage of residents with a regular health care provider
Education	> Number of school-aged residents per public school > Licensed childcare facilities > University and college campuses > High school and postsecondary graduation rates
Community, culture and recreation	> Number of publicly owned sports and recreation facilities per capita > State of repair of public recreation and sports infrastructure > Economic impact of recreational or cultural enterprises
Community justice	> Capacity and state of repair for correctional institutions > Policing infrastructure > Courts and sentencing rates

These indicators are intertwined in both their causes and impacts. Overcrowded housing contributes to higher rates of tuberculosis and mental health challenges. A lack of shared "culture and recreation" spaces like community halls, freezers, or kitchens can limit the ability for Inuit communities to harvest and share country foods and transfer cultural knowledge. Nunavut's comparatively low educational attainment rate means that not enough Nunavut Inuit are in executive and managerial positions, where they can use their lived experience and Inuit societal values to guide decision-making and service provision.

Too often, Nunavut Inuit must direct limited resources and attention to addressing the consequences of social infrastructure gaps, rather than remedying the gaps themselves. Nunavut has a long-standing lack of dedicated residential care for mental health and addictions, but has had to invest elsewhere to alleviate, for example, severe overcrowding in prisons. Preventative screening for health issues like cancer can be impossible within the territory, but Nunavut spends millions each year flying people who need urgent medical care out of the territory. Professionals in policing, health, and education have significant service gaps in providing supports in Inuktut, but an enduring lack of Inuktut-based public education means that the pipeline of fluent workers remains limited.

Housing

There is a critical lack of housing supply in Nunavut. The housing that does exist is more expensive, overcrowded, and far more likely to require major repairs than elsewhere in the country. The 2019 Inuit Nunangat Housing Strategy, developed jointly by Inuit Tapiriit Kanatami and the Government of Canada, describes the state of housing infrastructure in the region as a national crisis.[329]

The housing gap translates to overcrowding for Nunavut Inuit. Nunavut has the highest number of occupants per dwelling in the country; 3.1 people for each dwelling compared with a national average of 2.3.[330] Inadequate and overcrowded housing has significant health and socioeconomic implications for Nunavut Inuit. Homes that are too crowded mean that children lack space to do homework; in some households, residents have to share beds and take turns sleeping at night.[331] A lack of space is a factor contributing to the poor education outcomes for many Nunavut Inuit; the territory has the highest percentage of residents aged 25–64 in the country who did not complete high school.[332]

Overcrowding also places residents at greater risk of catching communicable diseases, including tuberculosis.[333] Many of the social distancing policies applied throughout Canada to contain the COVID-19 pandemic have been extraordinarily difficult to implement in Nunavut's overcrowded houses. To maintain travel limitations, Nunavut was forced during COVID-19 to quarantine essential travellers in hotels in Ottawa, Winnipeg, Edmonton, and Yellowknife, driven both by a desire to limit spread on flights and the absence of accommodation that would allow for quarantining within the territory.

TUBERCULOSIS CRISIS

Overcrowded housing in Nunavut contributes to the territory's tuberculosis crisis, with rates of the disease 296 times higher for Inuit persons than non-Indigenous Canadians, and with the number of cases doubling in Nunavut between 2016 and 2017.[334] Tuberculosis is an airborne disease that can linger in the air for hours, spreading easily in the poorly ventilated and overcrowded homes that are far more common in Nunavut than other parts of Canada. Left untreated, tuberculosis can be fatal.[335] While the federal government apologized in 2019 for mismanaging the tuberculosis epidemic in Inuit communities between the 1940s and the 1960s, current progress to eliminate TB has stalled because of insufficient federal funding for community screening clinics, and more broadly, urgently needed investments to reduce overcrowding in Nunavut homes.[336]

329 Inuit Tapiriit Kanatami and Government of Canada, Inuit Nunangat Housing Strategy.
330 Statistics Canada, "Population and Dwelling Count Highlight Tables, 2016 Census—Canada, Provinces and Territories," accessed June 7, 2020, https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/hlt-fst/pd-pl/Table.cfm?Lang=Eng&T=101&S=50&O=A. Occupants per dwelling calculated by dividing the territorial population by the number of dwellings.
331 Senate of Canada, "Northern Lights: A Wake-up Call for the Future of Canada," p. 42.
332 Statistics Canada and Council of Ministers of Education, "Education Indicators in Canada."
333 Senate of Canada, "We Can Do Better: Housing in Inuit Nunangat," 2017, https://sencanada.ca/fr/comites/appa/42-1; CBC News, "Progress on TB-elimination in Nunavut stalled due to lack of funding," 2020, https://www.cbc.ca/news/canada/north/tuberculosis-nunavut-philpott-update-1.5431199.
334 CBC News, "TB still a killer in Nunavut, as health workers and politicians struggle to stop the outbreaks," 2018, https://www.cbc.ca/news/canada/north/tb-still-a-killer-in-nunavut-as-health-workers-and-politicians-struggle-to-stop-the-outbreaks-1.4559587.
335 CBC News, "TB still a killer in Nunavut."
336 Prime Minister of Canada, "Statement of Apology on Behalf of the Government of Canada to Inuit for the Management of the Tuberculosis Epidemic from the 1940s–1960s," 2019, https://pm.gc.ca/en/news/speeches/2019/03/08/statement-apology-behalf-government-canada-inuit-management-tuberculosis#; CBC News, "Progress on TB-Elimination in Nunavut Stalled Due to Lack of Funding."

Public housing infrastructure in Nunavut compensates for a significant gap in private housing infrastructure. Of the approximately 11,500 dwellings in the territory, slightly more than 10 percent are reserved for Government of Nunavut employees, and nearly 50 percent are public housing.[337] Nationally, non-market housing represents about 5 percent of the housing stock.[338]

The difference is significant for renters; in 2018, 75 percent of renter households in Nunavut lived in non-market housing, compared with 38 percent in the Northwest Territories and 13.5 percent nationally.[339] The high rate of non-market housing in Nunavut is a response to the absence of private developers in most communities, high costs of building, and an average income too low to afford market rent.[340]

Even with the higher share of non-market housing, more than half of communities are critically underserved. In its 2018–19 Annual Report, the Nunavut Housing Corporation found that more than half (14 out of 25) communities are facing critical shortages in public housing—meaning a community needs an increase of 40 percent or more to its housing stock just to meet its *current* housing needs.[341] This does not take into account Nunavut's growing and young population. Igloolik, Kugaaruk, and Iqaluit have the highest reported housing needs, with Iqaluit requiring 66 percent more public housing units to meet current demand.[342] Only one community (Grise Fiord) was identified as being in need of an increase that amounts to less than 20 percent of its existing public housing stock.[343]

The lack of housing affects other infrastructure priority areas. For example, a lack of housing in smaller communities can affect the availability of health services to Nunavut Inuit if there is nowhere to accommodate health workers. The lack of accommodations for construction crews building new schools or other facilities impacts the ability of projects to be delivered on time and on budget. Overall, the shortage of housing impedes Inuit efforts to build capacity to meet the needs of Nunavut communities. Housing is also a barrier to the expansion of postsecondary education opportunities in Nunavut, both for instructors and students.[344]

At the same time, the territory has only a narrow range of temporary shelter options for persons at risk of domestic violence or homelessness. Among the 25 communities in Nunavut, currently only four homeless shelters are in operation, with one additional "damp shelter" for persons under the influence of alcohol, and five shelters for persons escaping violence.[345] Most communities have no shelter space at all.

The territory also lacks transitional housing facilities, which provide longer-term temporary shelter for persons in need. Overcrowding and a lack of alternative or emergency housing elevate the risk of gender-based violence. As of 2018, the rate of violent crime reported by women to police in Nunavut is 13 times higher than the national average.[346]

337 Research interviews, 2020; see also Nunavut Housing Corporation, "Nunavut Housing Corporation, Annual Report 2018–19," p. 8.
338 Steve Pomeroy, "Examining the dynamics of Canada's housing tenure system: Implications for a National Housing Strategy," Canadian Housing and Renewal Association, 2017, https://chra-achru.ca/examining-the-dynamics-of-canadas-housing-tenure-system-implications-for-a-national-housing-strategy/
339 Statistics Canada, "The Daily—First Results from the Canadian Housing Survey, 2018."
340 Inuit Tapiriit Kanatami and Government of Canada, "Inuit Nunangat Housing Strategy, " pp. 6, 20.
341 Nunavut Housing Corporation, "Nunavut Housing Corporation, Annual Report 2018–19."
342 Nunavut Housing Corporation, "Nunavut Housing Corporation, Annual Report 2018–19."
343 Nunavut Housing Corporation, "Nunavut Housing Corporation, Annual Report 2018–19."
344 Research Interview, 2020.
345 Research interview, 2020.
346 Pauktuutit Inuit Women of Canada, "Study of gender-based violence and shelter services needs across Inuit Nunangat," accessed June 3, 2020, https://www.pauktuutit.ca/project/study-of-gender-based-violence-and-shelter-services-needs-across-inuit-nunangat/

Gap analysis

To measure the gaps in housing infrastructure between Nunavut and the rest of Canada, this report includes four indicators:

- Housing suitability (overcrowding)
- Housing in need of major repair
- Households with a member on a waiting list for public housing
- Capacity and adequacy of emergency shelters for victims of abuse

For each of these indicators, Nunavut's need is at least seven times the Canadian average and at least double the next highest province or territory.

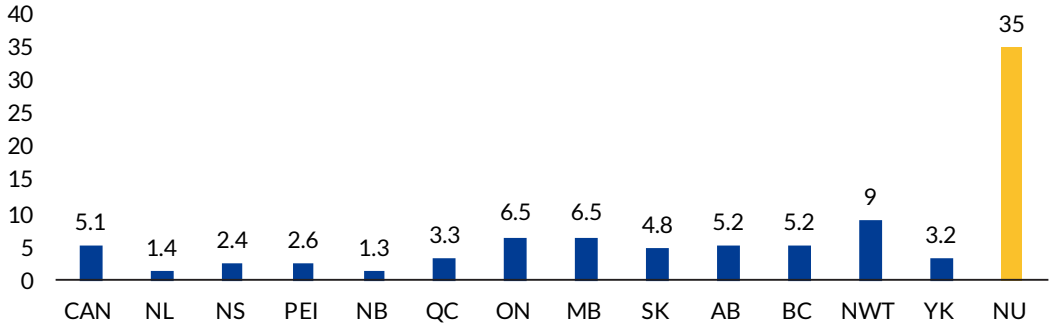
Indicator: housing suitability

CMHC and Statistics Canada use a technical measure of "suitability" to measure overcrowding (based on the number of bedrooms relative to the size and composition of the household—see box). Data from the 2018 Canadian Housing Survey show that Nunavut has the highest rate of unsuitable housing in the country by a substantial margin: 35 percent of households live in housing that does not have a sufficient number of bedrooms for their household's needs, compared with the national average of 5.1 percent (see Figure 20).[347]

Nunavut also has far more unsuitable homes than its territorial neighbours, with the Northwest Territories having 9 percent of housing being unsuitable, and the Yukon having 3.2 percent. The figures for Canadian provinces range between 1.4 percent and 6.5 percent.

FIGURE 20

Percentage of homes that are unsuitable (2018)



Source: Statistics Canada, Canadian Housing Survey

The gap is growing. In 2006, 30.9 percent of homes in the territory were considered unsuitable, compared with 35 percent in 2018. The situation in Nunavut grew worse while conditions improved nationally, where the Canada-wide percentage of unsuitable homes declined from 6.2 percent in 2006 to 5.1 percent in 2018.[348]

347 Statistics Canada, "Table: 46-10-0043-01: Housing Suitability and Dwelling Condition, by Tenure Including Social and Affordable Housing," 2018, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=4610004301.
348 Data on different dimensions of Core Housing Need dating back to 2006 are available from the Canadian Census, Statistics Canada, "Core Housing Need, 2016 Census." See table on Canada, provinces and territories. Data for 2018 sourced from the Canadian Housing Survey.

WHAT IS HOUSING SUITABILITY?

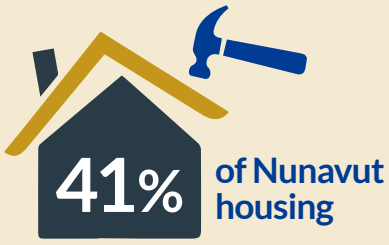
Housing suitability examines whether a home has enough bedrooms for the size and composition of the household. It is one component of Core Housing Need, a measure used by Statistics Canada and CMHC to identify households in need of assistance. The other components include affordability and whether a home requires repair. For housing suitability, the number of bedrooms a household needs is based on the following National Occupancy Standards:

- A maximum of two persons per bedroom
- Household members, of any age, living as part of a married or common-law couple share a bedroom with their spouse or common-law partner
- Lone parents, of any age, have a separate bedroom
- Household members aged 18 or over have a separate bedroom, except those living as part of a married or common-law couple.
- Household members under 18 years of age of the same sex share a bedroom
- Household members under 5 years of age of the opposite sex share a bedroom if doing so would reduce the number of required bedrooms
- Individuals living alone are not assumed to need a bedroom (e.g. the individual may live in a studio apartment)

Source: Statistics Canada

Indicator: housing in need of major repair

Much of the original permanent housing stock built in Nunavut was of poor quality and not designed to last in Arctic conditions.[349] Exposure to mould, a lack of insulation, broken windows, and malfunctioning heating systems are some of the more common issues facing older Nunavut homes.[350] The ability to repair and retrofit homes is complicated by the challenge of coordinating materials transported by sealift, a shortage of skilled trades workers, and a lack of space that residents can occupy temporarily while their homes are being repaired.[351]

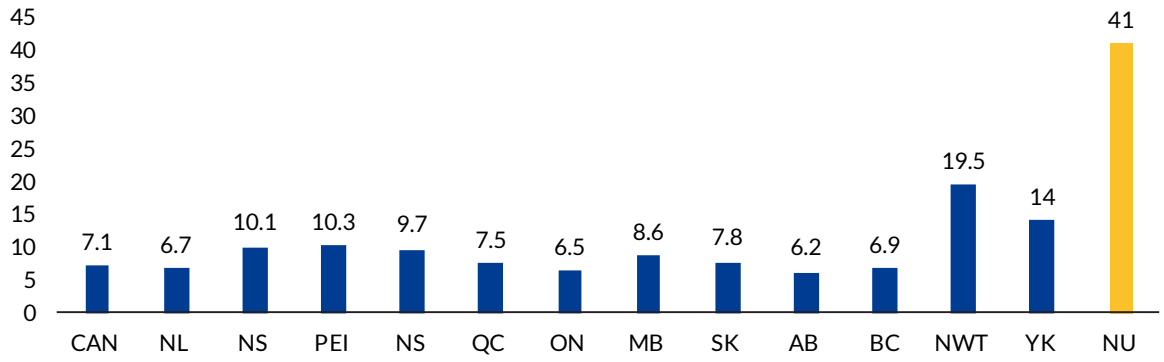


CMHC and Statistics Canada track the share of housing that needs major repairs. These include necessary updates to plumbing, electoral wiring and structural repairs.[352] Based on this survey, Nunavut has the highest rate of housing requiring major repairs in the country, with 41 percent of households living in homes requiring major updates.[353] The national average is 7.1 percent.

349 Senate of Canada, "We Can Do Better: Housing in Inuit Nunangat," pp. 14–15.
350 Research interviews, 2020.
351 Research interviews, 2020.
352 Statistics Canada, "Release Plan and Concepts Overview of the 2018 Canadian Housing Survey," accessed June 3, 2020, https://www.statcan.gc.ca/eng/statistical-programs/document/5269_D1_V1#a3.
353 Statistics Canada, "Table: 46-10-0043-01: Housing Suitability and Dwelling Condition, by Tenure Including Social and Affordable Housing."

FIGURE 21

Percentage of homes in need of major repair (2018)



Source: Statistics Canada, Canadian Housing Survey

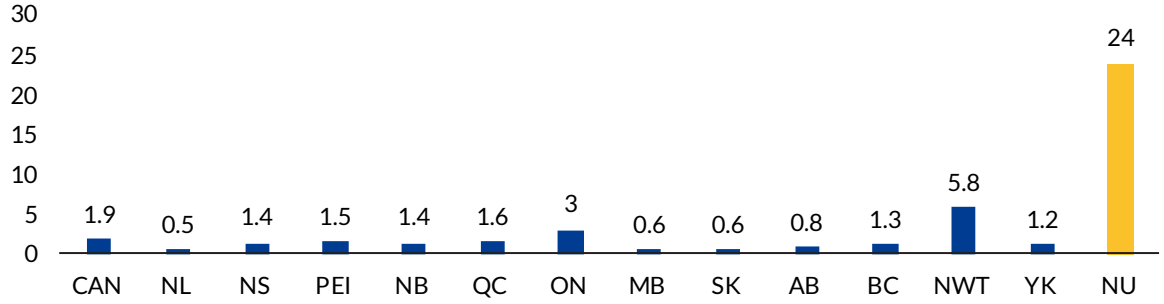
Here too, the size of the infrastructure gap is increasing. Between 2006 and 2018, the percentage of homes needing major repairs in Canada fell from 7.5 percent to 7.1 percent. In contrast, in Nunavut, the share of homes requiring major repairs doubled from 20.2 percent in 2006 to 41 percent in 2018.[354]

Indicator: households with a member on a waiting list for public housing

Nunavut has the highest rate of households with a member on a waiting list for public housing, at 24 percent—more than 12 times the national average of 1.9 percent.[355] This number may undercount the true number of Nunavummiut on waiting lists, since in some cases multiple members of a household may be on a waiting list for public housing.[356]

FIGURE 22

Percentage of households with a member on a waiting list for public housing (2018)



Source: Statistics Canada, Canadian Housing Survey

354 Data on different dimensions of Core Housing Need dating back to 2006 are available from the Canadian Census; Statistics Canada, "Core Housing Need, 2016 Census." Data for 2018 sourced from the Canadian Housing Survey.
355 Statistics Canada, "Waitlist Status Including Length of Time, by Tenure Including Social and Affordable Housing," accessed June 3, 2020, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=4610004201.
356 Research interview, 2020.

Additional public housing is needed, but building new homes can be a uniquely time-consuming and expensive task in Nunavut. For one thing, the lack of a private market means that government is the *only* builder of homes in most centres outside Iqaluit. For another, the short building season, dependence on sealift schedules for materials, and limited surveyed and serviced land for new homes can add significant delays to housing construction.[357]

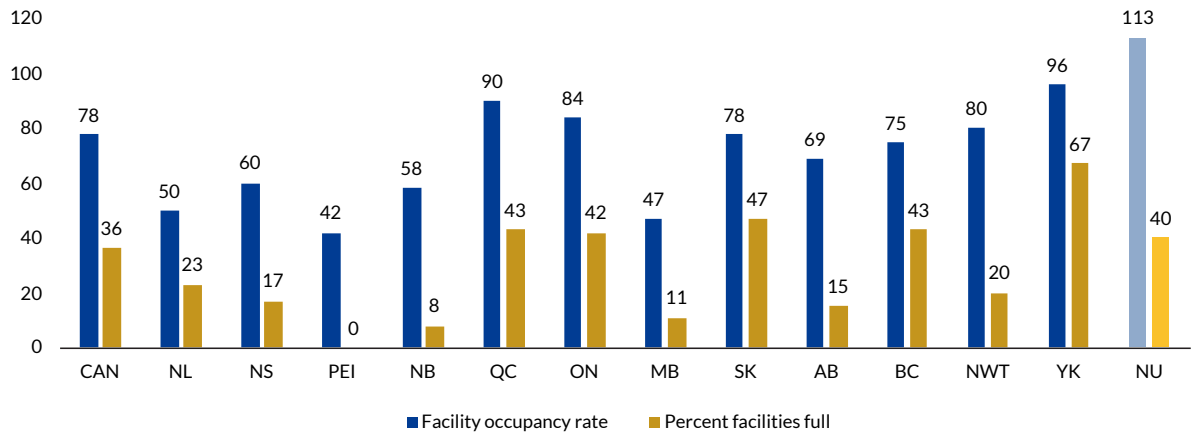
Indicator: capacity and adequacy of emergency shelters for victims of abuse

In 2018, Nunavut's rate of police-reported intimate partner violence was the highest in Canada, more than 14 times the national average (7,483 per 100,000 vs. 507 per 100,000).[358] Police-reported sexual violations against children under 12 in Canada averaged 31.5 per 100,000: in Nunavut, this rate was 18 times higher, at 611.1 per 100,000.

Statistics Canada reports that in 2018, Nunavut had five short-term facilities for victims of abuse, with 53 beds in total.[359] Nationally, 78 percent of short-term beds were occupied on a snapshot day in 2017/2018. Nunavut was the only jurisdiction with more than 100 percent occupancy at 113 percent (Yukon had 96 percent and the Northwest Territories 80 percent).[360] However, only 40 percent of Nunavut's five facilities were full, which indicates a few were overcrowded.[361]

FIGURE 23

Short-term facilities for victims of abuse by jurisdiction, 2017/2018, Statistics Canada[362]



Source: Statistics Canada

357 Research interview, 2020.
358 Statistics Canada, "35-10-0051-01: Victims of Police-Reported Violent Crime and Traffic Violations Causing Bodily Harm or Death, by Type of Violation, Sex of Victim and Age of Victim," 2018, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3510005101&pickMembers%5B0%5D=1.14&pickMembers%5B1%5D=6.20180101&pickMembers%5B2%5D=5.2. Highest percentage reported experiencing both physical and sexual abuse (although comparable information was unavailable for both territories on sexual abuse).
359 Statistics Canada, "Occupancy for Short-Term Facilities, by Urban or Rural Area, Province or Territory, April 18, 2018," 2018, https://www150.statcan.gc.ca/n1/pub/85-002-x/2019001/article/00007/tbl/tbl07-eng.htm.
360 Statistics Canada, "Occupancy for Short-Term Facilities, by Urban or Rural Area."
361 Statistics Canada, "Occupancy for Short-Term Facilities, by Urban or Rural Area."
362 Statistics Canada, "Occupancy for Short-Term Facilities, by Urban or Rural Area."

For women leaving abuse, the inability to find a space to live outside the emergency shelter may result in disastrous consequences for them and their children.

These shelters serve an urgent need in the territory. In Nunavut, the percentage of women who report having to protect their children from all forms of abuse was notably high: more than two-thirds of women (20 of 29) residing in facilities in Nunavut with their children indicated they were protecting them from sexual abuse, compared with a Canadian national average of eight percent.[363]

Reliable information on the state of repair of these shelters was not available in a consistent format. According to a report on shelters by Violence Against Women from 2019, 67 percent of respondent shelters in Nunavut (three responded out of six) reported needing minor or major repairs (less than the Canadian average of 80 percent).[364]

Nunavut is also the only jurisdiction in Canada without "second-stage" shelter housing for women leaving violent homes. For women leaving abuse, the inability to find a space to live outside the emergency shelter may result in disastrous consequences for them and their children:

> *If you're in the shelter and … you had to leave with your entire family from, say, Pond Inlet, you have to be in Iqaluit one entire year before you go on the waiting list, which is three to five years. So our women, unfortunately, many of our women know this. So then they'll stay in the relationship and it just contributes to the high stats of women who are actually losing their lives in the relationship.*[365]

Without broader infrastructure that supports independent living and affordable options for women and children starting a new life, evidence suggests that emergency shelters will remain unable to meet capacity needs.

363 Statistics Canada, "Canadian Residential Facilities for Victims of Abuse, 2017/2018," 2019, https://www150.statcan.gc.ca/n1/pub/85-002-x/2019001/article/00007-eng.htm.
364 Women's Shelters Canada, "More Than A Bed: A National Profile of VAW Shelters and Transition Houses," 2019, https://endvaw.ca/wp-content/uploads/2019/04/More-Than-a-Bed-Final-Report.pdf.
365 Pauktuutit Inuit Women of Canada and Elizabeth Comack, "Addressing Gendered Violence against Inuit Women: A Review of Police Policies and Practices in Inuit Nunangat," 2020, https://www.pauktuutit.ca/wp-content/uploads/Pauktuutit_Addressing-Gendered-Violence_English_Full-Report.pdf.

Food sovereignty

Nunavut has the highest level of food insecurity of any jurisdiction in Canada by a large and troubling margin.[366] According to Statistics Canada, Nunavut is the only jurisdiction in Canada where more than half of residents experienced some form of food insecurity during the survey period of 2017–18.[367]

Indeed, the percentage of Nunavummiut who experienced *severe* food insecurity (23.7 percent) is higher than the total percentage of people experiencing *any* kind of food insecurity in other Canadian jurisdictions.[368] Food insecurity is damaging to overall health and closely correlated to other markers of social and economic precarity.[369]

TABLE 6

Comparing rates of food insecurity between Canada and Nunavut (2017–18), Statistics Canada

Percentage of Canadian households that are food insecure, all households and severity levels	Percentage of Nunavut households that are food insecure, all households and severity levels[370]
12.7%	57.9%

Percentage of Canadian households that are *severely* food insecure, all types	Percentage of Nunavut households that are *severely* food insecure, all types
3%	23.7%

Percentage of Canadian households that are food insecure, couple with child(ren) less than 18 years old	Percentage of Nunavut households that are food insecure, couple with child(ren) less than 18 years old
8%	66.1%

In Nunavut, almost two-thirds of couples with children are food insecure (see above table). According to the same survey, no other jurisdiction in Canada had more than one-fifth of couples with children reporting food insecurity. The severity of food insecurity rates for Inuit children in particular represents a public health crisis: 70 percent of Inuit pre-school aged children live in a household that is food-insecure.

While food insecurity is a foundational indicator of well-being, insecurity is only a part of the overall landscape of food and how it affects Nunavut Inuit. This broader framework is better understood through the lens of food sovereignty. The Qikiqtani Inuit Association (QIA) distinguishes between the two:

366 Valerie Tarasuk and Andy Mitchell, "Household Food Insecurity in Canada," PROOF Food Insecurity Policy Research, 2020, https://proof.utoronto.ca/wp-content/uploads/2020/03/Household-Food-Insecurity-in-Canada-2017-2018-Full-Reportpdf.pdf.
367 Statistics Canada, "The Daily—Canadian Community Health Survey: Household Food Insecurity in Canada, 2017/2018," 2020, https://www150.statcan.gc.ca/n1/daily-quotidien/200218/dq200218e-eng.htm. Marginal food insecurity exists when there is a single indication of worry about running out of food and/or limited food selection due to a lack of money for food. Moderate food insecurity exists when there is a compromise in the quality or quantity of food consumed. Severe food insecurity exists when there is a reduced food intake or disrupted eating pattern.
368 See Tarasuk and Mitchell, "Household Food Insecurity in Canada," table on p. 9.
369 Tarasuk and Mitchell, "Household Food Insecurity in Canada."
370 Statistics Canada, "The Daily—Canadian Community Health Survey."

> *QIA prefers using the term food sovereignty rather than food security because food sovereignty allows for a culturally and community-minded approach to food management. Food sovereignty incorporates Inuit knowledge, language, culture continuity and community self-sufficiency.*[371]

Comparatively little in Nunavut could be easily described as "food-specific" infrastructure, and yet infrastructure systems are crucial to the delivery, harvest, cost, and quality of food. Infrastructure gaps in air travel, ports, roads, and power are barriers to the delivery of food from the South, the production and processing of food for commercial sale, and the harvesting of country food in Nunavut.

Certain food-related infrastructure needs are specific to Inuit. For commercial food being shipped to the North, residents, food banks, and retailers themselves require adequate space to store freighted supplies for months at a time—significantly more than would be typical in areas with more responsive supply chains. In particular, food banks and community food-sharing services can struggle to find warehousing space or facilities in which to prepare and serve food to communities that desperately need it.[372] Recently, greenhouses have shown promise as infrastructure that could boost local food sovereignty and create jobs: a new greenhouse in Gjoa Haven was able to deliver locally grown lettuce to community Elders.[373]

For many Nunavut Inuit, country food is both an important source of nutrition and an expressive function of Inuit cultural values.[374] These values have endured, despite a colonial legacy of waged-economy participation and forced relocations that up-ended harvesting practices used by Inuit for thousands of years. A 2017 survey found that 65 percent of Nunavut Inuit had hunted, fished, or trapped in the previous 12 months.[375]

The harvesting and sharing of country foods is supported through public infrastructure assets such as community freezers, community kitchens, and warehousing space for snowmobiles and harvesting equipment. However, more may be needed. Because communities are isolated, local food sovereignty is related to territorial food sovereignty: communities require their own country food infrastructure adapted to their needs.[376] These country food assets can be likened to tools used by farmers in southern Canada, such as tractors, and play a crucial role in closing the Nunavut-Canada food sovereignty gap.

371 Qikiqtani Inuit Association, "Food Sovereignty and Harvesting," 2019, https://www.qia.ca/wp-content/uploads/2019/03/Food-Sovereignty-and-Harvesting.pdf.
372 Research Interview, 2020.
373 CTV News, "Nunavut greenhouses bring food, jobs to Arctic tundra," 2020, https://www.ctvnews.ca/canada/anything-is-possible-nunavut-greenhouses-bring-food-jobs-to-tundra-1.4787362.
374 Nunavut Food Security Coalition, "Nunavut Food Security Strategy and Action Plan 2014–16," 2014, https://foodsecurecanada.org/sites/foodsecurecanada.org/files/nunavutfoodsecuritystrategy_english.pdf.
375 Chris Furgal, Peter Hutchinson, Wade Roseborough, Stephanie Kootoo-Chiarello, and Mohan B. Kumar, "Harvesting Activities among First Nations People Living off Reserve, Métis and Inuit: Time Trends, Barriers and Associated Factors," 2019, https://www150.statcan.gc.ca/n1/pub/89-653-x/89-653-x2019001-eng.htm.
376 See Nunavut Food Security Coalition, "Nunavut Food Security Strategy and Action Plan 2014–16," issue #3.

Gap analysis

This report's approach to food sovereignty looks at two components of food sovereignty: the prevention of hunger and the exercise of control over food processes and production. The latter includes governance and the ability of Inuit to draw economic benefit from the food industry in Nunavut.

To measure the gaps in food sovereignty infrastructure between Nunavut and the rest of Canada, this report uses three indicators:

- Stages of food travel and transfer
- Price difference in commercial food items
- Number of CFIA-licensed food establishments

Because the infrastructure needed to support food sovereignty is not often captured by "traditional" infrastructure metrics, these indicators offer a less direct approach than those used in other priority areas. Nonetheless they provide useful insight into the infrastructure gap.

Indicator: stages of food travel and transfer

The "steps of travel" needed to bring a commercial food staple to a retail store greatly increases the price for consumers. According to Nutrition North, "the actual number of times an item is handled in a cross-dock or trans-shipping process may be a greater factor in increasing costs than is the actual distance [an item] travelled."[377] Nunavut's transportation and warehousing infrastructure gaps make food supply chains more logistically complex and expensive.

PATH OF FOOD ITEMS BY AIR FREIGHT

Perishable foods from the South are brought to the territory by plane. According to the Nunavut Food Security Coalition, air freight in Nunavut is six to ten times more expensive than ground freight in remote regions accessible by road.[378] In addition to the fuel costs of flying fresh food up (especially nutritious but heavy foods like fruits, vegetables, and dairy products), the coordination and personnel needed to deliver items through multiple stages of transfer drives up overhead costs.

This table from Nutrition North compares the number of "touches" food freight experiences from departing a supplier to landing on a retail shelf.

377 Enrg Research Group, "Northern Food Retail Data Collection & Analysis," Government of Canada, 2014, https://www.nutritionnorthcanada.gc.ca/eng/1424364469057/1424364505951.
378 See Nunavut Food Security Coalition, "Food Security: Causes," accessed June 5, 2020, https://www.nunavutfoodsecurity.ca/Causes-en.

TABLE 7

Food path for perishable items moving to stores by air (chart from Nutrition North)[379]

Destination: Southern Store	Store Destination: Igloolik, NU	Store Destination: Lac Brochet, MB
Freight loaded onto vehicle, departs supplier	Freight loaded onto vehicle, departs supplier	Freight loaded onto vehicle, departs supplier
Vehicle unloaded at store	Vehicle unloaded at retailer's warehouse	Vehicle unloaded at retailer's warehouse
Product moved to store shelf for sale	Product loaded onto a truck and driven to airport	Product loaded onto a truck and driven to airport
	Freight unloaded at airport	Freight unloaded at airport
	Freight loaded onto aircraft bound for Iqaluit	Freight loaded onto aircraft bound for Lac Brochet
	Freight unloaded at Iqaluit airport	Freight unloaded at Lac Brochet airport
	Freight loaded onto a different aircraft bound for Igloolik	Freight loaded onto trucks and driven to store
	Freight unloaded at Igloolik airport	Freight unloaded at store
	Freight loaded onto trucks and driven to store	Freight moved to store shelf for sale
	Freight unloaded at store	9 total touches
	Freight moved to store shelf for sale	
3 total touches	11 total touches	

Each additional step in the food transportation chain illustrates not just higher costs, but also higher vulnerability and dependency. The longer the food supply chain, the greater the probability that a link in that chain can break. The delay or cancellation of a sealift or plane often affects food supply in Nunavut.[380]

PATH OF FOOD BY SEALIFT FREIGHT

Most non-perishable foods are shipped to retailers in Nunavut by sealift in summer. The harbours in Nunavut cannot accommodate large freight ships, and therefore goods (including food) for each community are taken from larger boats anchored offshore by tugboat or barge, and unloaded on land: a process that can take days.

379 Enrg Research Group, "Northern Food Retail Data Collection & Analysis."
380 Nunavut News, "Smoother sailing for sealift in 2019," 2019, https://nunavutnews.com/nunavut-news/smoother-sailing-for-sealift-in-2019/; CBC News, "Welcome to 'the place that never thaws'," 2020, https://www.cbc.ca/television/higharctichaulers/welcome-to-the-place-that-never-thaws-1.5468712.

To save costs, some individuals living in Nunavut fly South and buy food in bulk from stores to be shipped back to their homes by sealift.[381] Others use shopping/shipping services, whereby consumers in Nunavut order goods online, and someone from a freight service does the shopping for them. While this "bulk" approach can be cheaper than buying from Northern-located retailers, many Nunavut Inuit cannot use this approach. Ordering food from Southern retailers for individual use requires resources that many do not have access to: a credit card with which to place an order, the funds to make large one-time purchases of thousands of dollars, the space in which to store goods. As the section on banking in this report highlights, Nunavut Inuit are poorly served by financial services infrastructure. As a result, this "cost-saving" activity is not possible for those most in need of affordable options.[382]

When shipped by sealift, food items taken to Nunavut are handled and moved many more times on their journey from retail shelf to an individual's home. Table 7 details the path of items purchased by an individual consumer for shipping, but wholesale retailers would go through a similar set of steps.

TABLE 8

Food path for non-perishable items moving to individual customers by sealift[383]

Southern Purchasing	Rankin Inlet, NU
Item purchased from local retailer and loaded into purchaser's vehicle	Item purchased from local retailer (typically in Winnipeg) and loaded into vehicle
Purchaser drives home	Consumer or provider drives to local warehouse and unloads item(s) into wooden crates alongside other bulk items
Purchaser unloads item at home	Wooden crate moved to storage location
	Wooden crate unloaded, moved onto vehicle to point of sea departure, loaded into a shipping container
	Shipping container moved to the harbour for loading
	Shipping container lifted onto sealift by crane
	Shipping container transported by sealift
	Shipping container unloaded from sealift and loaded on to smaller tug or barge
	Shipping container transported to shore by tug or barge
	Shipping container unloaded from tug or barge by front loader and deposited on shore
	Crate unloaded from shipping container
	Crate loaded into delivery vehicle
	Item moved from crate into individual home
3 steps	12 steps

381 See, for example, iShop4U, https://ishop4u.ca/sealift/, and personal accounts such as Finding True North, "How to Sealift to Iqaluit," 2014, http://findingtruenorth.ca/blog/sealift-to-iqaluit; Elaine Anselmi, "Life via Sealift," Up Here Magazine, 2017, https://uphere.ca/articles/life-sealift.
382 Research Interview, 2020.
383 Constructed based on accounts of sealift transfer found online, including Finding True North, "How to Sealift to Iqaluit."

Indicator: price difference in commercial food items

In 2011, the Canadian government launched the Nutrition North Canada (NNC) program to bring down the cost of eligible foods for consumers in Northern communities. NNC replaced the Food Mail Program.[384] NNC provides subsidies directly to registered Northern retailers, Southern suppliers, and country food processors/distributors, to help defray costs of food.[385]

Nunavut has the highest per-capita expenditure for foods receiving the highest subsidy rate of any jurisdiction in the Nutrition North program.[386] The Nutrition North program has succeeded in making eligible foods cheaper, and consumers can now see NNC savings reflected on their receipts. However, research suggests that the NNC program has not yet reduced food insecurity and hunger in Nunavut. Food insecurity in Nunavut still increased after the introduction of NNC, going from 33.1 percent in 2011 to 46 percent in 2014.[387]

The prices for eligible food items listed below include the savings from the Nutrition North program, meaning that the "true cost" is not visible here for items such as milk and eggs. Nutrition North has made changes to its funding formula since 2017, and now provides subsidies for select food items shipped by sealift. Those changes will bring down the posted price of non-perishable items such as flour, which was previously not subsidized.[388]

TABLE 9

Nunavut food prices compared with Canada averages (2017)[389]

Food Item	Nunavut Average Price	Canada Average Price	Nunavut-Canada Ratio
Bananas (per kg)	$4.88	$1.58	3.09
Carrots (per kg)	$5.93	$2.25	2.92
Flour (2.5 Kg)	$13.81	$4.91	2.81
Whole wheat bread (675 g)	$4.92	$2.81	1.75
Baby food (per jar)	$1.62	$0.95	1.70
2% milk (1 L)	$3.29	$2.33	1.41
Eggs (dozen)	$4.20	$3.08	1.36

384 Senator Dennis Patterson, "Nutrition North," 2019, https://dennispatterson.ca/nutrition-north/
385 Senator Dennis Patterson, "Nutrition North."
386 Tracey Galloway, "Canada's Northern Food Subsidy Nutrition North Canada: A Comprehensive Program Evaluation," International Journal of Circumpolar Health 76,1 (2017), https://doi.org/10.1080/22423982.2017.1279451.
387 Data is from a different survey from the one covering 2017-18 referenced at the beginning of this chapter. Andrée Anne Fafard St-Germain, Tracey Galloway, and Valerie Tarasuk, "Food Insecurity in Nunavut Following the Introduction of Nutrition North Canada," CMAJ 191, 20 (May 21, 2019): E552–58, https://doi.org/10.1503/cmaj.181617.
388 CBC News, "Nutrition North to subsidize sealifted goods, tampons for 1st time," 2019, https://www.cbc.ca/news/canada/north/nutrition-north-yvonne-jones-1.5254469.
389 Government of Nunavut, "Economic Data, Food Price Survey 2017," accessed July 23, 2020, https://www.gov.nu.ca/executive-and-intergovernmental-affairs/information/economic-data.

FOOD SECURITY PROTESTS

In 2012, the consistently high costs of food in Nunavut led Nunavut Inuit to take to the streets to protest. Sparked by a Facebook group called "Feeding My Family," protests extended to communities across Nunavut.[390] The protests highlighted the shortcomings of the Nutrition North Program as well as the high cost of country food (fuel, snowmobiles, firearms, ammunition, and gear).[391]

The pressures of food insecurity are amplified by housing shortages that contribute to a high cost of living, and the limited infrastructure to support food sovereignty such as small-craft harbours and community freezers.

Inuit organizations are developing their own approaches to food sovereignty. As part of the Inuit Impact Benefit Agreement negotiated between the Qikiqtani Inuit Association and the Government of Canada for the creation of the Tallurutiup Imanga National Marine Conservation Area, QIA will lead the development of small-craft and community harbours in Grise Fiord, Resolute Bay, Arctic Bay, and Clyde River and new multi-use facilities and country-food processing units in five communities.[392]

Indicator: number of CFIA-licensed food establishments

Despite its proximity to Arctic fishing resources, Nunavut has limited capacity to harvest, process, and package food for commercial sale. Without harbours where fishing trawlers can dock and unload their haul, and without adequate processing facilities to package food or freight infrastructure to support affordable mass exporting, Nunavut cannot reap the full economic benefits of its fishing capacity. One indicator that demonstrates this gap is Nunavut's lack of industry regulated by the Canadian Food Inspection Agency (CFIA).

Without proper food infrastructure, Nunavut Inuit cannot reap the full economic benefits of their fishing capacity.

The CFIA regulates the safety and nutritional quality of food in Canada. Certain activities associated with food preparation, processing, packaging, and trade require a licence issued by the CFIA. Not all commercial food production requires a CFIA licence: for example, inter-jurisdictional sale and trade of food is often exempt from inspection or regulation (this is relevant to the circulation and sale of country food within Nunavut, which does not require a licence). However, it is a useful proxy to gauge commercial involvement with national and international food markets, and the infrastructure in place to support that commerce.

390 CBC News, "Nunavut holds second round of food price protests," June 22, 2012, https://www.cbc.ca/news/canada/north/nunavut-holds-second-round-of-food-price-protests-1.1141557.
391 The Globe and Mail, "Inuit organize widespread protest over hunger, food cost," June 8, 2012, https://www.theglobeandmail.com/news/national/inuit-organize-widespread-protest-over-hunger-food-cost/article4243673/
392 Qikiqtani Inuit Association, "Tallurutiup Imanga and Tuvaijuittuq Agreements," 2019, https://www.qia.ca/tallurutiup-imanga-and-tuvaijuittuq-agreements/

TABLE 10

Number of CFIA licensed establishments

Jurisdiction	Nunavut	Newfoundland and Labrador	P.E.I.	Yukon	Northwest Territories
Number of CFIA-registered establishments	3	133	124	10	3

The total list number of CFIA-licensed food establishments in Canada is 9,450. In Nunavut, there are three.[393] The three establishments are:

- Kitikmeot Foods Ltd. (6 permanent, 14 seasonal staff members)
- Kivalliq Arctic Foods Ltd. (7–12 staff members)
- Pangnirtung Fisheries Ltd (42–52 staff members on a yearly basis)[394]

In other words, there are approximately 3,977 people per CFIA-licensed establishment in the rest of Canada, and about 12,926 people per CFIA-licensed establishment in Nunavut.[395] The low rate could be explained by the role of the informal country-food economy in Nunavut; the fact that Nunavut's climate makes participation in most agriculture impossible; and the smaller market of consumers outside Nunavut who buy country food. However, infrastructure barriers are also a factor: Nunavut has access to exportable fish resources but has almost no capacity to process fish or undertake any other secondary fishing-industry activities.

Other ocean-adjacent provinces with small populations (like P.E.I. or Newfoundland and Labrador) have many more CFIA-licensed establishments to support their fishing and harvesting industries. Of the CFIA-licensed establishments in Newfoundland and Labrador, 101 are licensed to export fish internationally: only two in Nunavut are.[396]

Shrimp and turbot caught by Nunavut-owned industry are sometimes frozen and processed in offshore freezer trawlers; this activity is not captured in the CFIA numbers.[397] However, most other fish intended for harvest and export from Nunavut are taken off boats in either Newfoundland and Labrador or Greenland, because of the lack of ports in Nunavut.

Nunavut Inuit have also long advocated for an increase in Nunavut's share of fishing quotas in nearby waters, and their efforts have led to some progress in recent years.[398] According to the Government of Nunavut, "Without the development of basic marine infrastructure, fisheries will continue to operate well below their potential and maximum levels of efficiency" within Nunavut. One report estimates that the fishing fleet from Nunavut contributes more than $8 million per year to the economy of Nuuk, Greenland.[399]

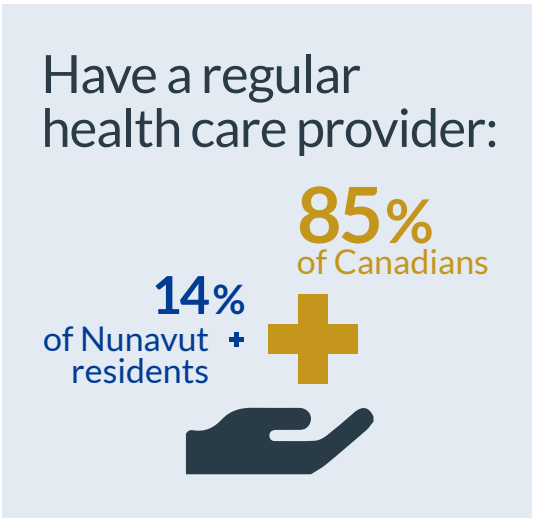
393 List available at Canadian Food Inspection Agency, "Safe Food for Canadians Licence Registry," 2020, https://www.inspection.gc.ca/webapps/foodlicenceregistry/en/
394 Numbers available through Nunavut Development Corporation, "NDC Investment," accessed June 5, 2020, https://ndcorp.nu.ca/we-invest/areas-of-investment/#.
395 Canadian Food Inspection Agency, "Safe Food for Canadians Licence Registry."
396 Canadian Food Inspection Agency, "Canadian Fish and Seafood Establishments Approved for Export," accessed June 5, 2020, https://www.inspection.gc.ca/exporting-food-plants-or-animals/food-exports/registers-and-lists/canadian-fish-and-seafood-establishments/eng/1547232222906/1547232382997.
397 Government of Nunavut, "Nunavut Fisheries Strategy 2016-2020," 2016, https://assembly.nu.ca/sites/default/files/TD-277-4(3)-EN-Department-of-Environment's-Nunavut-Fisheries-Strategy,-2016-2020.pdf.
398 Beth Brown, "Nunavut fishers get more turbot quota from Ottawa," Nunatsiaq News, January 29, 2019, https://nunatsiaq.com/stories/article/nunavut-fishers-get-more-turbot-quota-from-ottawa/
399 Government of Nunavut, "Nunavut Fisheries Strategy 2016-2020."

Health

Nunavut's infrastructure gaps mean that far too often, critical moments of life happen outside the territory. In particular, the lack of health infrastructure in the territory results in the territorial government's having to spend more than one-third of its total health budget on medical travel costs, and out-of-territory physician and hospital services.[400]

Travel is disruptive to patients, affecting health outcomes and separating patients from their families and support networks during stressful times and major milestones. For example, a lack of birthing facilities and obstetrics capacity means women often have to leave the territory to give birth[401] (see box). Patients undergoing more complex but fairly routine diagnostic procedures, such as breast cancer screening or an MRI, must also travel out of territory.[402]

Limited long-term-care facilities also mean that Elders may have to leave the territory for the care they need. There are currently only three continuing care facilities in the territory, based in Cambridge Bay, Gjoa Haven, and Igloolik, each with between 10 and 12 beds.[403] However, only basic levels of care are available at these facilities, so higher-needs patients must leave Nunavut and their broader support system to find appropriate services.[404]



Most health infrastructure, including the territory's only hospital, is based in Iqaluit and faces capacity issues. Nunavut has the fewest staffed and operational hospital beds per capita in the country, with 1,095 persons per bed, compared with a national average of 409.[405] In addition, Iqaluit's Qikiqtani General Hospital typically serves residents of the Qikiqtani region only, meaning Nunavummiut in Kivalliq and Kitikmeot must travel to hospitals in Yellowknife or elsewhere in Canada for care.[406]

Physician services outside Iqaluit, Rankin Inlet, and Cambridge Bay are often delivered remotely, but delivery can be hampered by poor Internet connections that make it difficult for medical professionals to make a diagnosis. For example, audio-visual delays make it impractical to listen to a heartbeat or a patient's breathing.[407]

400 Government of Nunavut, "2017/2018 Annual Report on the Operation of the Medical Care Plan," accessed June 16, 2020, https://assembly.nu.ca/sites/default/files/TD-108-5(2)-EN-2017-2018-Annual-Report-on-the-operations-of-the-Medical-Care-plan.pdf, p. 3. Per-capita estimate determined using the number of individuals registered under Nunavut's Health Insurance plan as of March 31, 2018.
401 Research interviews, 2020. See also Nunavut News, "Bring birthing home to communities, say advocates." March 16, 2019. https://nunavutnews.com/nunavut-news/bring-birthing-home-to-communities-say-advocates/
402 Canadian Partnership Against Cancer, "Breast Cancer Screening in Canada: Environmental Scan," 2017, https://www.partnershipagainstcancer.ca/topics/breast-cancer-screening-environmental-scan-2017/
403 Research interviews, 2020.
404 Research interviews, 2020.
405 Canadian Institute for Health Information, "Hospital Beds Staffed and In Operation, 2018-2019," 2020, https://www.cihi.ca/en/quick-stats.
406 Research interviews, 2020.
407 Research interviews, 2020.

Outside Iqaluit, all other communities either have a regional or community health facility. Regional health centres are found in Rankin Inlet and Cambridge Bay, and offer some specialized health services, such as post-natal and palliative care, and imaging equipment such as ultrasounds. However, regional facilities are primarily designed to stabilize patients before they travel to Iqaluit or out of territory for more comprehensive care.[408]

Nunavut's other 22 hamlets have a community health centre, which offers only limited services to residents. These facilities are equipped with basic medical equipment, such as X-ray machines, defibrillators, and tools for conducting blood tests.[409] Community health centres have at least one room for patient examinations, and an emergency room that often doubles as a birthing space for low-risk pregnancies.[410] All include a small pharmacy, and some have a room for dentistry. However, many of these facilities are aging, and too small to meet the needs of a growing population.[411]

These gaps are part of the reason that Nunavut residents are the least likely in Canada to have a regular healthcare provider, at 13.9 percent compared with the national average of 84.9 percent.[412] Nunavut residents also report poorer health outcomes than residents in other provinces and territories. Only 41.3 percent of Nunavut residents report their health to be good or excellent, almost 20 percentage points below the national average.[413]

There are also serious gaps in Nunavut's mental health-related infrastructure. Nunavut has the highest suicide rate in Canada, more than five times higher than the national average, at 54.7 persons per 100,000, compared with 10.3 per 100,000 persons nationally.[414] As of 2017–18, Nunavummiut are more likely to rate their mental health care as being fair or poor, at 13.4 percent compared with 7.4 percent nationally.[415] This is the highest rate in the country, and higher than the rate in the other two territories, with Yukon at 9.8 percent and the Northwest Territories at 8.7 percent.[416] Despite these numbers, the number of mental health beds in the territory remains low, along with a lack of facilities and supportive infrastructure.

Gap analysis

To measure the gaps in health infrastructure between Nunavut and the rest of Canada, this report includes four indicators:

- Number of hospital beds staffed and in operation
- Mental health care and addictions infrastructure
- Government spending on out-of-jurisdiction health care
- Percentage of residents with a regular health care provider

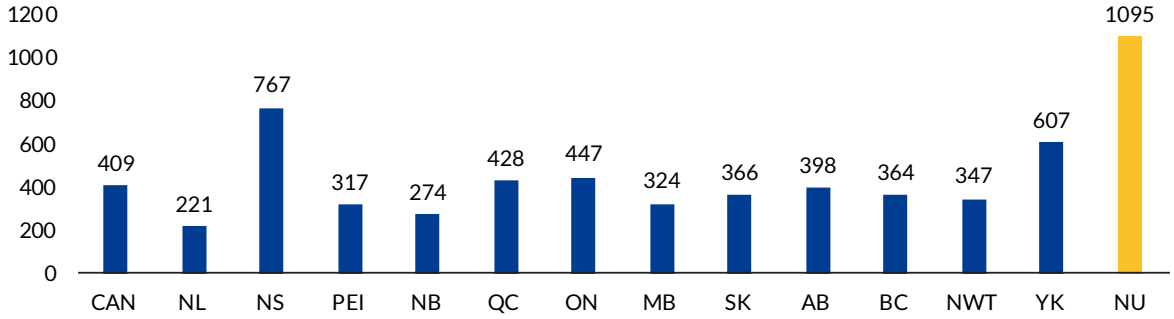
408 Research interviews, 2020. See also Gregory P. Marchildon, Nunavut: A Health System Profile, vol. 72 (McGill-Queen's University Press, 2013), https://doi.org/10.3402/ijch.v72i0.22877, p. 46.
409 Marchildon, Nunavut: A Health System Profile, pp. 46–47.
410 Research interviews, 2020.
411 Research interviews, 2020.
412 Data from the 2015–16 Canadian Community Health Survey as reported by CIHI. See Canadian Institute for Health Information, "Nunavut – Has a Regular Health Care Provider," 2018, https://yourhealthsystem.cihi.ca/hsp/indepth?lang=en#/indicator/074/2/C191/
413 Statistics Canada, "Table 13-10-0805-01: Health Characteristics, Two-Year Period Estimates, Census Metropolitan Areas and Population Centres," 2019, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310080501.
414 Centre for Suicide Prevention, "Cross-Canada Comparison Statistics," 2019, https://www.suicideinfo.ca/resource/cross-canada-comparison-statistics/
415 Statistics Canada, "Health Characteristics, Two-Year Period Estimates, Census Metropolitan Areas and Population Centres."
416 Statistics Canada, "Health Characteristics, Two-Year Period Estimates."

Indicator: number of hospital beds staffed and in operation

Nunavut has 35 hospital beds, which means that there is only one bed available for every 1,095 Nunavut residents. This is the highest number of persons per bed in the country by a substantial margin, and more than double the national average of 409 persons per hospital bed.[417]

FIGURE 24

Number of persons per hospital bed



Source: Reseach team calculations based on CIHI data

The concentration of beds in Iqaluit also means that Nunavummiut in Kitikmeot and Kivalliq regions must travel out-of-territory for hospital care, or for diagnosis requiring more advanced imaging equipment. Travel times for individuals needing care are long. Assuming no flight delays or cancellations (which are common in Nunavut), a patient travelling to Edmonton from Cambridge Bay should expect a journey of two or more flights, and minimum flight time of 4 hours and 20 minutes, with many journeys lasting 9 hours or more.[418] For patients needing urgent inpatient care, having to travel long distances is associated with worse health outcomes, including lower rates of survival, or a longer stay in hospital.[419]

There are also limitations in the type of hospital care available in Iqaluit. Despite Nunavut's increasingly young population, pediatric and obstetrics capacity at the hospital is limited. Shortages in medical staff can also mean that medical procedures available at a given time are inconsistent—including reading a CT scan or even setting a broken arm.[420] A lack of local capacity means that many nurses and doctors in Nunavut come from outside the territory, sometimes on short rotations. This practice contributes to difficulties staffing and retaining staff and to interacting with patients in Inuktut. A lack of housing for visiting medical staff can also be a barrier.[421]

417 Canadian Institute for Health Information, "Hospital Beds Staffed and in Operation, 2018–2019."
418 Travel duration and number of stops was determined by reviewing Monday to Friday itineraries on First Air for the week of March 16, 2020.
419 Charlotte Kelly et al., "Are differences in travel time or distance to healthcare for adults in global north countries associated with an impact on health outcomes? A systematic review," BMJ Open 6, 11 (2016), https://bmjopen.bmj.com/content/6/11/e013059 .
420 Research interview, 2020.
421 Auditor General of Canada, "Health Care Services—Nunavut," 2017, https://www.oag-bvg.gc.ca/internet/English/nun_201703_e_41998.html.

GIVING BIRTH IN NUNAVUT

Unlike other parts of Canada, only about 50 percent of Nunavut's births occur in the territory.[422] Limited obstetrics capacity means that only low-risk births can take place in Iqaluit, Rankin Inlet, and Cambridge Bay. Elsewhere, half of Nunavut mothers must leave their communities and loved ones and travel long distances to hospitals in southern Canada.

COVID-19 AND NUNAVUT HEALTH INFRASTRUCTURE

Since Nunavut health care is concentrated in Iqaluit, air travel is common for patients. This represents a particular challenge in the context of COVID-19, given the need for physical distancing from potentially infectious patients. In Nunavut hamlets, it would be impractical for some community health facilities to deal with an outbreak of COVID-19. It would be equally difficult to self-isolate in overcrowded housing. Such vulnerabilities were one reason why Nunavut closed its borders quickly after the global pandemic began to limit the risk of community transmission.[423]

There is also a lack of infrastructure for the deceased. Particularly in the context of COVID-19, a lack of suitable space to store bodies that may be infectious represents a serious infrastructure gap. Only nine communities in the territory have morgue spaces. In communities without morgues, bodies are often kept in shipping containers or repurposed buildings such as sheds or community freezers.[424] Additionally, there is only one funeral home, and no cremation capacity in the territory, compared with about 1,500 funeral homes in the rest of Canada.[425]

Indicator: mental health and addictions infrastructure

Across Canada, mental health care services are delivered by provinces and territories, accounting for about seven percent of all health spending.[426] Services are delivered on a continuum of care ranging from community-based supports (such as through primary-care clinics) to emergency departments, inpatient care, and psychiatric hospital services.[427]

Despite a lack of clear data nationally on the scale of infrastructure used for mental health care needs, data on hospital beds dedicated to mental health and addictions treatments are available from the Canadian Institute for Health Information (CIHI). Other parts of Canada range from a low of 10 dedicated mental health beds in the Northwest Territories, to a high of 8,766 in Ontario.[428] When looking at the number of persons per available mental health bed, Yukon has the most access, with 1,356 persons per bed, with the Northwest Territories having the least, at 4,505 persons.

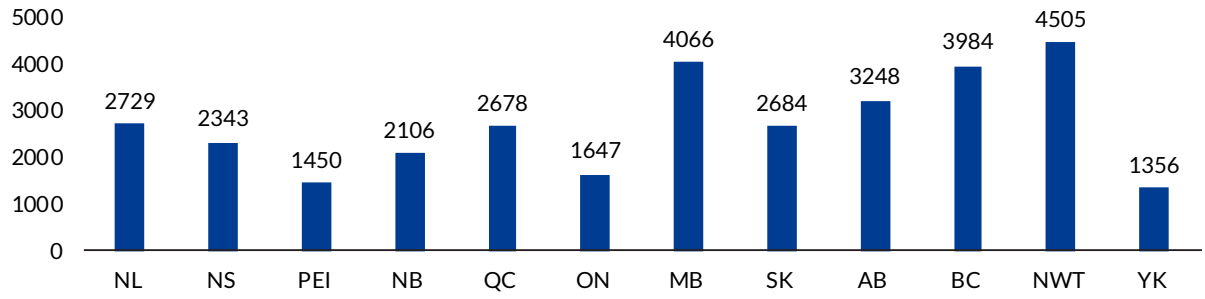
422 Nunavut News, Bring birthing centres home to communities, say advocates. March 16, 2019. https://nunavutnews.com/nunavut-news/bring-birthing-home-to-communities-say-advocates/
423 CBC News, "COVID-19 could hit Nunavut harder than elsewhere, says territory's top doctor," 2020, https://www.cbc.ca/news/canada/north/COVID-19-nunavut-1.5500621.
424 Nunavut News, "Resting in peace not an option in most Nunavut communities."
425 CBC News, "'Our safety is becoming secondary': How funeral homes are grappling with mounting COVID-19 deaths," 2020, https://www.cbc.ca/news/canada/funeral-homes-grappling-covid-1.5553436.
426 Canadian Institute for Health Information, "Health System Resources for Mental Health and Addictions Care in Canada," 2019, https://www.cihi.ca/en/mental-health-and-addictions.p.13
427 Canadian Institute for Health Information, "Health System Resources for Mental Health and Addictions."
428 Canadian Institute for Health Information, "Hospital Beds Staffed and In Operation, 2018–2019."

As Nunavut is not included in the CIHI dataset, it is difficult to make direct comparisons. Currently, there is only one 24-hour dedicated inpatient facility, the Akausisarvik Mental Health Treatment Facility, with spaces for 15 inpatients, and capacity for 40 outpatients.[429] There are plans to build an addictions and treatment centre connected to the Qikiqtani General Hospital. Based on the 15 beds available at the Akausisarvik Mental Health Treatment Facility, this would place Nunavut at 2,556 persons per bed, situating Nunavut between Yukon and the Northwest Territories in access to mental health care and addictions beds.

However, these data do not capture regional variations in Nunavut, as few mental health supports are available outside Iqaluit. There is currently a transitional support home in Cambridge Bay, and plans to build a new facility in Rankin Inlet.[430] Elsewhere, patients experiencing acute mental health care needs must travel to Iqaluit or out of the territory.

FIGURE 25

Number of persons per mental health and addictions bed (2018–19)



Source: Research team cacultations based on CIHI data

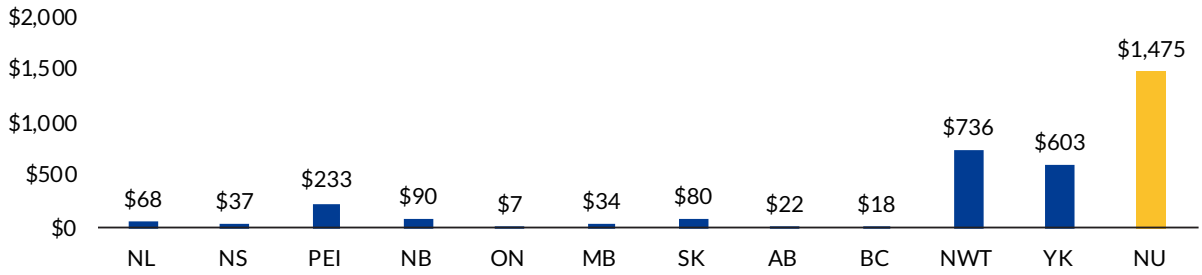
Indicator: government spending on out-of-jurisdiction health care

Nunavut spends more than any other province or territory in Canada on out-of-jurisdiction health care for its residents. In 2018–19, the territory spent about $56.5 million in out-of-territory care. This is just spending on services, and does not include medical travel costs. Territorial spending in this area translates to approximately $1,475 on out-of-territory care per person, the highest rate in the country, and about double the amount in the Northwest Territories, the second-highest spending jurisdiction.[431]

429 Research interviews, 2020; see also Government of Nunavut, "Akausisarvik Mental Health Treatment Centre to offer more services to more clients," accessed June 17, 2020, https://www.gov.nu.ca/sites/default/files/2013-05_nr32_-_akausisarvik_official_opening_-_eng.pdf.
430 Research interviews, 2020.
431 Data on spending on out-of-jurisdiction health care is sourced from the Health Canada, "Canada Health Act Annual Report 2018–2019," 2020, https://www.canada.ca/en/health-canada/services/publications/health-system-services/canada-health-act-annual-report-2018-2019.html.

FIGURE 26

Government spending on out-of-jurisdiction health care, per capita (2018–19)



Source: Research team calculated based on Health Canada data

Indicator: percentage of residents with a regular healthcare provider

Nunavut residents are the least likely in Canada to have a regular healthcare provider. Only 13.9 percent of Nunavut residents report having a regular healthcare provider—one-sixth of the national average of 84.9 percent. The Northwest Territories has the second-lowest percentage of residents with a regular healthcare provider, at 37.3 percent. Other jurisdictions in Canada fall between 78.5 percent and 90.1 percent of residents with a regular provider.[432]

The gap between Nunavut and the rest of Canada is also growing. In 2015–16, 23.8 percent of Nunavut residents reported having a regular health care provider, almost 10 percentage points more than in 2017–18. In contrast, the Canadian average increased from 83.6 percent to 84.9 percent of residents having a regular health care provider during the same period.[433]

Nunavut residents are the least likely in Canada to have a regular healthcare provider. Only 13.9 percent of Nunavut residents report having a regular healthcare provider—one-sixth of the national average of 84.9 percent.

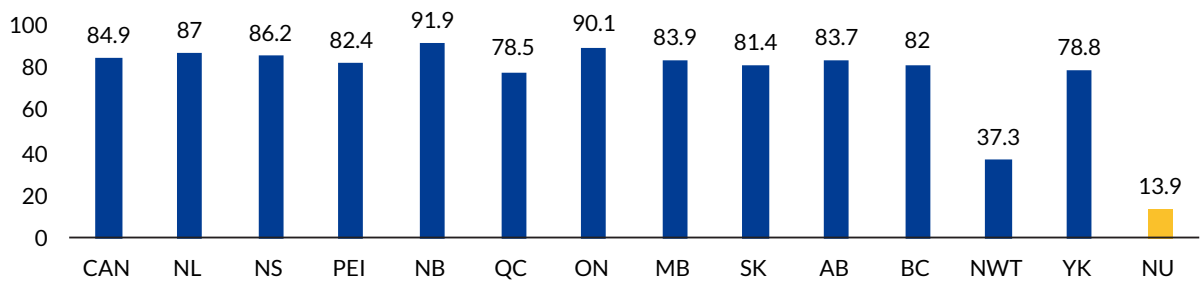
This outcome reflects both limited health infrastructure in Nunavut and limited human resources. Out of the 26 full-time family-doctor positions in Nunavut, only 7.5 positions are allocated to Kivalliq region and 2.5 to Kitikmeot.[434] Limited housing options make it difficult to hire medical staff in many parts of Nunavut, and poor Internet connections are a barrier to making diagnoses remotely.

Limited access to regular health care providers likely contributes to Nunavut's scoring well below the national average in residents reporting they are in good health. Having a regular health care provider is an important component of health delivery, including early screening, prevention, and treatment of medical conditions. Long-standing and trusting relationships between patients and providers are also important to the identification and treatment of mental health issues.

432 Statistics Canada, "Health Characteristics, Two-Year Period Estimates, Census Metropolitan Areas and Population Centres."
433 Data from the 2015–16 Canadian Community Health Survey as reported by CIHI. See Canadian Institute for Health Information, "Nunavut – Has a Regular Health Care Provider," 2018. https://yourhealthsystem.cihi.ca/hsp/indepth?lang=en#/indicator/074/2/C191/
434 Health Canada, "Canada Health Act Annual Report 2018–2019."

FIGURE 27

Percentage of residents with a regular healthcare provider, 2017-2018



Source: Statistics Canada, Canadian Community Health Survey

ACCESS TO CANCER SCREENING

The lack of overall health infrastructure, especially services for routine check-ups, means that preventive public health efforts are challenging. Nunavut has the highest proportion of avoidable deaths in the country.[435] This theme is evident in data on cancer rates in the territory. On paper, Nunavummiut have the lowest rates of cancer detection in Canada.[436] Yet the cancer fatality rate is more than double the national average.[437] The Conference Board of Canada has suggested that this disconnect can be explained in part by gaps in screening.[438]

435 CIHI, "Avoidable Deaths," accessed June 12, 2020, https://yourhealthsystem.cihi.ca/hsp/inbrief.#!/indicators/012/avoidable-deaths.
436 Government of Nunavut, "Cancer in Nunavut: 1999–2011," 2014, https://www.gov.nu.ca/sites/default/files/cancer_report_2013_final.pdf.
437 Government of Nunavut, "Cancer in Nunavut: 1999–2011."
438 Conference Board of Canada, "Mortality Due to Cancer – Health Provincial Ranking – How Canada Performs," accessed June 12, 2020, https://www.conferenceboard.ca/hcp/provincial/health/cancer.aspx. Conference Board of Canada.

Education

Nunavut has the youngest population in Canada, so education infrastructure is essential to the present and future of Nunavut Inuit. Early childhood education, K-12 education, postsecondary education, and adult education all have distinct infrastructure needs that must be met for the system as a whole to function effectively. Education also plays a critical role in strengthening the Inuktut language and Inuit culture, and in the implementation of the *Nunavut Agreement*, such as obligations related to Inuit government employment (Article 23) and government contracting (Article 24).

Nunavut has 44 schools, with elementary and high school offered in all 25 communities.[439] Through the Nunavut Arctic College's five campuses and Community Learning Centres, each Nunavut community has some form of postsecondary or adult education facility (typically including a classroom and computer lab).[440] Through partnerships with universities outside Nunavut (e.g., the University of Saskatchewan/Nunavut Arctic College Law Program), Nunavut Inuit can access some degree and diploma programs in Nunavut, even though there is no university in the territory.

Nunavut Inuit face education system gaps on a number of fronts. Nunavummiut have the lowest high-school graduation rates in Canada—the share of the Nunavut population aged 25–64 who have not completed secondary school (42 percent) is more than five times the Canadian average (8 percent).[441] For people who identified "Inuit" as their single identity in the 2016 census, only 4 percent of those 25–64 had a university degree, compared with 31 percent for Canada as a whole.[442] These low educational attainment numbers may reflect how Inuit have been pushed out of the education system because of the absence of Inuktut language or Inuit culture in the curriculum. Gaps in postsecondary attainment contribute to ongoing labour market challenges in Nunavut, including the planning and development of infrastructure (see the section on Skills and human capacity).

Infrastructure is, of course, not the whole story of Nunavut's education challenges. While the vast majority of Nunavut Inuit speak Inuktitut or Inuinnaqtun, there is limited Inuit-language instruction available.

Students' educational outcomes are often undermined by infrastructure gaps in other areas, such as overcrowded housing and food insecurity. Nunavut's school attendance rates are among the lowest in Canada (averaging 68 percent across Nunavut).[443] Accounting for fluctuating student numbers makes it hard to provide schools with appropriate funding and teacher complements.[444] Nunavut's Department of Education has had ongoing difficulties in both recruiting and retaining teachers in Nunavut—illustrating the importance of building Inuit capacity rather than relying on teachers from elsewhere. Broader infrastructure gaps are a factor in teacher shortages: for example, finding appropriate housing for

439 Auditor General of Canada, "Support for High School Students and Adult Learners," 2019, https://www.oag-bvg.gc.ca/internet/English/nun_201906_e_43388.html.
440 "New Community Learning Centre in Grise Fiord!" Nunavut Arctic College, accessed March 11, 2020, https://arcticcollege.ca/newsletter/2018/12/4/new-community-learning-centre-in-grise-fiord?locale=en.
441 Statistics Canada and Council of Ministers of Education, "Education Indicators in Canada."
442 Statistics Canada, "Distribution of Population Aged 25 to 64 (Total and with Aboriginal Identity), by Sex and Educational Attainment," accessed June 9, 2020, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3710010001.
443 Government of Nunavut, "Department of Education Annual Report 2016–2017," accessed June 8, 2020, https://gov.nu.ca/sites/default/files/2016-2017_education_annual_report_-_english.pdf.
444 CBC News, "Poor school attendance 'baked into system,' Nunavut Standing Committee hears," 2019, https://www.cbc.ca/news/canada/north/auditor-general-adult-education-nunavut-legislature-1.5303563.

teachers is a recruitment and retention obstacle for all levels of education.[445] In some instances, because of a shortage of housing, teachers are expected to share a house with other teachers, even those who have partners or families.[446]

For students pursuing postsecondary education outside their home community, finding housing is also a persistent barrier. There are typically waitlists for places in student residences or housing; however, unlike many communities in the South, there is rarely a market supply of alternative private housing that can be leased if a residence space is unavailable.[447] Inuit students who relocate from their home communities for postsecondary education often struggle to make the transition successfully, far away from families who may rely on them, or support systems that are familiar. Online learning has the potential to help students stay within their communities but has limited efficacy without adequate broadband infrastructure or flexible learning facilities.

A lack of available and appropriate infrastructure to support childcare is a major barrier for early childhood development and for broader labour market participation in Nunavut. Nunavut has the highest fertility rate in Canada and significantly younger parents than the Canadian average. As of 2016, the fertility rate for women aged 15–19 was 13 times the Canadian average, and the rate for women aged 20-24 was four times the Canadian average.[448] This means that having access to appropriate childcare options is essential to participating in education and training for many Nunavut Inuit. However, better infrastructure is needed in many communities to expand the complement of available regulated childcare spaces. Currently only 37 percent of Nunavut children five years and under are in daycare or an early learning program, lagging far behind a national Canadian average of 60 percent.[449] In neighbouring Greenland, 75.8 percent of children under 6 were enrolled in some form of preschool or daycare program in 2019.[450]

Infrastructure is, of course, not the whole story of Nunavut's education challenges. While the vast majority of Nunavut Inuit speak Inuktitut or Inuinnaqtun, there is limited Inuit-language instruction available. The 2008 *Education Act* committed to full bilingual instruction being available by 2019–20, but in 2019 proposed reforms extend these timelines by 20 years.[451] Combined with the legacy of residential schools and other threats to Inuit culture, this means that the education infrastructure available does not consistently support the education needed to strengthen and support Inuit culture.

There are no consistent measurements of state of repair of education infrastructure across Canada. Each jurisdiction does its own assessments as part of its capital planning processes, and in most cases, this information is not publicly available. Recent major education capital projects in Nunavut include new schools in Kinngait, Igloolik, and Kugaruuk, an addition to the French school in Iqaluit, and a major renovation in Coral Harbour to remove mould.[452]

445 CBC News, "As school year begins, Nunavut and Nunavik face major teacher shortages," 2019, https://www.cbc.ca/news/canada/north/teacher-shortage-nunavut-1.5254193, and research Interviews, 2020.
446 Research interviews, 2020.
447 Research interviews, 2020.
448 Statistics Canada Government of Canada, "Fertility: Overview, 2012 to 2016," June 5, 2018, https://www150.statcan.gc.ca/n1/pub/91-209-x/2018001/article/54956-eng.htm.
449 CBC News, "Nunavut lags behind rest of Canada for use of child care: StatsCan," 2019, https://www.cbc.ca/news/canada/north/daycare-spaces-nunavut-1.5259503.
450 Data taken from Statbank Greenland, "Preschool Keyfigures by Municipality, District and Residence," accessed June 9, 2020, http://bank.stat.gl/pxweb/en/Greenland/Greenland__OF__OF40/OFXUKN1.px/?rxid=OFXUKN109-06-2020 07.
451 Nunavut Tunngavik Inc., "Bill 25 Education Act Amendments Disappoint Again," June 2019, https://www.tunngavik.com/news/bill-25-education-act-amendments-disappoint-again/
452 Government of Nunavut, "Capital Estimates 2019–2020," 2018, https://www.gov.nu.ca/sites/default/files/capital_estimates_2019-2020-eng.pdf.

Gap analysis

To measure the education infrastructure gap between Nunavut and the rest of Canada, this report includes four indicators:

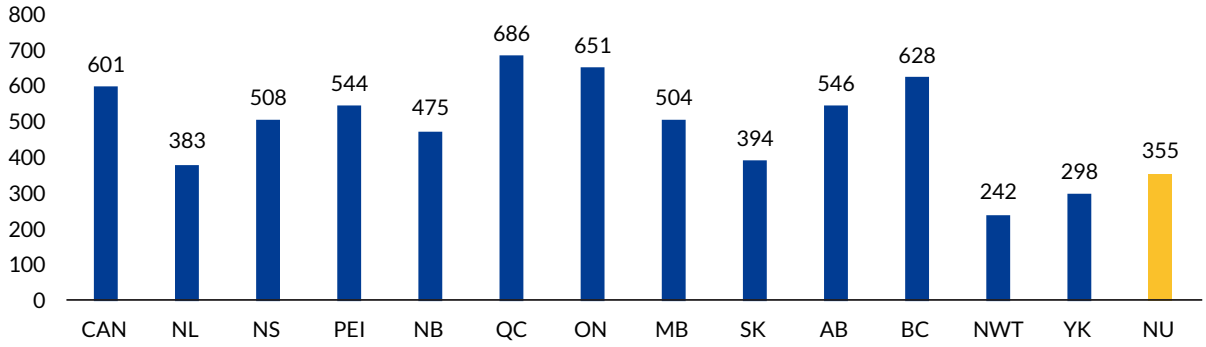
- Number of school-aged people per public school
- Licensed childcare facilities
- University and college campuses
- High school graduation and postsecondary attainment rates

Indicator: number of school-aged people per public school

Nunavut has 44 schools across its communities with both elementary and high school available in each community.[453] By raw measures this puts Nunavut in a better position in terms of school facility access than any of the provinces, but with more students per institution than Yukon or the Northwest Territories.

FIGURE 28

Population under 19 per public school, various sources[454]



Source: Research team calculations based on provincial and territorial departments of education data.

453 Government of Nunavut, "Department of Education Annual Report 2016–2017."
454 Population data from Statistics Canada, "Canada's Population Estimates: Age and Sex, July 1, 2019" and "Distribution of Population Aged 25 to 64 (Total and with Aboriginal Identity), by Sex and Educational Attainment." Provincial education data from Newfoundland and Labrador English School District, "NLESD School Directory," accessed June 9, 2020, https://www.nlesd.ca/schools/schooldirectory.jsp; Government of Prince Edward Island, "Schools in PEI" accessed June 9, 2020, https://www.princeedwardisland.ca/en/topic/schools-pei; Government of Nova Scotia, "Nova Scotia Directory of Public Schools," accessed June 9, 2020, http://ns-schools.ednet.ns.ca/; Government of New Brunswick, "Department of Education – Welcome to the School Directory," accessed June 9, 2020, https://www.nbed.nb.ca/schooldirectory/?strLang=E; Gouvernement du Québec, "GDUNO – Recherche d'un Organisme," accessed June 9, 2020, https://prod.education.gouv.qc.ca/gdunojrecherche/rechercheOrganisme.do;jsessionid=Udma8r5iN-_hKjCbwH_EMxd6tL7pIuimt31FGwi2XzKj04yO1-26!1178282852!1162440643?methode=recherche; Government of Ontario, "Education Facts, 2018–2019 (Preliminary)," n.d; Government of Manitoba, Education, School Programs Division, "Schools in Manitoba," n.d; Government of Saskatchewan, "Active List of Saskatchewan Schools / Programs Provincial K-12 Headcount Enrolment (as of September 30, 2018)," 2018;; "Student Population Statistics – Alberta.Ca," accessed June 9, 2020, https://www.alberta.ca/student-population-statistics.aspx#toc-2; Government of British Columbia, "Education by the Numbers," 2019, https://news.gov.bc.ca/releases/2019EDUC0069-001642; Government of Yukon, "Find a School," accessed June 9, 2020, https://yukon.ca/en/education-and-schools/kindergarten-grade-12/directory; Government of Northwest Territories, "Directory of NWT Schools," accessed June 9, 2020, https://www.ece.gov.nt.ca/en/services/curriculum-and-school-list/directory-nwt-schools.Government of Nunavut, "Department of Education Annual Report 2016–2017."

Students' educational outcomes are often undermined by infrastructure gaps in other areas, such as overcrowded housing and food insecurity.

As with other infrastructure indicators, the per-capita figures for schools do not paint the full picture of the state of educational infrastructure in Nunavut and how well it serves communities. A province or territory with more total schools could have significant gaps in certain communities or across the board if they have smaller populations or smaller schools. It also does not capture the state of repair or the quality of facilities (libraries, science labs, gyms). The Auditor General of Canada found in a 2013 study that only a minority of safety inspections for Nunavut schools and childcare facilities took place within legislated timelines and that there was little evidence that follow-up took place to ensure that deficiencies were corrected.[455]

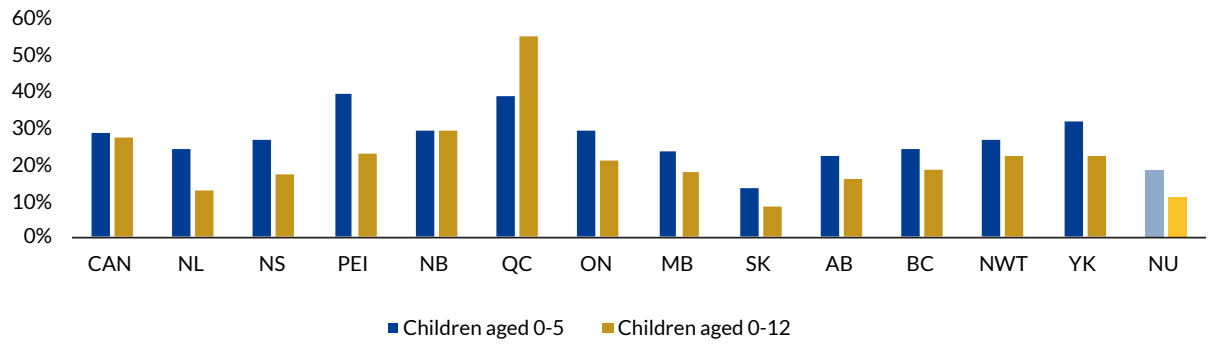
However, the presence of high schools in each community does represent an infrastructure advantage that Nunavut Inuit have compared with other Northern and remote regions of Canada. In the Yukon, young people from some smaller communities must live away from their families in Whitehorse to attend high school. Nonetheless, inadequate programming that is not culturally appropriate, the lack of Inuktut language of instruction, and cross-cutting challenges have resulted in very low attendance and poor outcomes from Nunavut's public school system—in effect, Nunavut Inuit students are pushed out of the school system.

Indicator: licensed childcare facilities

Nunavut has among the most significant shortages of childcare spaces in Canada. There are enough regulated spaces for 18 percent of children aged 0–5 (compared with 29 percent on average nationally) and spaces for only 11 percent of children aged 0–12 (compared with 27 percent on average nationally).[456]

FIGURE 29

Share of children for whom a regulated childcare space is available, 2016, Childcare Canada[457]



Source: Martha Friendly et al (2018)

455 Auditor General of Canada, "2013 November Report of the Auditor General: Safety of Schools and Childcare Facilities in Nunavut," 2013, https://www.oag-bvg.gc.ca/internet/English/nun_201311_e_38770.html.
456 Martha Friendly et al., Early Childhood Education and Care in Canada 2016, 2018, https://www.childcarecanada.org/sites/default/files/ECEC-in-Canada-2016.pdf.
457 Friendly et al., Early Childhood Education and Care in Canada.

These shortages vary across Nunavut, depending on the size and location of the community. Larger communities in Kivalliq and Qikiqtaaluk have significant waitlists, while smaller communities in Kivalliq report low occupancy.[458] Kitikmeot has repair problems in many of its childcare facilities.[459] Even taking into account recent investments (such as the construction of the new 60-space Tundra Buddies Daycare Society in Iqaluit, the largest in Nunavut), acute shortages remain in Iqaluit and elsewhere.[460] While there is no centralized waitlist, a 2018 government analysis estimated a two-year waitlist for licensed childcare spaces in Iqaluit.[461] Centres in many communities are open for only 9 or 10 months each year.[462]

The overall numbers also do not capture the responsiveness to Inuit cultural priorities. Despite the importance of Inuit culture and language environments for children, Iqaluit's only Inuktut-language daycare was forced to shut down for nearly one month in late 2019 due to staff shortages.[463] Rigid food inspection rules limit the ability of childcare facilities to pass on cultural practices by serving country food.[464] Outside Iqaluit, a major challenge is finding and retaining staff for childcare in small communities: not only qualified early childhood education staff members, but also people to sit on non-profit boards and oversee daycare facilities.[465]

One obstacle to appropriate and quality childcare facilities in Nunavut has been the cost. Work by the Kativik regional government in Nunavik with the Quebec regional government determined that the capital costs of childcare facilities in Nunavik have a 4:1 ratio with the south—a centre that costs $1 million to build in the south would cost $4 million in Nunavik.[466] A comparable or higher ratio could be expected in Nunavut, given cross-cutting infrastructure challenges.

Since 2008, the Government of Nunavut has had a policy that all new schools should include a daycare facility, an approach that both cuts down on overall capital costs and increases childcare availability.[467] Having a daycare located in the school itself improves capacity for the community at large and provides a convenient option for students who need childcare in order to attend class. The Government of Nunavut, as well as the Qikiqtani Inuit Association also provides subsidies to parents to assist with childcare costs.[468]

458 Inuit Tapiriit Kanatami, "Assessing the Impact of the First Nations and Inuit Child Care Initiative (FNICCI) across Inuit Nunangat," 2014, https://assembly.nu.ca/library/Edocs/2014/001698-e.pdf.
459 Inuit Tapiriit Kanatami, "Assessing the Impact of the First Nations and Inuit Child Care Initiative."
460 Government of Canada, "Completion of New Community Daycare in Iqaluit Celebrated," 2019, https://www.canada.ca/en/crown-indigenous-relations-northern-affairs/news/2019/07/completion-of-new-community-daycare-in-iqaluit-celebrated.html.
461 CBC News, "'Childcare Is a chronic issue': Iqaluit parents quitting jobs, dropping out of training programs," 2018, https://www.cbc.ca/news/canada/north/nunavut-daycare-shortage-unemployment-kindergarten-1.4646297.
462 Inuit Tapiriit Kanatami, "Assessing the Impact of the First Nations and Inuit Child Care Initiative."
463 Nunatsiaq News, "Iqaluit's Inuktut daycare calls for greater government support," 2019, https://nunatsiaq.com/stories/article/iqaluits-inuktut-daycare-calls-for-greater-government-support/
464 Lena Egotak, Jenny Lyall, Julie-Ann Berthe and Jessica Lyall Maria Storr, "Early Childhood Development in Inuit Nunangat: A Changing Landscape," Presentation to International Meeting on Indigenous Child Health, 2019, https://www.cps.ca/uploads/imich/D5_Egotak.pdf.
465 Research interview, 2020.
466 Inuit Tapiriit Kanatami, "Assessing the Impact of the First Nations and Inuit Child Care Initiative."
467 Research interview, 2020.
468 Qikiqtani Inuit Association, "Daycare and Early Learning Resources," accessed July 21, 2020, https://www.qia.ca/what-we-do/daycare-and-early-learning-resources/#ipitiki; Government of Nunavut, "The Government of Canada and the Government of Nunavut Sign a Bilateral Agreement on Early Learning and Child Care," 2017, https://www.gov.nu.ca/education/news/government-canada-and-government-nunavut-sign-bilateral-agreement-early-learning-and.

Indicator: universities and colleges

Nunavut Inuit have few options to continue their education beyond high school other than to leave their community or leave Nunavut altogether. Through Nunavut Arctic College (NAC), five campuses and 25 community learning centres provide some postsecondary infrastructure to each community. The College awards certificate and diploma credentials as well as Bachelor's degrees in partnership with other institutions. These program offerings are primarily split between the core campuses in Iqaluit, Cambridge Bay, and Rankin Inlet.

Each community has a "learning location," but most of the community learning centres are limited in their programming and facilities. While it is helpful that there is a NAC presence in all communities, most facilities are far from what could be considered a "satellite" campus space. In 2019, Nunavut MLA John Main wrote to the Hon. Patterk Netser, Minister Responsible for the Nunavut Arctic College, about NAC community learning centres, asking about the age, condition, renovations, and capital planning of facilities. According to that letter, nine facilities had been rated as being in "fair" or "poor" condition by a visiting capital planner in 2018.[469] Four of the 25 "community learning centres" were in trailers. In Gjoa Haven, the floor collapsed in the community learning centre trailer, and programming had to be moved to an old nursing station.[470] According to that letter, to "the best of anyone's knowledge," no renovations were reported to *any* of the community learning centres, other than brand-new builds.[471]

TABLE 11

Reported conditions of 2018 inspection for Community Learning Centres, 2019, Nunavut Legislative Assembly[472]

Condition of Facility	Number of Facilities
Excellent	3
Good	12
Fair	4
Poor	5
Unknown	1

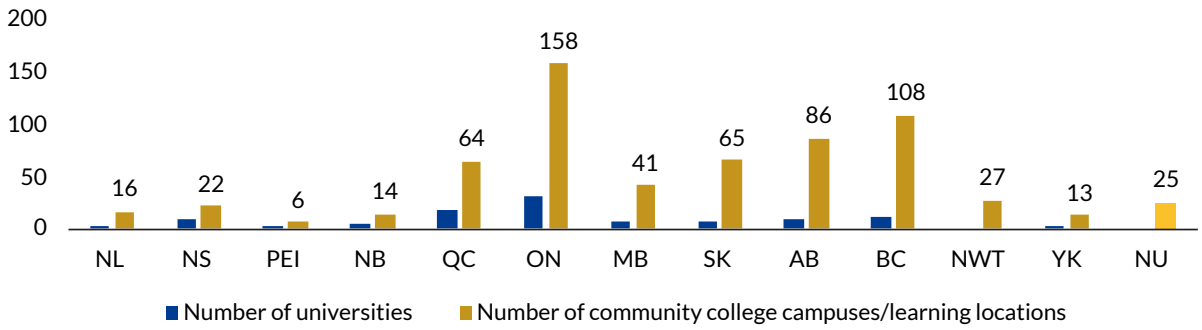
Ensuring local learning spaces are functional and easy to access is a crucial component of improving postsecondary outcomes in Nunavut. Proximity matters for how likely young people are to pursue postsecondary education.[473] Being able to stay close to home has been shown to influence attendance both in terms of costs (for those who can stay at home) and the ability to study in familiar environments close to support networks. Yukon University, which began operation in May 2020, will be Canada's first university in the territories.

469 MLA Hon. Patterk Netser and Minister Responsible for the Nunavut Arctic College, "Return to Written Question: Status of Community Learning Centres," 2019, https://assembly.nu.ca/sites/default/files/RTWQ-041-5%282%29-Response-NAC-EN.pdf.
470 Nunatsiaq News, "Nunavut MLAs decry state of community adult learning centres," 2019, https://nunatsiaq.com/stories/article/nunavut-mlas-decry-state-of-community-adult-learning-centres/
471 Netser, "Return to Written Question: Status of Community Learning Centres."
472 Netser, "Return to Written Question: Status of Community Learning Centres."
473 David Zarifa, Darcy Hango, and Roger Pizarro Milian, "Proximity, prosperity, and participation: Examining access to postsecondary education among youth in Canada's provincial North," Rural Sociology 83, 2 (2018): 270–314, https://doi.org/10.1111/ruso.12183; Ruth N. López Turley, "College proximity: Mapping access to opportunity," Sociology of Education 82, 2 (2009): 126–46.

Fully 39.4 percent of Nunavummiut aged 20–24 are not in education or in the labour force.[474] That compares with 7.3 percent for this age group for the Canadian average and 9 percent for the OECD average.[475] The ability to study close to home amid Inuit culture is a clear contributing factor, among others.

FIGURE 30

Number of universities and colleges, Universities Canada and Colleges and Institutes Canada[476]



Source: Universities Canada; Collages and Institutes Canada

Canadian provinces and territories range considerably in their number of institutions. Nova Scotia, for example, has nearly as many universities as British Columbia. Nor does the number of institutions or campuses provide any information about their size or facilities. However, given that only approximately one in ten university students in Canada leave their province to study, the range of institutions in the province or territory clearly matters for post-secondary choices.

Inuit Tapiriit Kanatami's National Inuit Strategy on Research called for the creation of an Inuit-led University in Inuit Nunangat.[477] In addition to providing students with more options to study locally, an Inuit-led university would help ensure Inuit access and ownership of research, as well as support Inuit researchers to access funds that typically go to researchers based at Universities elsewhere in Canada.[478]

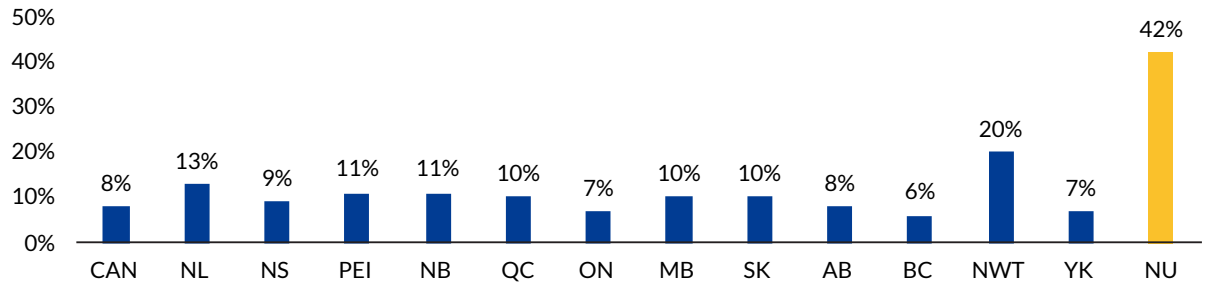
Indicator: high school graduation and postsecondary attainment rates

Among the current working age population, Nunavut is an outlier in the low levels of formal education. The share of the Nunavut residents aged 25–64 who have not completed secondary school (42 percent) is more than five times the Canadian average (8 percent).[479] This gap can be seen at all education levels. The share of Nunavummiut with university degrees is less than half the Canadian average.

474 Statistics Canada and Council of Ministers of Education, "Education Indicators in Canada."
475 Statistics Canada and Council of Ministers of Education, "Education Indicators in Canada."
476 Universities Canada, "Enrolment by University," accessed June 9, 2020, https://www.univcan.ca/universities/facts-and-stats/enrolment-by-university/; Colleges and Institutes Canada, "Colleges and Institutes Canada by Province," accessed June 9, 2020, https://www.collegesinstitutes.ca/our-members/member-directory/; Statistics Canada, "Estimates of Population as of July 1st, by Marital Status or Legal Marital Status, Age and Sex," accessed June 9, 2020, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1710006001.
477 Inuit Tapiriit Kanatami, "National Inuit Strategy on Research."
478 Inuit Tapiriit Kanatami, "National Inuit Strategy on Research."
479 Statistics Canada and Council of Ministers of Education, "Education Indicators in Canada."

FIGURE 31

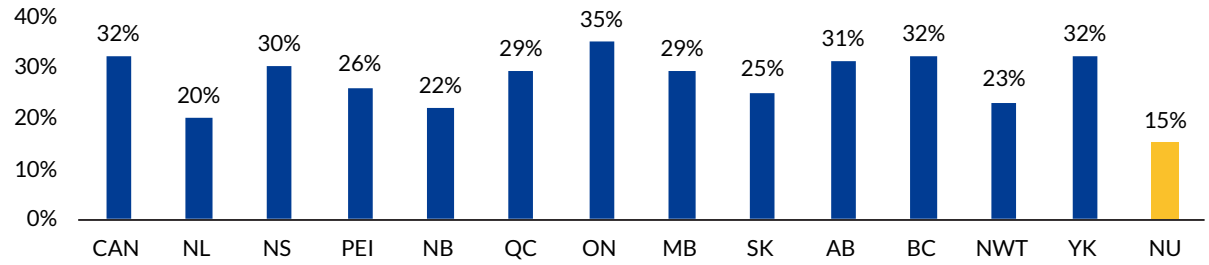
Share of the working age population (25-64) without a highschool diploma, Statistics Canada[480]



Source: Statistics Canada, Education Indicators

FIGURE 32

Share of working age population with bachelor's degree or above, Statistics Canada

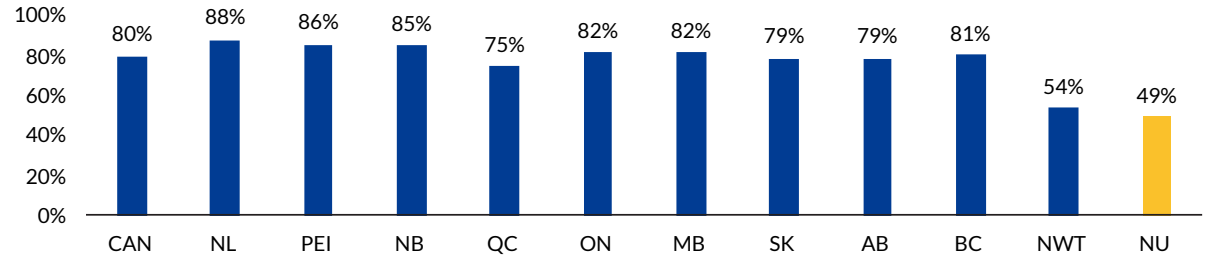


Source: Statistics Canada, Education Indicators

Part of the gap in the working age population reflects past gaps in education infrastructure and programs. But given low graduation rates today, these gaps are likely to widen. Based on 2016–17 data from the Council of Ministers of Education Canada and Statistics Canada, the on-time graduation rate of high school students in Nunavut was the lowest in the country, lagging the Canadian average by more than 30 percentage points.[481]

FIGURE 33

On-time high school graduation rate, Statistics Canada[482]



Source: Statistics Canada, Education Indicators

480 Statistics Canada and Council of Ministers of Education, "National Inuit Strategy on Research."
481 Statistics Canada and Council of Ministers of Education, "Education Indicators in Canada." Data for extended time graduation rates not available for Nunavut. Data not available for Yukon or Nova Scotia.
482 Statistics Canada and Council of Ministers of Education, "Education Indicators in Canada."

Community, culture, and recreation

Communities rely on a variety of infrastructure for recreational, cultural, and community-building activities. These include sports facilities (arenas, soccer fields, baseball diamonds, pools), multi-purpose facilities ("community centres" used for fitness, educational programming of all kinds, and civic activity), and what Statistics Canada classifies as "arts and culture" facilities (museums, libraries, and performance spaces). According to the 2006 Aboriginal Children's Survey, only 27 percent of Inuit parents surveyed in Nunavut said they viewed their community as a place with adequate facilities for children: for example, community centres, rinks, gyms, or parks.[483]

Such gaps affect Nunavummiut's capacity to deepen cultural ties, build community, and improve well-being. Nunavut is the only jurisdiction among Canada's provinces and territories that does not have a dedicated theatre for live performances. Only 11 of 25 communities have access to a bricks-and-mortar public library (other communities receive books by mail). Intra-territorial sports teams must undertake expensive, logistically challenging trips to compete with other teams in the territory. While Iqaluit has recently upgraded to a new Aquatic Centre (prompting the establishment of Nunavut's first-ever swimming club), many other communities either lack pools or have pools that are only seasonally accessible and prone to disrepair (see section on state of repair below).

Most of the data in this section come from Statistics Canada's 2016 Core Public Infrastructure Survey. However, it is difficult to account for all the places in which community activities take place (Legion Halls, cultural community centres, churches) and to gauge whether the available complement of spaces meets local needs. Recreation and sports take place in many different kinds of facilities, and this fact might not be captured by the public infrastructure survey, which focuses on purpose-built infrastructure. Community feasts may take place in high school gyms; artistic performances may take place in churches; hunting and fishing programming might take place at a local library. The capacity of community spaces to promote well-being depends on the availability and good repair of more than just dedicated recreation facilities, although specific facilities are necessary for some activities: e.g., arenas for hockey or pools for swimming. Moreover, since community halls may also be used to hold court sessions or Ranger exercises, recreation and cultural uses must compete for the space.

Nunavut has the youngest population in Canada, which means that recreation and sports facilities are essential to promote active living and development.

Nunavut has the youngest population in Canada, which means that recreation and sports facilities are essential to promote active living and development. Because housing in Nunavut is scarce and Nunavut Inuit experience high levels of overcrowding, "third spaces" outside home or work are even more important for children and adults alike.[484] Because of Nunavut's climate, activities that might otherwise take place outside (a pickup soccer game, a fitness class, or even a discussion among friends on a park bench) require indoor space most of the year.

483 Statistics Canada, "Aboriginal Children's Survey," 2006, Table 3.4 Percentage of Inuit Children Whose Parents or Guardians Reported that their Community was 'Excellent' or 'Very Good' in terms of Selected Characteristics, by Inuit Region; Family, Community and Child Care, accessed June 7, 2020, https://www150.statcan.gc.ca/n1/pub/89-634-x/2008001/t/6000154-eng.htm. This survey has not been repeated since 2006.

484 Theme seen across many publications. One example is Jessica Davey-Quantick, "Nunavut Turns 20: What's Next?," Up Here Magazine, 2019, https://uphere.ca/articles/nunavut-turns-20-whats-next.

Community and family play an important role in Inuit culture, therefore safe and welcoming communal spaces are needed. Kinship and interdependence are important pre-colonial hallmarks of Inuit life, outside the context of formalized or Westernized settlements. Researchers studying factors that contribute to Inuit suicide rates found that family and kinship were most significant in self-reported factors of well-being:

> *By far the most prominent theme across all interview questions/questionnaire items, and interrelated with most other themes, was the central importance of family and kinship…. When asked about happiness, family was mentioned four times more frequently than the next most common theme, which was being on the land, usually with family.*[485]

Communal spaces provide a vital opportunity for building and maintaining connections between community members. Moreover, important recreational and community-building activities in Nunavut do not necessarily have analogues elsewhere in Canada, and those activities have specific infrastructure needs. A working and spacious community freezer may be an important infrastructure need for Inuit-led youth programming, or a large hall that can accommodate many people without fire and safety concerns may be required for a community feast as well as for the intergenerational transfer of Inuit knowledge.

Under the *Nunavut Agreement*, Article 32 formalizes Inuit rights to participate in the development and delivery of social and cultural policies and programs in Nunavut, and Article 33 outlines the rights of Inuit to take on oversight and responsibility for Inuit heritage and archaeological practices.[486] Ensuring access to local infrastructure where such programming and cultural activity can take place (and that the infrastructure is in good repair) is a crucial prerequisite to fulfilling this commitment in the *Nunavut Agreement*. In fact, the establishment of a Nunavut Heritage Centre is the only infrastructure referenced in the *Nunavut Agreement*.

Gap analysis

To measure the gaps in community, culture, and recreation infrastructure between Nunavut and the rest of Canada, this report includes three indicators:

- Number of publicly owned sports and recreation facilities per capita
- State of repair of public recreation and sports infrastructure
- Economic impact of recreational or cultural enterprises

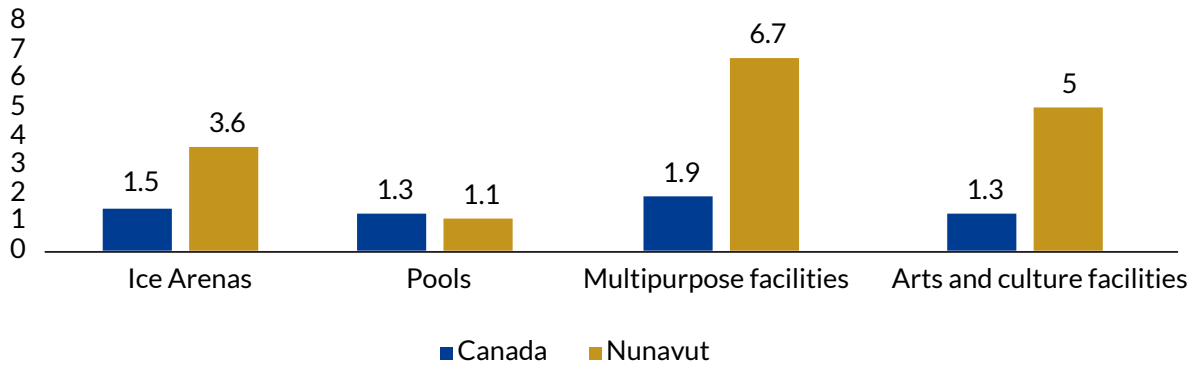
Indicator: number of publicly owned sports and recreation facilities per capita

Statistics Canada collected information about publicly owned sports and recreation facilities as part of its 2016 Public Infrastructure Survey. It seems that not all infrastructure was captured by the survey (Nunavut has 11 libraries, not seven) but this survey nonetheless represents the most centralized accounting of comparative recreational infrastructure across Canada.[487]

485 Michael J Kral et al., "Unikkaartuit: Meanings of well-being, unhappiness, health, and community change among Inuit in Nunavut, Canada," American Journal of Community Psychology 48, 3-4 (2011), https://doi.org/10.1007/s10464-011-9431-4.
486 See details at Nunavut Tunngavik Inc., "Article 32 – Nunavut Agreement," accessed June 7, 2020, https://nlca.tunngavik.com/?page_id=2659. and Nunavut Tunngavik Inc., "Article 33 – Nunavut Agreement," accessed June 8, 2020, https://nlca.tunngavik.com/?page_id=2676.
487 Infrastructure Canada and Statistics Canada, "Table: 34-10-0188-01: Inventory of Publicly Owned Culture, Recreation and Sport Facilities Grouped," 2016, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410018801.

FIGURE 34

Number of publicly owned sports and recreation facilities per capita



Source: Statistics Canada

TABLE 12

Number of publicly owned sports and recreation facilities per 10,000 by jurisdiction[488]

	Ice Arenas	Pools	Multipurpose facilities	Arts and culture facilities
Canada	1.5	1.3	1.9	1.3
Newfoundland and Labrador	1.0	1.0	4.1	2.3
Prince Edward Island	0.8	0.6	1.2	3.8
Nova Scotia	0.5	0.6	0.7	1.2
New Brunswick	1.3	1.4	2.5	1.6
Quebec	3.0	2.0	4.2	1.6
Ontario	1.0	1.2	1.1	1.0
Manitoba	3.5	1.7	1.8	2.2
Saskatchewan	2.5	2.0	2.1	2.1
Alberta	1.1	0.8	1.0	0.9
British Columbia	0.4	1.0	1.1	1.0
Yukon	1.1	2.2	1.1	5.9
Northwest Territories	2.6	1.2	1.9	1.7
Nunavut	3.6	1.1	6.7	5.0

488 Using facility data from above and population data from Statistics Canada, "Population and Dwelling Count Highlight Tables, 2016 Census—Canada, Provinces and Territories," accessed June 3, 2020, https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/hlt-fst/pd-pl/Table.cfm?Lang=Eng&T=101&S=50&O=A.

As Table 13 shows, Nunavut in most cases has more recreational facilities per capita than the Canadian average (for infrastructure captured in the public infrastructure survey). While this finding reflects some recent investments in community infrastructure and programming, it does not necessarily represent the comparative availability of services and programming. Because communities cannot share resources and facilities, large portions of Nunavut Inuit cannot access cultural and recreational facilities, despite the high per-capita numbers.

In the South, cultural and recreational facilities that serve small communities can be thought of as providing a regional service. One framework for this regional planning is the typical "hub-and-spoke" model centred on a larger community or a city.

Another framework that may service communities without a larger population centre is a "regional" model. If there is no indoor arena in town X, then there likely is one within a short drive in town Y. Instead, town X may have a children's theatre program, that people from town Y and other towns use. As a result, without any one community's having a "full" complement of facilities, a critical mass of community culture and recreation infrastructure is reasonably accessible.

In Nunavut such a model is not possible. Without taking a flight, residents have access only to the facilities in their own community. The table below lists types of sports, culture and recreation facilities captured by the Core Public Infrastructure Survey, with a sampling of Canada's lower-population provinces and territories.

TABLE 13

Number of publicly owned sports and recreation facilities[489]

	Outdoor ice arenas	Outdoor pools	Galleries	Libraries	Museums and archives	Presentation and performance spaces	Community centres	Outdoor skate parks	Outdoor sports fields
Nunavut	0	0	0	7	4	7	14	4	7
Northwest Territories	5	0	0	5	2	0	5	5	11
New Brunswick	32	26	12	46	24	39	58	30	230
Prince Edward Island	3	4	3	30	15	6	17	5	63

Libraries help explain why per-capita measurements do not tell a complete story of Nunavut's comparative access to recreation and sports infrastructure. Even though it is one of Canada's smaller provinces, New Brunswick has more than 20 times the population of Nunavut. Nunavut has more libraries than New Brunswick per capita: 1.9 per 10,000 if you use the Statistic Canada data, or 3.1 per 10,000 if you use the 11 libraries listed on the Nunavut libraries website. In comparison, New Brunswick only has 0.7 libraries per 10,000.

489 Infrastructure Canada and Statistics Canada, "Table: 34-10-0188-01: Inventory of Publicly Owned Culture, Recreation and Sport Facilities Grouped."

Yet New Brunswick does better comparatively in terms of the ratio of communities to libraries. Data suggest that about half of New Brunswick's 109 communities have a library, and just under half of Nunavut's communities (11 out of 25).[490] A strict comparison becomes less effective when considering the reality of Nunavut's self-contained communities. More than 11,000 people in Nunavut, or just under a third of the 2016 total population, live in a community with no access to a bricks-and-mortar library.[491] In contrast, every person in New Brunswick is within a one-hour drive of a library. While both New Brunswick and Nunavut have a robust mail-library system for all residents, this service cannot replace what libraries provide in terms of community and civic space: a place to meet, study, and learn.

Nunavut remains the only Canadian jurisdiction without a heritage centre, even though such a centre is necessary to meet commitments under the Nunavut Agreement.

While local recreation and culture infrastructure is crucial to the health of individual communities, Nunavut also lacks heritage and culture infrastructure that meets territory-wide needs. There is a museum in Iqaluit (Nunatta Sunakkutaangit Museum) and several cultural centres throughout the territory, but no comprehensive heritage infrastructure in which Nunavut's collections of ethnographic and archaeological artefacts can be housed.[492]

Nunavut remains the only Canadian jurisdiction without a heritage centre, even though such a centre is necessary to meet commitments under Article 33 of the *Nunavut Agreement* and a Nunavut Heritage Centre feasibility study that was published in the early 2000s.[493] Instead, Nunavut's collections are housed elsewhere in Canada: most are at the Canadian Museum of Nature, and the fine art collection is at the Winnipeg Art Gallery.[494]

Without a major investment into appropriate warehousing and curatorial space in Nunavut, collections that are integral to the territory's rich history and culture cannot be kept where they belong—accessible to both the Nunavut Inuit and Inuit curators and decision-makers.[495] Instead of investing in a heritage centre in Nunavut, new funds continue to flow to the Winnipeg Art Gallery for storing Nunavut Inuit artifacts there; a federal cabinet minister even called that facility an "important cultural amenity for Nunavut."[496]

490 List of New Brunswick registered municipalities from Government of Canada, "List of Municipalities – New Brunswick," accessed June 7, 2020, https://www.canada.ca/en/revenue-agency/services/charities-giving/other-organizations-that-issue-donation-receipts-qualified-donees/other-qualified-donees-listings/list-municipalities-new-brunswick.html; information about New Brunswick libraries from Government of New Brunswick, "New Brunswick Public Libraries," accessed June 7, 2020, https://www2.gnb.ca/content/gnb/en/departments/nbpl.html.

491 Based on calculations from list of libraries from the Nunavut Library Service, "Nunavut Public Library Services," accessed June 7, 2020, https://www.publiclibraries.nu.ca/; 2016 population estimates from the Government of Nunavut, "Population Estimates," 2016, https://www.gov.nu.ca/sites/default/files/population_estimates_report_july_1_2016.pdf.

492 Research interview, 2020.

493 Nunavut News, "Nunavut's artists and centres deserve national standards," 2019, https://nunavutnews.com/nunavut-news/nunavuts-artists-and-centres-deserve-national-standards/

494 Government of Nunavut, "Heritage Collection," accessed June 8, 2020, https://www.gov.nu.ca/culture-and-heritage/information/heritage-collection.

495 Phrasing taken from Canadian Heritage Committee, "Testimony of Hon. Eva Aariak (President, Inuit Heritage Trust Incorporated) at the Canadian Heritage Committee," March 1, 2018, https://openparliament.ca/committees/canadian-heritage/42-1/97/eva-aariak-1/only/

496 Bartley Kives, "Feds to contribute $15M to Winnipeg Art Gallery's Inuit Art Centre," CBC News, August 2, 2016, https://www.cbc.ca/news/canada/manitoba/inuit-art-feds-1.3703946.

Indicator: state of repair of public recreation and sports infrastructure

According to the 2016 Core Public Infrastructure Survey, the physical condition of Nunavut's sports and recreation facilities are all rated "fair" or better. The exception is community centres, 33 percent of which were rated as in poor condition, compared with 15 percent of Canadian community centres rated as poor or very poor.[497]

Not captured here, however, is the state of certain types of indoor recreational facilities that can be difficult to heat, maintain, and repair. One example is Cambridge Bay's pool. The pool is open for only six weeks a year, but it stayed closed in 2019 because of "major structural problems" caused by melting permafrost.[498] A pool in Taloyoak was closed for five years for repairs, reopening in 2018.[499] Rankin Inlet, Nunavut's second-largest community, has no pool at all. One *National Post* story noted that passing cruise ships that dock in Nunavut's waters may represent the largest or only pool for thousands of kilometres (not that they are accessible to Nunavut Inuit).[500]

Resolute Bay's indoor arena is currently closed because of ongoing repair issues (it was built in 2011).[501] In Gjoa Haven, the floor of a community adult learning centre has collapsed, and classes now take place instead in a nearby nursing facility.[502]

The lack of accessible pools in good repair factors into a larger public health issue of water safety. Drowning rates in the territories are higher than anywhere else in Canada—at nearly seven times the national average.[503] Additionally, Inuit in the territories drown more often than non-Inuit. This is in part because of the Inuit tradition of "being on the land," which includes proximity to bodies of water.[504] As one researcher said, "one obvious reason for the high drowning rate is the omnipresence of lakes, rivers, and the ocean in Nunavut"; others cite low water temperatures, and failure to wear a lifejacket.[505] However, researchers have also pointed out that swimming and lifesaving programs are often unavailable to communities in the North; where they are available, they are often not adapted to meet the needs of an Inuit audience, and therefore are less effective.[506]

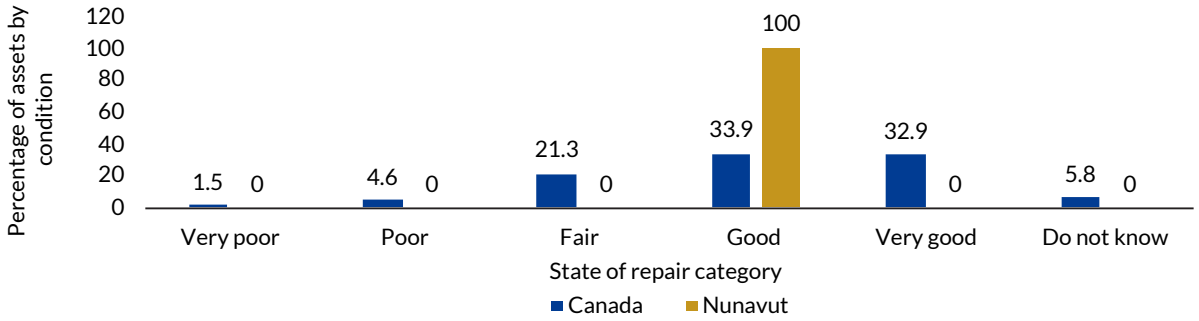
497 Infrastructure Canada and Statistics Canada, "Table: 34-10-0180-01: Inventory Distribution of Publicly Owned Culture, Recreation and Sport Facilities by Physical Condition Rating," 2016, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410018001.
498 Nunavut News, "Cambridge Bay swimming pool deemed unsafe, closed for rest of summer,"2019, https://nunavutnews.com/nunavut-news/cambridge-bay-swimming-pool-deemed-unsafe-closed-for-rest-of-summer/
499 Nunavut News, "Pool reopens after five years," 2018, https://nunavutnews.com/nunavut-news/pool-reopens-after-five-years/
500 National Post, "'Do you live here all year?' Nunavut community invaded by largest cruise ship in Arctic History," 2016, https://nationalpost.com/news/do-you-live-here-all-year-nunavut-community-invaded-by-largest-cruise-ship-in-arctic-history.
501 Nunavut News, "Resolute seeks to reopen arena: Close to $100,000 in repairs needed," 2020, https://nunavutnews.com/nunavut-news/resolute-seeks-to-reopen-arena-close-to-100000-in-repairs-needed/
502 Nunatsiaq News, "Nunavut MLAs decry state of community adult learning centres."
503 Lifesaving Society Canada, "Canadian Drowning Report 2016 Edition," 2016, http://www.lifesavingsociety.com/media/241812/canadiandrowningreport_english_web.pdf.
504 Research Interview, 2020.
505 Audrey R Giles et al., "Adaptation to aquatic risks due to climate change in Pangnirtung, Nunavut," Arctic 66,2 (2013): 207–17, http://pubs.aina.ucalgary.ca/arctic/Arctic66-2-207.pdf.
506 ,Lauren Vogel, "Decades of water safety training culturally 'irrelevant' to First Nation people," Canadian Medical Association Journal 182,12 (2010): E565–66, https://doi.org/10.1503/cmaj.109-3323.

When pools are shut down during part or all of their short season, these challenges are compounded. Finding ways to improve swimming pool availability and water safety programming for Inuit is especially important in the context of climate change and increasingly unstable ice conditions.[507] Iqaluit's Aquatic Centre opened in 2017 and is a year-round, state-of-the-art facility for the territorial capital—the Aquatic Centre had 26,000 visits in its first year. While access to this pool facility is valuable for Nunavut's most populous community (which had no pool from 2012 to 2017), it remains inaccessible to those who live outside the capital.[508]

FIGURES 35 A-E

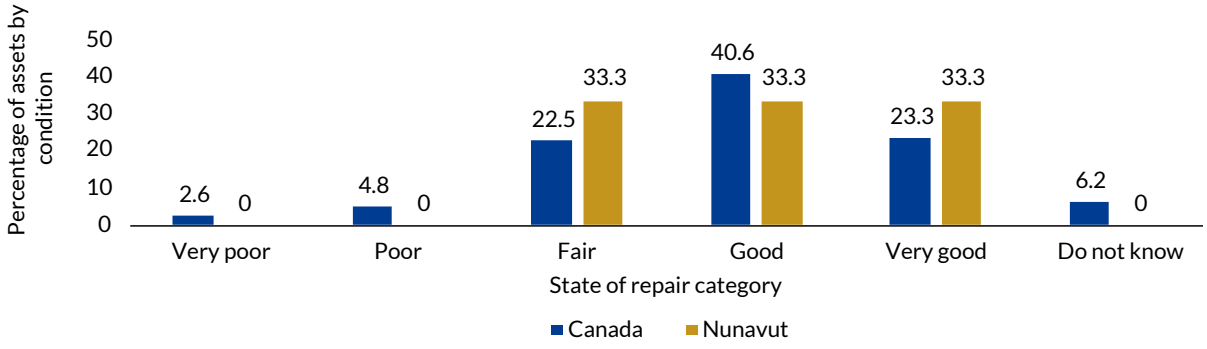
State of repair for Nunavut recreation and culture infrastructure (where captured), 2016[509]

Condition of outdoor skate parks



Source: Canada's Core Public Infrastructure Survey

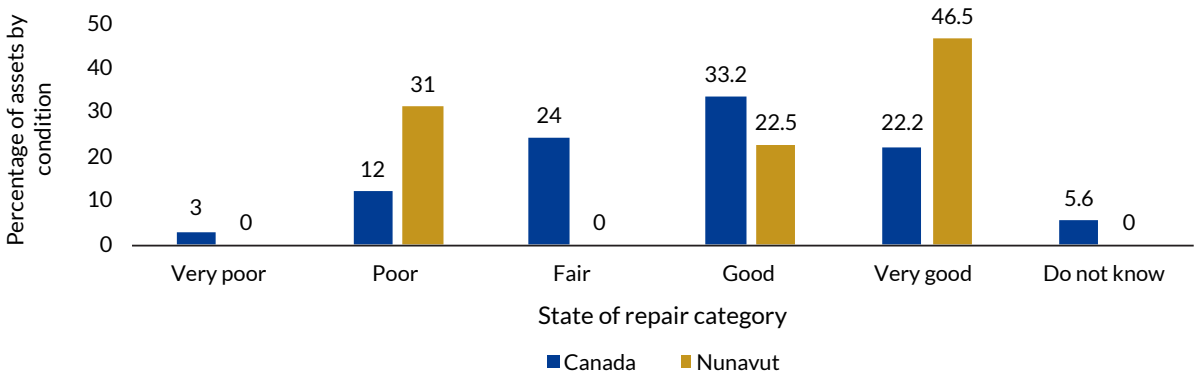
Condition of outdoor sports fields



Source: Canada's Core Public Infrastructure Survey

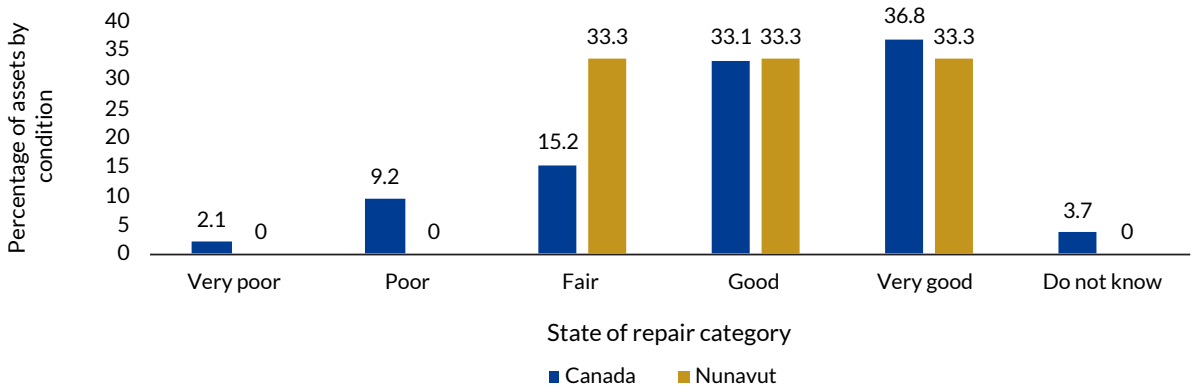
507 Giles et al., "Adaptation to aquatic risks due to climate change in Pangnirtung, Nunavut."
508 CBC News, "Iqaluit Aquatic Centre Celebrates 1 Year of Healthier Lifestyles and Wet Children," 2018, https://www.cbc.ca/news/canada/north/iqaluit-aquatic-centre-celebrates-1-year-of-healthier-lifestyles-and-wet-children-1.4507451.
509 Infrastructure Canada and Statistics Canada, "Table: 34-10-0180-01: Inventory Distribution of Publicly Owned Culture, Recreation and Sport Facilities by Physical Condition Rating."

Condition of community centres



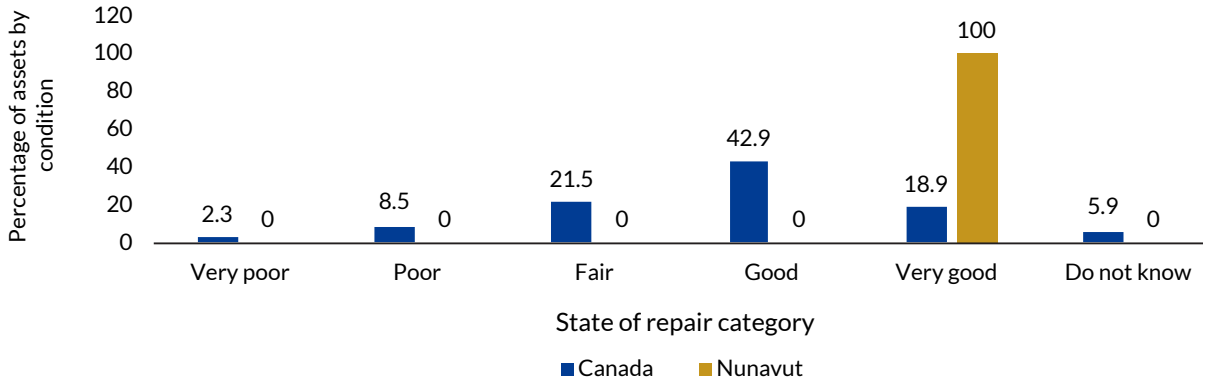
Source: Canada's Core Public Infrastructure Survey

Condition of presentation and performance spaces



Source: Canada's Core Public Infrastructure Survey

Conditions of museums and archives



Source: Canada's Core Public Infrastructure Survey

PROFILE: MULTI-USE SPACES IN TALLURUTIUP IMANGA

A shortage of multi-use facilities is a common problem in many Nunavut communities, making it difficult for communities to find suitable space to hold events and training, for harvesters to process or sell country food, or for residents to celebrate events including community feasts. A partnership between the Qikiqtani Inuit Association (QIA) and the federal government is helping to build much-needed multi-use facilities in five Nunavut communities. New buildings in Arctic Bay, Clyde River, Grise Fiord, Pond Inlet, and Resolute Bay will create space for a variety of community needs not being met by current infrastructure.[510]

Together, these facilities show how Inuit leadership and effective collaboration can help build better infrastructure that is more responsive to community needs. The buildings are being constructed as part of the Tallurutiup Imanga Inuit Impact Benefit Agreement, and are designed with valuable input from local communities on how multi-use spaces will be used.[511] In addition to the multi-use spaces, a new Inuit Training and Research Centre is planned for Pond Inlet. The centre is designed to close a gap in local skills capacity by providing space for the transfer of cultural knowledge and skills, including in hunting, fishing, and cabin building, as well as for performance arts.[512]

The centre will also offer space for education and accreditation in mining—previously, Nunavut Inuit interested in careers in mining had to leave the territory for training. The ability to train in mining locally will help close a major skills gap, as most mining jobs in Nunavut, which represent a rapidly growing sector of Nunavut's economy, go to workers from elsewhere in Canada.[513]

Indicator: economic impact of recreational or cultural enterprises

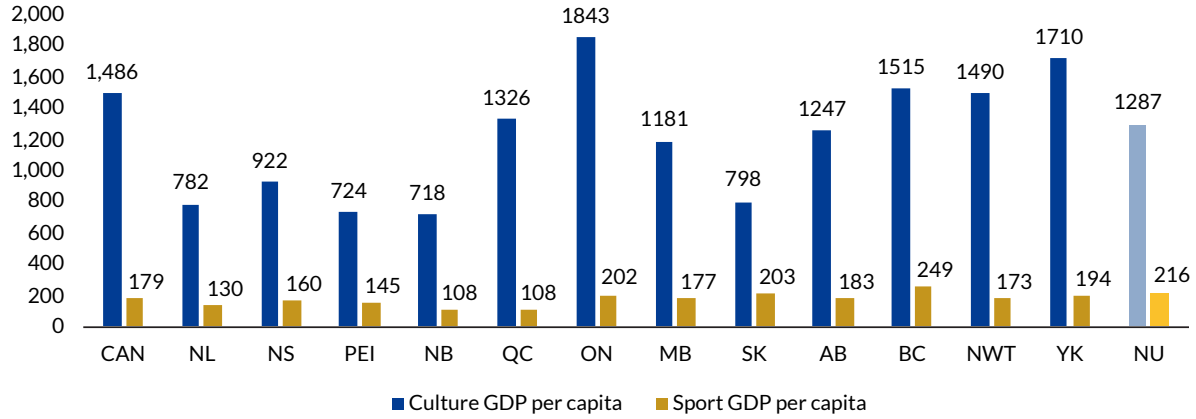
Public infrastructure is crucial for community arts and recreation, but the private sector also plays an important role in fostering culture, sports, and the arts. Recreational and cultural industries require affordable, reliable infrastructure: purpose-built retail or studio space, transportation to bring in equipment and ship out wares, housing for visiting athletes and artists, etc.

There is no centralized accounting of privately owned spaces for culture and recreation activities, but examining the health of those sectors is one way of gauging how the broader infrastructure situation may be affecting those industries.

According to Statistics Canada, GDP per capita in Nunavut was close to the Canadian average for both sports ($216 per person in Nunavut vs. $179 per person for Canada) and culture ($1,287 per person in Nunavut vs. $1,468 per person for Canada).[514]

510 Qikiqtani Inuit Association, "Tallurutiup Imanga and Tuvaijuittuq Agreements."
511 Research interviews, 2020.
512 Research interviews, 2020.
513 Arctic Today, "Mining will drive double-digit economic growth in Nunavut this year, report says," 2019, https://www.arctictoday.com/mining-will-drive-double-digit-economic-growth-in-nunavut-this-year-report-says/
514 Statistics Canada, "Table 1: Culture and Sport Gross Domestic Product per Capita and as a Share of the Total Economy, 2016," 2016, https://www150.statcan.gc.ca/n1/daily-quotidien/180227/t001a-eng.htm.

FIGURE 36



Culture and sports GDP per capita 2016[515]

Source: Statistics Canada

Nunavut's arts community is renowned across Canada and globally—especially for its sculpture and print making in communities like Baker Lake and Kinngait. It is encouraging to see that culture industries make up a comparable level of economic activity as a share of territorial GDP. However, infrastructure gaps can still limit the levels of investment and activity in the arts. In the Government of Nunavut's 2007 "Stone Carving Action Plan," the authors write that infrastructure is a key component of that industry's success: "transportation is the greatest challenge to formulating an economically viable carving stone action plan."[516]

Recreational and cultural industries require affordable, reliable infrastructure: purpose-built retail or studio space, transportation to bring in equipment and ship out wares, housing for visiting athletes and artists, etc.

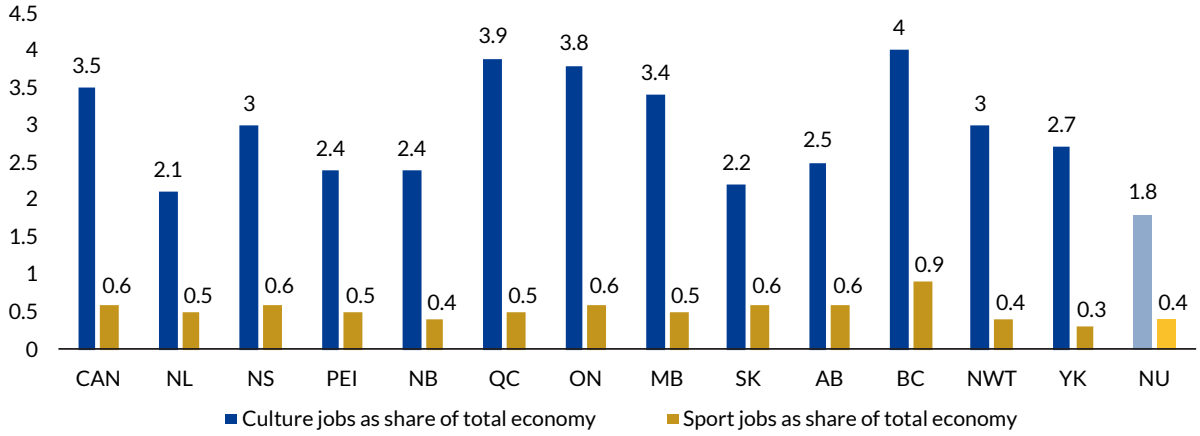
When interviewed about the movie *The Grizzlies*, set in Kugluktuk and filmed in Nunavut, the director told the CBC that it was important to her to film in Nunavut, but "[she] could have made the film four years earlier in northern Manitoba for half the price."[517] She cited the cost of bringing in equipment and food as one of the primary challenges.

Another way of measuring the health of private-sector recreation and arts is by examining comparative data on jobs and employment.

515 Statistics Canada, "Table 1: Culture and Sport Gross Domestic Product."
516 Government of Nunavut, "Ukkusiksaqtarvik: The Place Where We Find Stone: Carving Stone Supply Action Plan," 2007, https://www.gov.nu.ca/sites/default/files/carving_stone_action_plan_english.pdf.
517 CBC Radio, "The Grizzlies: 15 things about the groundbreaking new Canadian film," 2019, https://www.cbc.ca/radio/q/blog/the-grizzlies-15-things-about-the-groundbreaking-new-canadian-film-1.5101737.

FIGURE 37

Culture and sports jobs as a percentage of the economy[518]



Source: Statistics Canada

The data indicate that Nunavut's culture and sports industries have fewer jobs as a share of the total economy compared with most other provinces and territories.

A 2016 registry of Canadian businesses also indicates that Nunavut is lacking in Nunavut-based enterprises related to recreation, arts and culture, or community activity.[519] Out of the 7,257 Canadian employers registered as "civic and social organizations," only 11 are in Nunavut (the Northwest Territories and Yukon have 38 and 29, respectively).

Nunavut is also the only jurisdiction in Canada with no businesses registered as athletic instruction or spectator-sport enterprises. Not one of the 2,325 independent artists, writers, and performers registered as Canadian employers is in Nunavut; in the "non" employer category, Nunavut has two registered enterprises, and Canada has 16,750. Nunavut has comparatively fewer fitness businesses per capita: Canada has one fitness company per 5,380 people; in Nunavut, there is one per 7,740 people.

Nunavut is the only jurisdiction in Canada without a dedicated live performing arts centre and Iqaluit is the only capital city in North America without a performing arts space. Qaggiavuut!, an organization in Iqaluit, has been advocating for a performance space for several years. Early in 2020, a feasibility study commissioned by this group was published, exploring the fiscal and cultural benefits of their proposed 350-seat performing arts space (which they call the "Qaggiq Hub"). They estimate that such a space would support 408 jobs and add millions of dollars to Nunavut's GDP.[520]

518 Statistics Canada, "Table 1: Culture and Sport Gross Domestic Product."
519 From Canadian Industry Statistics data repository at Government of Canada, "Canadian Industry Statistics – Innovation, Science and Economic Development Canada," accessed June 7, 2020, https://www.ic.gc.ca/app/scr/app/cis/search-recherche. Data sets used here include "Civic and Social Organizations," "Performing Arts Companies," "Spectator Sports," "Independent, Writers, and Performers," "Fitness and Recreational Sports Centres," "Athletic Instruction."
520 Nunavut News, "Performing Arts Centre Would Support 408 Jobs, Infuse Tens of Millions of Dollars into Nunavut Economy, Says Qaggiavuut," 2020, https://nunavutnews.com/nunavut-news/performing-arts-centre-would-support-408-jobs-infuse-tens-of-millions-of-dollars-into-nunavut-economy-says-qaggiavuutq/

Community justice

The legacies of colonialism and the inadequacy of Western frameworks to serve Inuit populations has resulted in high levels of incarceration and poor safety outcomes in Nunavut. Without question, Nunavut's high crime rate is influenced by broader gaps in community, social, and health services and infrastructure, including inadequate housing and transitional supports. It is crucial to ensure that Nunavut Inuit who are either victims or perpetrators of crime have adequate supportive infrastructure to live with dignity: this means an RCMP that is resourced to meet community needs, sentencing that is timely, and prisons that are safe and free of overcrowding. Even more important are investments that address the root causes of crime, including gaps in social infrastructure, to curb the need for criminal justice interventions. As one interview participant said of Iqaluit's new capacity-expanding correctional facility, "I'm really hoping this is the last [prison] we need to build in Nunavut."[521]

Indigenous people are grossly overrepresented within Canada's entire criminal justice system, a reality that has prompted sentencing reform (such as *Gladue* sentencing) as well as policing and correctional changes across the country.[522] These efforts have had little impact on Indigenous overincarceration rates nationally or in Nunavut.

While statistics vary in Nunavut year-to-year as a function of its small population, Nunavut has persistently higher crime rates than the rest of Canada:

- In 2018 (the most recent year for which data are available) Nunavut had the second-highest crime rate in Canada.[523]
- The "Crime Severity Index" is a formula used to gauge the "scale of seriousness" of crimes, including volume and severity. In 2018, Nunavut had a Crime Severity Index of 320, compared with a Canadian average of 75.[524]
- Men in Nunavut were victims of police-reported assault at a rate of 4,348 per 100,000 (compared with a Canadian average of 650).[525]
- Women were victims at an even higher rate of 7,750 per 100,000 (compared with a Canadian average of 615). This means that about 1 in 25 Nunavummiut men and 1 in 13 women were victims of police-reported violent assault in 2018.[526]
- Despite having higher rates of incarceration than the Canadian average, Nunavut has only one federal probation officer assigned to cover the entire territory. [527]

521 Research Interview, 2020.
522 Under Gladue sentencing, a judge may consider restorative justive focused on healing and aligned with Aboriginal justice practices, as opposed to jail time. Justice Education Society, "Gladue and Aboriginal Sentencing," accessed June 8, 2020, https://www.justiceeducation.ca/about-us/research/gladue-and-aboriginal-sentencing.
523 Statistics Canada, "Table: 35-10-0076-01: Police Personnel and Selected Crime Statistics," 2018, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3510007601&pickMembers%5B0%5D=1.15.
524 Statistics Canada, "Table: 35-10-0076-01: Police Personnel and Selected Crime Statistics."
525 Statistics Canada, "35-10-0051-01: Victims of Police-Reported Violent Crime and Traffic Violations Causing Bodily Harm or Death, by Type of Violation, Sex of Victim and Age of Victim." This is assuming that most of the individuals captured in the data were "unique victims."
526 Statistics Canada, "35-10-0051-01: Victims of Police-Reported Violent Crime."
527 Nunavut Courts, "A Primer on Nunavut 5th Edition," 2016, https://www.nunavutcourts.ca/phocadownload/EN/Primer/PrimerNunavut2015-2016.pdf.

The gap in community justice infrastructure does not suggest that the solution is more police officers or jails. Nunavut's limited complement of social services and health infrastructure puts a strain on the criminal justice system and compounds cycles of trauma and negativity between community members and police.

In spite of significant substance abuse challenges, Nunavut has no residential addictions treatment facility, although NTI, the Government of Nunavut, and the Government of Canada have committed to jointly funding one in Iqaluit planned for 2024.[528]

This shortage puts pressure on community safety resources. RCMP officers estimate that more than 90 percent of their call-outs are alcohol-related. An estimated 95 percent of the prison population in Baffin Regional Correction Centre has substance abuse issues.[529] There are also systemic issues of police violence in Nunavut and NTI has called for different policing approaches and an independent alternative oversight model.[530]

A lack of community programming for those serving non-custodial sentences, or who are on probation or parole, means that rehabilitating offenders and improving recidivism rates can be a challenge, as described by a judge for the Nunavut Court of Justice:

> *For many Inuit coming from the isolated communities of Nunavut, parole within Nunavut itself remains a forlorn hope. In the absence of any structured residential setting appropriate for early release, Inuit face no realistic prospect of returning to their home community for the purpose of a structured reintegration into their community. Much of the specialized programming necessary to address rehabilitative needs remains available only in the south.*[531]

In a separate evaluation, the Canadian Department of Justice also noted, "[in Nunavut] the lack of community-based programming, including mental health and addiction services, youth programs and probation services seriously affects the ability of judges to turn to alternatives to incarceration," furthering the strain on custodial solutions.[532]

Gap analysis

To measure the gaps in criminal justice infrastructure between Nunavut and the rest of Canada, this report includes three indicators:

- Capacity and state of repair for correctional institutions
- Policing infrastructure
- Courts and sentencing

528 CBC News, "Nunavut addictions treatment centre planned for Iqaluit," 2019, https://www.cbc.ca/news/canada/north/addictions-treatment-nunavut-funding-1.5250235.
529 Government of Nunavut, "Nunavut Crime Prevention Strategy Five-Year Strategy," 2017, https://assembly.nu.ca/sites/default/files/TD-302-4(3)-EN-Nunavut-Crime-Prevention-Strategy.pdf; North Sky Consulting Group Ltd., Nunavut Liquor Act Review Task Force, "Final Report: A New Approach Halting the Harm," 2012, https://www.gov.nu.ca/sites/default/files/files/Finance/NLCAnnualReports/Halting_the_Harm_Final_.pdf.
530 Nunavut Tunngavik Inc., "Statement – Police Violence in Nunavut – NTI Calls for a Trauma Informed Approach and an Independent Oversight Model," June 4, 2020, https://www.tunngavik.com/2020/06/04/nti-calls-for-a-trauma-informed-approach-and-an-independent-oversight-model/
531 "R v AB, 2011 NUCJ 15 (CanLII)," 2011, https://www.canlii.org/en/nu/nucj/doc/2011/2011nucj15/2011nucj15.html?searchUrlHash=AAAAAQANc291dGggZmVkZXJhbAAAAAAB&resultIndex=2.
532 Department of Justice Canada, "Executive Summary - The Nunavut Court of Justice - Formative Evaluation," n.d.

Indicator: corrections infrastructure

Construction is under way on a 112-bed correctional facility in Iqaluit, the Qikiqtani Correctional Healing Centre, designed to replace reliance on the territory's "main" intake prison, the Baffin Regional Corrections Centre (BCC). In 2019, Nunavut passed a new *Corrections Act*, which includes a mandate to create an independent oversight position, establish an Inuit societal values committee, and provide further mental health supports.[533]

As the chart below indicates, Nunavut has a higher rate of incarcerated persons than any other jurisdiction in Canada, both for prisoners on remand (awaiting sentencing) and those serving their sentence.[534] Nunavut spent around 10 times as much per capita on corrections compared with the Canadian average.[535] All current prisoners in the Nunavut system identify as Inuit.

TABLE 14

Incarcerated persons in Canada, by jurisdiction 2017–18[536]

Jurisdiction	REMAND		SENTENCED CUSTODY	
	Number of people	Rate per 100,000	Number of people	Rate per 100,000
Newfoundland and Labrador	157	36	185	42
Prince Edward Island	23	18	62	51
Nova Scotia	289	37	158	20
New Brunswick	216	35	256	41
Quebec	2,065	30	2,770	40
Ontario	5,082	44	2,260	20
Manitoba	1,653	159	747	72
Saskatchewan	897	100	963	107
Alberta	2,518	75	1,074	32
British Columbia	1,692	43	903	23
Yukon	37	119	22	72
Northwest Territories	102	305	74	222
Nunavut	81	333	67	274
Total—Provinces and territories	14,812	50	9,543	32
Federal (CSC)	N/A	N/A	14,129	48

533 CBC News, "Inuit values, inmate care, focus of new made-in-Nunavut Corrections Act," 2019, https://www.cbc.ca/news/canada/north/nunavut-corrections-act-passes-1.5182133.
534 Statistics Canada, "Average Daily Counts of Adults under Correctional Supervision, by Type of Supervision and Jurisdiction, 2017/2018," accessed June 11, 2020, https://www150.statcan.gc.ca/n1/pub/85-002-x/2019001/article/00010/tbl/tbl02-eng.htm.
535 Nunatsiaq News, "Nunavut has the highest incarceration rate for adult offenders in Canada: Stats Can," 2017, https://nunatsiaq.com/stories/article/65674nunavut_home_to_highest_rate_of_adult_offender_in_canada_stats_can/
536 Statistics Canada, "Average Daily Counts of Adults under Correctional Supervision."

FEDERAL CORRECTIONS

In the Canadian correctional framework, prisoners sentenced for more than two years serve their sentence in a federal facility under the jurisdiction of the Correctional Service of Canada (CSC). Although there are no data that identify how many Inuit are held in federal facilities, and none in comparison to other jurisdictions, a 2018 point-in-time report from the Nunavut Ministry of Justice indicated that there were 60 Inuit in federal corrections facilities at the time of inquiry.[537] Today, that number is estimated to be closer to 100.[538] None of CSC's 43 custodial correctional facilities are in Canada's territories.[539]

TABLE 15

Regions with federal correctional institutions, 2020, Corrections Canada[540]

Region	Number of Residential Correctional Institutions run by CSC
The Atlantic Region	5
The Quebec Region	10
The Ontario Region	8
The Prairie Region	12
The Pacific Region	8
Territories (including NU)	0

While federal prisoners do not always have a guarantee of being housed near their community, efforts are typically made to keep prisoners close to their home region. Because there are no Northern institutions, prisoners from Nunavut in federal institutions are always very far from home. Beaver Creek Institution in Gravenhurst, Ontario, is a common destination for male Nunavut Inuit prisoners.[541] Gravenhurst is more than 2,200 kilometres from Iqaluit, a distance roughly equivalent to the distance between Vancouver and Winnipeg.[542] Another facility in Laval, Quebec, has a unit for Inuit prisoners, a fact that made the news in 2020 because of a particularly virulent COVID-19 outbreak in the prison.[543]

This distance makes it difficult for Inuit prisoners to stay connected to their communities and families. Rule 59 of the Nelson Mandela Rules (UN Standard Minimum Rules for the Treatment of Prisoners) states that "Prisoners shall be allocated, to the extent possible, to prisons close to their homes or their places of social rehabilitation."[544] This is not possible for Nunavut Inuit in federal prisons. As one person interviewed said of federal facilities, "They may as well be on Mars."[545]

537 Nunatsiaq News, "Roughly 200 Nunavut residents now incarcerated, justice minister says," 2018, https://nunatsiaq.com/stories/article/65674roughly_200_nunavut_residents_now_in_jail_justice_department/
538 Research interview, 2020.
539 Correctional Service Canada, "Institutional Profiles," accessed June 11, 2020, https://www.csc-scc.gc.ca/institutions/index-eng.shtml.
540 Correctional Service Canada, "Institutional Profiles."
541 Nunavut Courts, "A Primer on Nunavut 5th Edition."
542 Calculated using Google Maps.
543 CTV News, "Prison with Canada's worst COVID-19 outbreak houses Inuit inmates," 2020, https://montreal.ctvnews.ca/prison-with-canada-s-worst-COVID-19-outbreak-houses-inuit-inmates-1.4962407.
544 Full articles of the Mandela rules available at United Nations General Assembly, "United Nations Standard Minimum Rules for the Treatment of Prisoners (the Nelson Mandela Rules)," 2016, https://cdn.penalreform.org/wp-content/uploads/1957/06/ENG.pdf.
545 Research interview, 2020.

Despite being Canada's only Indigenous-majority territory, Nunavut has neither a CSC healing lodge (designed for Inuit prisoners), nor a "section 81" facility, which are community-based facilities typically overseen by Indigenous organizations.[546]

TERRITORIAL CORRECTIONS

Nunavut has four territorial correctional institutions for men (Baffin Regional Correctional Centre/ Makigiarvik, Rankin Inlet Healing Facility, Kugluktuk Ilavut Centre, Uttaqivik Community Residential Centre), one for women (Nunavut Women's Correctional Centre), and one for youth offenders (Young Offenders' Facility). Of these six facilities, four are in Iqaluit.[547]

Nunavut's corrections infrastructure has been the subject of considerable attention from both supervisory bodies and the media, particularly conditions and overcrowding at the Baffin Regional Corrections Centre (BCC).[548]

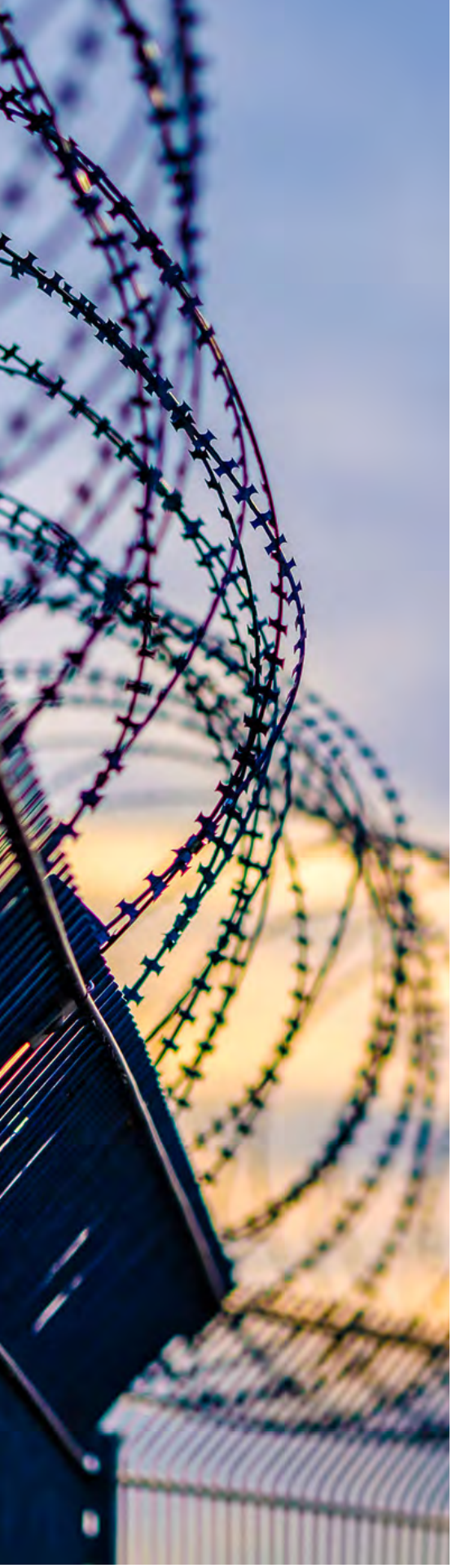
BCC was the subject of a 2013 report by the federal Office of the Correctional Investigator (OCI). The facility was originally designed to house 41 minimum-security inmates: in the mid-1990s, it was expanded to house 68 inmates. At the time of the OCI's visit, 106 inmates were housed there. In the report, the OCI characterized the facility as "overcrowded beyond acceptable standards of safe and humane custody," with an "omnipresent" smell of mould, among other deficiencies, stemming from "grossly inadequate infrastructure."[549]

Among other concerns, the OCI noted that 42 inmates from the dorm unit and 15 inmates from the gymnasium shared two shower enclosures (two additional shower enclosures were out of order), two toilets, and three urinals.[550] In 2014, then-Correctional Investigator Howard Sapers said that BCC was comparable to some of the worst prisons he had seen around the world.[551]

Data to compare correctional facilities across Canada are scarce, but a 2015 report from the Public Services Foundation of Canada indicates that overcrowding in prisons and jails has been a nation-wide phenomenon during the last decade.

The report states, "Most correctional facilities in Canada currently house more inmates than they were designed for… but there is no centralized source of information on the overcrowding crisis in Canada's provincial jails."[552] Assessing capacity needs and overcrowding can be difficult when relying on institutional self-reporting or "official" bed counts, from Nunavut or elsewhere. For example, the Auditor General of Ontario reported that in 2017–18, overcrowding in Ontario prisons was both rampant and underreported due to "revised" capacity counts from the Ministry itself:

546 Research interview, 2020.
547 Government of Nunavut, "Annual Report: Division of Corrections, Department of Justice," 2016, https://assembly.nu.ca/sites/default/files/TD-44-5(2)-EN-Division-of-Corrections-2016-2017-Annual-Report.pdf.
548 Nunatsiaq News, "Auditor General: Nunavut's jails a menace for staff, inmates alike," 2015, https://nunatsiaq.com/stories/article/65674auditor_general_nunavuts_jails_a_menace_for_staff_inmates_alike
549 Office of the Correctional Investigator, "Report of the Office of the Correctional Investigator (Canada) on the Baffin Correctional Centre and the Legal and Policy Framework of Nunavut Corrections Report," 2013, https://assembly.nu.ca/library/GNedocs/2013/001193-e.pdf.
550 Office of the Correctional Investigator, "Report of the Office of the Correctional Investigator (Canada) on the Baffin Correctional Centre."
551 CBC News, "Nunavut prison still squalid, drug-ridden a year after report," 2014, https://www.cbc.ca/news/canada/north/nunavut-prison-still-squalid-drug-ridden-a-year-after-report-1.2746226.
552 Public Services Foundation of Canada, "Crisis in Correctional Services: Overcrowding and Inmates with Mental Health Problems in Provincial Correctional Facilities," 2015, http://former.bcgeu.ca/sites/default/files/page/attachments/Crisis in Correctional Services April 2015%5B2%5D.pdf.



> *The Ministry has increased the capacity of 16 of the 25 institutions by an average of 81% more than the original capacity when they were built by adding beds in cells. For example, in 2018/19, Ottawa-Carleton Detention Centre had a 518-bed capacity—178% higher than its original 186-bed capacity. In 12 of the 16 institutions, the increased capacities were not due to expansion of the institutions but to placing more inmates in cells together.*[553]

In 2015, the Auditor General of Canada did an audit of corrections in Nunavut and found that "the [Nunavut] Department of Justice has not adequately met key responsibilities for its management of correctional facilities" and, as a result, had "put inmates and staff at risk."[554] Issues they identified included:

- An overall lack of appropriate space at Baffin Correctional Centre.
- The poor conditions of space available at Baffin Correctional Centre.
- Housing remanded and sentenced inmates together in the same facility without appropriate separation.
- Holes in the walls, inadequate fencing, lack of appropriate security camera systems—all of which had helped contribute to high levels of contraband.
- No or little effort to make repairs identified in fire inspection reports many years earlier.

Appropriately housing medium- and maximum-security inmates is a legal obligation of the Department of Justice. In the report, the Auditor General noted that new correctional facilities had opened, including Makigiarvik (designed to relieve crowding at BCC for minimum-security inmates) and the Rankin Inlet Healing Facility. However, these new institutions do not meet community needs in relation to security classifications. "While these facilities will provide some relief of overcrowding, they do not address the territory's most critical facility needs."[555]

553 Ministry of the Solicitor General for Ontario, "Adult Correctional Institutions (Chapter 1)," 2019, https://www.auditor.on.ca/en/content/annualreports/arreports/en19/v3_100en19.pdf.
554 Auditor General of Canada, "Corrections in Nunavut – Department of Justice," 2015, https://www.oag-bvg.gc.ca/internet/English/nun_201503_e_40255.html.
555 Auditor General of Canada, "Corrections in Nunavut – Department of Justice."

FIGURE 16

Information on Nunavut corrections facility capacity vs occupancy, 2015, Auditor-General of Canada Report[556]

Facility and location	Year opened	Security level	Capacity	Average occupancy (2013–14 fiscal year)
Baffin Correctional Centre (Iqaluit)	1986	Minimum	68	82
Rankin Inlet Healing Facility (Rankin Inlet)	2013	Medium	48	23
Kugluktuk Ilavut Centre (Kugluktuk)	2005	Minimum	15	8
Makigiarvik (Iqaluit)	2015 (planned)	Minimum	48	Not available
Uttaqivik Community Residential Centre (Iqaluit)	2000	Minimum	14	10
Outpost camps (various locations)	1999	Not specified	8	4

The data used to inform the Auditor-General's report were from 2013–14: however, using the most recent annual report from the Government of Nunavut Department of Justice, it appears that many of the capacity problems noted in the report persist. Because the now-open Makigiarvik (a 48-bed facility) is "grouped" with BCC in inmate counts, it is difficult to ascertain how much it has relieved overcrowding.

The average occupancy for BCC and Makigiarvik together for 2016–17 was about 83 prisoners (using first-of-the-month counts). However, occupancy rates for other facilities remained relatively low (Rankin Inlet had 33 inmates, Kugluktuk Ilavut Centre had 5, Uttaqivik Community Residential Centre had 10), indicating that primary need for capacity space is for medium- and maximum-security prisoners, who are predominantly housed at BCC, and not at Makigiarvik.[557] There is also nothing in the Annual Report to indicate that the Department of Justice has worked to separate prisoners on remand from those who have been sentenced in BCC.

BCC experienced major infrastructure damage in 2017 and 2018 as a result of prisoner riots. In 2017, an estimated 85 percent of the sleeping area in BCC's medium-security area was destroyed, along with part of the maximum-security area. In 2018, another riot damaged one of BCC's cell blocks, and resulted in 40 prisoners, both those who had been sentenced and those on remand, being transferred out of BCC to Ontario during investigations and repairs.[558]

While the riot resulted in an unusually large transfer, prisoners at BCC are routinely transferred out of territory to be housed in other jurisdictions (what the Justice Department calls "extra-territorial transfers"). A large transfer also happened in 2015 (to British Columbia) as a result of BCC's mould remediation project. The following year (2016–17) transfers fell by 31 percent, but there were still 106 extra-territorial transfers of Nunavut prisoners.[559]

556 Auditor General of Canada, "Corrections in Nunavut – Department of Justice."
557 Government of Nunavut, "Government of Nunavut Annual Report: Division of Corrections, Department of Justice."
558 APTN News, "Iqaluit jail riot to cost Nunavut more than $11k a day and counting," 2018, https://www.aptnnews.ca/national-news/iqaluit-jail-riot-to-cost-nunavut-more-than-11k-a-day-and-counting/
559 Government of Nunavut, "Annual Report: Division of Corrections, Department of Justice."

Extra-territorial transfer is not the only solution to capacity issues: according to documents from the Nunavut Court of Justice, "some high-risk maximum-security inmates are housed at Iqaluit's RCMP detachment because the BCC facility lacks the means to effectively manage this risk."[560]

Construction of the Qikiqtani Correctional Healing Centre is under way: it was initially slated to open in 2020 and is now projected to open in 2022. The facility will include separate and secure wings for medium and maximum-security inmates.

COMMUNITY SUPERVISION

CSC data indicate that there were 1,268 parole officers across Canada in 2017–18, and about half of those work outside prisons in communities at one of 91 parole offices.[561] A single CSC parole officer services the whole of Nunavut. On the CSC website, the Nunavut Parole Office (in Iqaluit) is listed under the "Ontario" heading, under the subheading "Northeastern Ontario and Nunavut" (in addition to offices in Ottawa and Cornwall).[562] However, a report from the Nunavut Court indicates that "some courtesy supervision of paroled inmates is also provided by Nunavut's probation officers."[563]

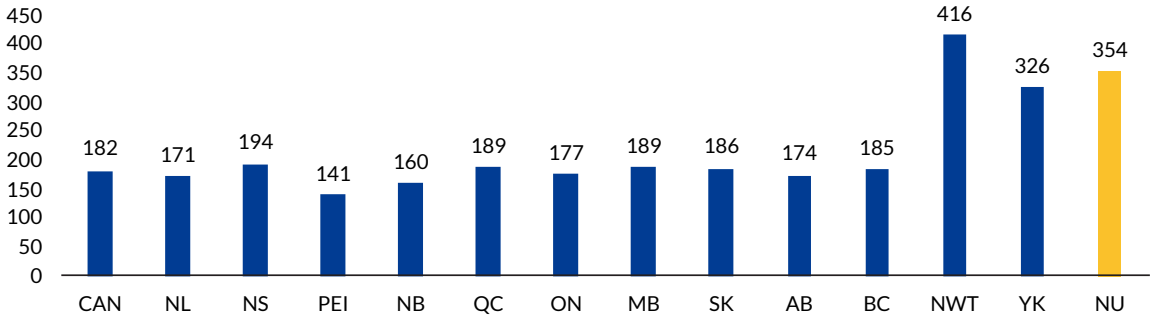
Indicator: police services and related infrastructure

Statistics Canada reports that in 2018, Nunavut had 136 police officers (more than 85 percent of whom are men) out of 167 total policing personnel.[564] Outside Iqaluit, where there is a municipal police force, the RCMP is responsible for all policing in Nunavut. Nation-wide, the RCMP provides policing services under contract to about 150 municipalities and to all provinces and territories except Ontario and Quebec, employing about 18,000 officers across the country.[565]

The RCMP operates 25 detachments and two Operational Communications Centres in Nunavut (Yukon has 14 RCMP detachments and the Northwest Territories has 22).[566] Nunavut has the second-highest rate of police per capita in Canada, as indicated by the chart below: 354 police officers per 100,000 people.

FIGURE 38

Number of police officers per 100,000 people, Statistics Canada[567]



Source: Statistics Canada

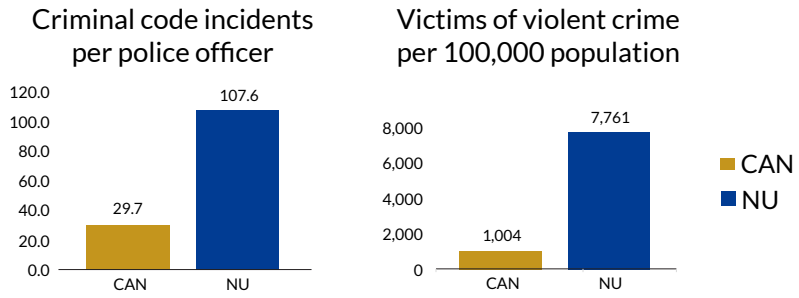
560 Nunavut Courts, "A Primer on Nunavut, 5th Edition."
561 Correctional Service Canada, "CSC Statistics: Key Facts and Figures," accessed June 11, 2020, https://www.csc-scc.gc.ca/publications/005007-3024-en.shtml.
562 Correctional Service Canada, "Institutional Profiles."
563 Nunavut Courts, "A Primer on Nunavut 5th Edition."
564 Statistics Canada, "Table: 35-10-0076-01: Police Personnel and Selected Crime Statistics."
565 Auditor General of Canada, "Report 5—Equipping Officers of the Royal Canadian Mounted Police," 2019.
566 Public Works and Government Services Canada, "Radio Modernization RCMP v Div (M7594-196210/A)," 2019, https://buyandsell.gc.ca/procurement-data/tender-notice/PW-QD-042-27378 (archived).
567 Statistics Canada, "Table: 35-10-0076-01: Police Personnel and Selected Crime Statistics."

However, even with this higher ratio of police officers per person, Nunavut still has clear strains on policing capacity. The same data set from Statistics Canada shows that in Nunavut, there were 107.6 *Criminal Code* incidents per police officer annually, as opposed to the Canadian average of 29.7.[568] In other words, despite a significantly higher presence of police officers by population size, police officers in Nunavut still have a higher "workload" (as calculated by *Code* incidents per officer) and corresponding need for resources. Rates of violent criminal code violations, which are more difficult cases to police, are 10 times higher in Nunavut compared with the Canadian average.

This strain is amplified by Nunavut's higher-than-average RCMP vacancy rate, which means some detachments are understaffed.[569] In order to do their work, the RCMP requires local infrastructure, including jail cells in the detachment itself. While there is no centralized accounting of the number of jail cells in each detachment, anecdotal evidence indicates that detachment space can be inadequate. One sergeant reported that in Iqaluit's RCMP detachment (which has nine cells), police sometimes put drunk people in police vans in lieu of a cell to sober up.[570] That same officer described that this lack of space can result in officers spending time trying to find a safe space for someone to stay: "RCMP often end up knocking on doors, looking for a friend or family member who will take in an intoxicated person," which takes their time away from other work.[571]

FIGURES 39 A+B

Both Figures per 100,000 people, 2018 Statistics Canada



Source: Statistics Canada

The RCMP and the Inuit population they police have a complex relationship shaped by colonialism. The RCMP enacted federal policies of forced relocation, sled-dog killing, and taking children to residential schools, actions that have left a legacy of distrust. There are allegations of ongoing police brutality, misconduct, and sexual abuse perpetrated by the RCMP in Nunavut, particularly against Inuit. As recently as June 2020, police violence towards Inuit persons made national headlines after a resident of Kinngait was arrested after being violently struck by an RCMP vehicle.[572] The same month, six Nunavut MLAs joined NTI and the Legal Services Board on Nunavut in calling for a territory-wide review of the RCMP's actions in Nunavut.[573]

568 Statistics Canada, "Table: 35-10-0076-01: Police Personnel and Selected Crime Statistics."
569 CBC News, "'It's alarming': RCMP vacancy rates above 8% in N.W.T., Nunavut," 2017, https://www.cbc.ca/news/canada/north/rcmp-vacancy-rates-nwt-nunavut-1.4270714.
570 Nunatsiaq News, "Nunavut RCMP say they're understaffed," 2019, https://nunatsiaq.com/stories/article/nunavut-rcmp-say-theyre-understaffed/
571 CBC News, "Iqaluit damp shelter expected to reopen in mid-January," 2019, https://www.cbc.ca/news/canada/north/iqaluit-damp-shelter-re-opens-1.5405269.
572 Beth Brown, "Man in violent Nunavut arrest video wants officer charged," CBC News, June 5, 2020, https://www.cbc.ca/news/canada/north/kinngait-man-wants-to-sue-rcmp-1.5599517.
573 Thomas Rohner, "Nunavut leaders calling for systematic review of RCMP service in the territory," CBC News, accessed June 12, 2020, https://www.cbc.ca/news/canada/north/nunavut-leaders-systematic-rcmp-review-1.5603222.

At the same time, structural features of RCMP presence in Nunavut fall short of local needs. None of the 25 RCMP detachments officially offers services in Inuktut. According to a 2019 CBC story, only two percent of the officers are Inuit (three out of 131 regular members) and no Inuit officer had been recruited in the previous fifteen years.[574] Another CBC story reported in 2016 that Nunavut had a police force that was "the least reflective" of the population they policed compared with any jurisdiction in Canada.[575] The RCMP in Nunavut has launched a specialized recruitment process to attract and retain new Inuit applicants.[576] Some of the barriers to recruitment have involved community isolation and lack of infrastructure. For example, for a new recruitment program, the RCMP waived its typical "unrestricted" driver's licence requirement in recognition that only three communities have motor vehicle offices capable of distributing these licences.[577]

Indicator: courts and justice infrastructure

The Nunavut court system is unique within the nation: the Nunavut Court of Justice is Canada's only single-level trial court, combining the power of the territorial court and the superior court. Nunavut has one permanent courthouse in Iqaluit: the rest of Nunavut's communities are served by a "circuit court," which essentially acts as a travelling court. The Canadian Department of Justice (DOJ) outlines the use of circuit courts this way on their website:

> *For example, in Nunavut, most of the communities are small and isolated from Iqaluit, the capital, so the court travels to them. The circuit court includes a judge, a clerk, a court reporter, a prosecutor, and at least one defence attorney. Interpreters are hired in the communities when possible, or travel with the circuit court when necessary. The court holds regular sessions in Iqaluit and flies to about 85% of all 25 communities in Nunavut, as often as every six weeks or as seldom as every two years, depending on how often it's needed.*[578]

Circuit courts are not unique to Nunavut: they are used by many jurisdictions across Canada to ensure access to judicial processes for residents of remote communities. Manitoba's circuit courts visit 13 communities,[579] British Columbia has 44 circuit court locations (in addition to 45 permanently staffed locations) and Alberta has more than 40 circuit court locations. However, circuit courts in other jurisdictions may have a purpose-built location, as well as more regular sittings (one day a week, for example, in Slave Lake, Alberta).[580] Instead, circuit courts in Nunavut often use unconventional locations. The unique challenges of administering justice in Nunavut within available facilities were described by Justice Bychok in *R v Anuuga*:

574 CBC News, "Former officers call on RCMP top brass to do more to recruit, retain Inuit members," 2019, https://www.cbc.ca/news/canada/north/rcmp-needs-more-inuit-officers-1.5277637; The Globe and Mail, "Lawsuit against Nunavut RCMP claims force losing touch with Inuit," 2019, https://www.theglobeandmail.com/canada/article-lawsuit-against-nunavut-rcmp-claims-force-losing-touch-with-inuit-2/

575 CBC News, "Nunavut RCMP chief says boosting inuit recruitment will take 'many generations'," 2016, https://www.cbc.ca/news/canada/north/nunavut-rcmp-least-police-diversity-1.3678360.

576 According to a report from March 2020, the recruitment program currently has seven Inuit applicants.

577 CBC News, "RCMP launch recruitment program aimed at Nunavut Inuit," 2019, https://www.cbc.ca/news/canada/north/rcmp-training-program-aimed-at-nunavut-inuit-1.5247615.

578 Department of Justice Canada, "Canada's Court System," 2015, https://canada.justice.gc.ca/eng/csj-sjc/ccs-ajc/pdf/courten.pdf.

579 Winnipeg Free Press, "The high price of injustice," 2019, https://www.winnipegfreepress.com/local/the-high-price-of-injustice-508919932.html; Clicklaw BC, "Court Registries British Columbia," accessed June 11, 2020, https://www.clicklaw.bc.ca/helpmap/service/1014.

580 Provincial Court of Alberta, "Court Practices and Schedules," accessed June 11, 2020, https://www.albertacourts.ca/pc/court-practice-and-schedules/locations-map.

> *There is only one courthouse in Nunavut and it is located in Iqaluit. Outside Iqaluit, our Court sits in school gyms, community halls and even council chambers. Many of the community halls lack functioning washrooms. Invariably every year, heating systems fail in a community hall during a circuit, leaving court participants to conduct court in their winter parkas and mittens.*[581]

While planned proceedings have changed due to COVID-19, the 2020 non-jury circuit schedule indicates that most communities would have held court in their community hall. However, there were also sittings scheduled in a school (Naujaat), hamlet offices (Resolute Bay), and even a hotel (Rankin Inlet).[582] The Canadian Department of Justice (DOJ) report on justice in Nunavut noted how a lack of conventional courthouse infrastructure in Nunavut can affect court proceedings:

> *In the smaller communities, Court is typically held in the community hall. The issue most commonly raised by informants working in the justice system was the lack of facilities for meeting with clients—several people commented that lawyer-client interviews were frequently conducted in bathrooms or across the room from opposing counsel. There were concerns raised about victim safety in some cases, and about protection for child witnesses (the Court does not always travel with a screen).*[583]

Circuit courts in Nunavut face unique challenges as a result of infrastructure: access to five of Nunavut's communities requires an overnight stay in Yellowknife for those travelling with the court. Scheduled visits may be cancelled because of bad weather, thereby delaying court proceedings for months. Because of the long periods between laying charges and going to trial, sometimes witnesses or RCMP officers need to be flown back to the community for trial. Teleconferencing and digital tools could help alleviate some of the challenges presented by distance, but broadband infrastructure in remote communities is not yet equipped to support these processes reliably.[584]

Rule 59 of the Nelson Mandela Rules (UN Standard Minimum Rules for the Treatment of Prisoners) states that "Prisoners shall be allocated, to the extent possible, to prisons close to their homes or their places of social rehabilitation." This is not possible for Nunavut Inuit in federal prisons.

Nevertheless, Nunavut has the second-fastest median case processing times for adults within Canada, and fifth-fastest for youth. The only jurisdiction that was faster for adult processing times was Prince Edward Island, which has an entirely different and more accessible court system.[585]

Despite Nunavut's comparatively efficient case processing times, some have expressed concern that federal requirements under *R. v Jordan* are not well suited to the context of Nunavut and its infrastructure. Under *R. v Jordan*, cases experiencing a long delay (minus defence-related delays or "exceptional circumstances") may be dismissed if an application is made.

581 "R. v Anugaa, 2018 NUCJ 2 (CanLII)," 2018, https://www.canlii.org/en/nu/nucj/doc/2018/2018nucj2/2018nucj2.html?searchUrlHash=AAAAAQANam9yZGFuIGJ5Y2hvawAAAAAB&resultIndex=2.
582 Nunavut Court of Justice, "Nunavut Courts – Court Schedule," accessed June 11, 2020, https://www.nunavutcourts.ca/index.php/nucj-court-schedule.
583 Department of Justice, "The Nunavut Court of Justice Formative Evaluation Final Report," 2007, https://www.justice.gc.ca/eng/rp-pr/cp-pm/eval/rep-rap/07/ncj-cjn/nunavut_eng.pdf.
584 Research interview, 2020
585 R. v Anugaa, 2018 NUCJ 2 (CanLII).

In the 2018 ruling *R. v Anuuga*, Nunavut Justice Bychok argued that *Jordan* deadlines run contrary to Nunavut's geographic realities, Inuit cultural practices, and restorative sentencing practices for Indigenous offenders enshrined by *Gladue* principles. Moreover, Justice Bychok argues, there is no "culture of delay" within the Nunavut court system, but rather a court system that is working hard to function effectively within unique limitations:

> …R. v Jordan *does not account for the impact of Nunavut's tremendous infrastructure deficit. Communities which see regular sittings of the Court two or three times a year will continue to see that level of service despite the new* Jordan *rules. Nunavut's infrastructure needs are truly staggering.*[586]

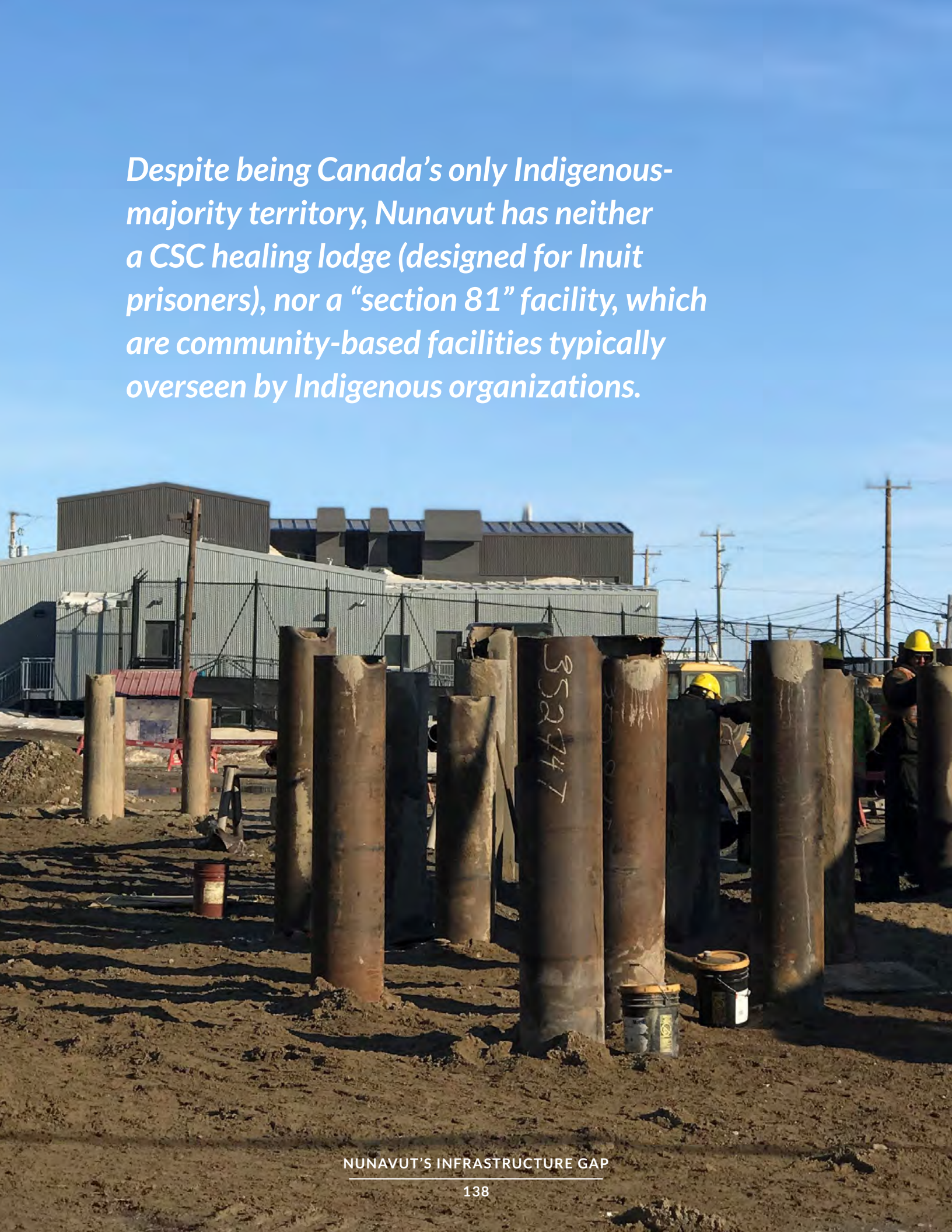
A federal DOJ examination of circuit court use in the Northwest Territories indicates that the nature of how courts function in the North (often with judges, court workers, lawyers, or even witnesses all arriving and leaving together) can further subvert Inuit understanding of judicial processes and their rights under the law:

> *[Respondents identified] their experience is often one of alienation and loss of confidence in a system they can't understand. This can be exacerbated by the perception that the legal aid lawyer and courtworker, arriving in the community at the same time as the rest of the court party, are simply all part of the same foreign system that has no intrinsic interest in their welfare.*[587]

The Nunavut-specific 2005 DOJ report reinforced that this is also likely true of Nunavut Inuit, indicating that Inuit respondents often saw the Courts as an extension of "other" kinds of authority, such as government, rather than serving a separate judicial function.

586 R. v Anugaa, 2018 NUCJ 2 (CanLII).
587 Government of Northwest Territories Department of Justice, "Legal Aid, Courtworker, and Public Legal Education and Information Needs in the Northwest Territories," 2002, https://www.justice.gc.ca/eng/rp-pr/aj-ja/rr03_la8-rr03_aj8/index.html.

Despite being Canada's only Indigenous-majority territory, Nunavut has neither a CSC healing lodge (designed for Inuit prisoners), nor a "section 81" facility, which are community-based facilities typically overseen by Indigenous organizations.



Connections

The infrastructure that connects Nunavut with Canada and the world—or the absence of that infrastructure—defines many of the challenges and opportunities that Nunavut Inuit experience in their daily lives. The difficulty and cost of getting people and goods to and from Nunavut's communities undermines food security and other aspects of quality of life, and limits the opportunity for Inuit-led economic development. This section of the report includes 17 infrastructure indicators across seven priority areas.

Priority area	Indicators
Ports and harbours	Number of ports Number of harbours
Telecommunications	Availability of fibre optic technology Internet speed and capacity LTE availability
Road and sidewalks	Length of roadway and sidewalks (per 100,000 km^2) Physical condition of roadway
Air	Number of paved runways Average runway length
Customs and tourism	Number of travel accommodation employers Customs and border service locations GDP per capita generated by tourism
Banking	Bank branches per capita Bank-owned ATMs per per capita Average household spending on financial services Take-up rate for tax-advantaged savings accounts: Registered Education Savings Plans (RESPs) and Registered Retirement Savings Plans (RRSPs)
Rail	Kilometres of track per 100,000 km^2

In each of these areas, Nunavut faces infrastructure gaps with the rest of Canada. Some of these are very tangible—the absence of road, rail, or fibre-optic links between communities or to other territories and provinces. Others, such as the lack of banking infrastructure, are less traditional measures of infrastructure that nonetheless represent important bridges to economic opportunity.

These gaps are not a product of geography or population density—they are the result of policy choices that have led to consistent underinvestment. Despite having a substantial share of Canada's coastline and reliance on marine access for supplies and industry, Nunavut has only one of the 1,010 harbours recognized by Fisheries and Oceans Canada and none of the 95 public ports overseen by Transport Canada. This lack of facilities drives up the cost of construction and food, as vessels must take longer to transfer supplies to shore by barge. A lack of marine infrastructure also hampers the fisheries industry—without appropriate places to dock, much of the Arctic fishery is processed offshore or in other jurisdictions.

These intersecting challenges also limit the potential of the tourism industry. About 1.3 million cruise ship passengers came through Canadian ports in 2018.[588] Without a substantial increase to port infrastructure, and an increase to customs and border infrastructure to process arrivals, Nunavut is not well-positioned to benefit from Arctic tourism. This is compounded by limited air infrastructure.

The infrastructure gap in broadband illustrates how these gaps compound over time. Nunavut is well behind the Government of Canada's target of 50 Mpbs download/10 Mbps upload speeds for all Canadians by 2030. But average speeds in Canada are already well beyond these levels. If achieving these speeds by 2030 is treated as a baseline, Nunavut Inuit will fall further behind in access to economic opportunity, ability to produce Inuit cultural content, and access to services.

These infrastructure gaps are felt by Nunavut Inuit in their daily lives. They are experienced in the cost and logistical challenge of arranging for household or business supplies by sealift. Because only few Nunavut airports have runways that accommodate wide-body jets, they are felt in days-long travel routes within the territory and for necessary medical or work travel outside. And the lack of financial services infrastructure alongside a lack of service in Inuktut means that Nunavut Inuit are underserved by banks, driving up costs and reducing access to credit and tax-advantaged savings accounts.

The state of connections infrastructure also shapes the overall infrastructure gap across all areas. The absence of road connections means each of the 25 communities must have its own solid waste sites, community spaces, and health centres. The reliance on sealifts drives up the cost and lengthens timelines for new infrastructure and maintenance of existing infrastructure. And the limits of broadband infrastructure make it difficult or impossible for virtual solutions (e.g., telemedicine) to provide meaningful alternatives to bridge the gap. Together, the gaps in each of these areas produce a gap that is larger than the sum of its parts.

588 Association of Canadian Port Authorities, "RePORTage," 2018, http://www.acpa-ports.net/pr/pdfs/rePORTage2018-Online.pdf.

Ports and harbours

All of Nunavut's communities, including inland Baker Lake, rely on marine access for vital supplies, including annual sealifts bringing non-perishable foods, heavy goods, as well as fuel for power and heating.[589] Safe access to waterways is also critical for local fisheries. However, Nunavut has only one official harbour for all of its communities, and as of 2020, no public ports.[590] In comparison, 95 port facilities in the rest of Canada are operated by Transport Canada, and 1,010 harbours recognized by Fisheries and Oceans Canada.[591]

The absence of harbours means communities are restricted to using crowded sealift staging areas to access waterways or small government wharfs.[592] There is also a lack of sheltered areas for community and fishing vessels.[593]

The absence of port infrastructure also hampers annual resupply sealifts for communities, as large vessels cannot dock directly at communities and must rely on barges to transport materials to shore, or in some cases, long hoses from ships to resupply communities with fuel.[594] Sea ice can hamper and delay unloading from barges.[595] In Iqaluit, until the deep-water port currently under construction opens, resupply activities can occur only at high tide, adding time and expense when unloading large vessels.[596]

Ports and harbours are major contributors to the Canadian economy. In 2017, Canadian ports facilitated the movement of almost $90 billion, or 17 percent of Canada's exports to world markets, as well as bringing in $110 billion or 21 percent of Canada's total imports.[597] Port infrastructure is also vital to the tourism industry.[598] A shortage of marine infrastructure limits Nunavut's ability to benefit from increased cruise ship traffic in Arctic waters, as vessels may choose not to disembark passengers where local infrastructure is unable to facilitate the safe transfer of passengers to land.

589 Government of Nunavut, "Sealift Services," accessed June 6, 2020, https://www.gov.nu.ca/fr/services-communautaires-et-gouvernementaux/information/sealift-services.
590 Government of Nunavut, "Nunavut Small Craft Harbours Report," 2006, https://www.gov.nu.ca/economic-development-and-transportation/documents/nunavut-small-craft-harbours-report.
591 Fisheries and Oceans Canada, "Harbours List," 2019, https://www.dfo-mpo.gc.ca/sch-ppb/list-liste/harbour-list-liste-port-eng.html.
592 Research interviews, 2020.
593 Research interviews, 2020.
594 CBC News, "5 quick facts about fuel in Iqaluit," 2017, https://www.cbc.ca/2017/truenorthcalling/iqualit-fuel-5-facts-1.3970962.
595 Nunatsiaq News, "Sea ice delays unloading of sealift to Iqaluit, officials say," accessed June 6, 2020, https://nunatsiaq.com/stories/article/sea-ice-delays-unloading-of-sealift-to-iqaluit-officials-say/#:~:text=A blockage of sea ice,made it impossible to continue.
596 Government of Nunavut, "Sealift Services," accessed June 9, 2020, https://www.gov.nu.ca/fr/services-communautaires-et-gouvernementaux/information/sealift-services; . The Globe and Mail, "Sealift a lifeline to remote hamlets in the North – The Globe and Mail," 2014, https://www.theglobeandmail.com/news/national/the-north/sealift-a-lifeline-to-remote-hamlets-in-the-north/article16398189/
597 Transport Canada, "Backgrounder on Canada's Port System," 2019, https://www.tc.gc.ca/eng/backgrounder-canada-port-system.html.
598 Association of Canadian Port Authorities, "RePORTage."

DEFINING MARINE INFRASTRUCTURE

A **harbour** is a body of water that is sheltered by natural or artificial barriers, and provides safe anchorage for vessels, as well as the transfer of passengers and cargo between land and water. Fisheries and Oceans Canada supports a network of harbours with infrastructure to support fishing and recreation.

A **port** is a type of marine infrastructure that includes loading docks with cranes to directly unload cargo from vessels. Many ports in Canada, such as the Port of Vancouver, include significant storage and processing facilities, and direct access to railways and roads. Some ports also include a separate cruise ship terminal for passengers. Ports are generally large multi-purpose facilities, serving as major transport and logistics hubs, supporting fisheries, and as a base for search-and-rescue.

A **deep-water port** has water depths of approximately 9 metres or more, and is able to accommodate large, ocean-going vessels.

Gap analysis

To measure the gaps in ports and harbour infrastructure between Nunavut and the rest of Canada, this report includes two indicators:

- Number of ports
- Number of harbours

Indicator: number of ports

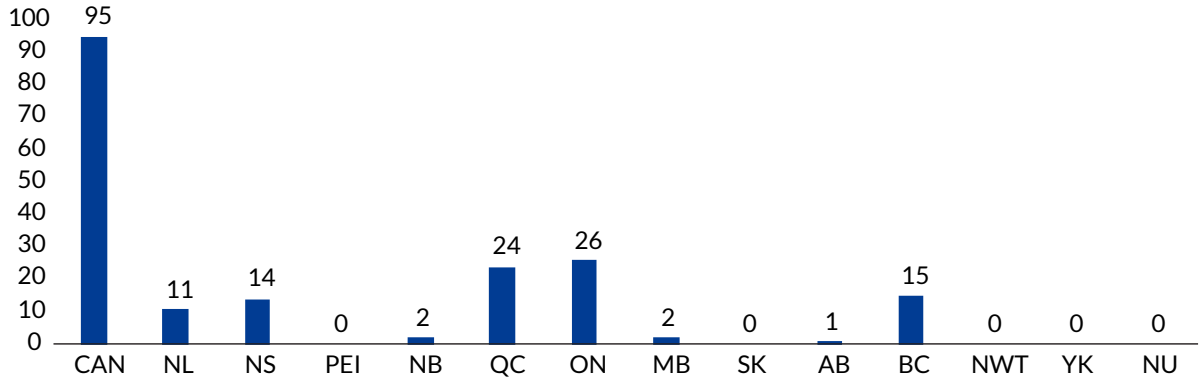
There are 95 port facilities in Canada owned and operated by Transport Canada (and more than 550 ports if private facilities are included). In addition, there are 17 large deep-water ports in the country, classified as Canada Port Authorities owing to their strategic importance and scale of operation.[599]

Nunavut currently has no public ports, so it is not possible for ocean-going vessels, including those used for community resupply, to dock anywhere in the territory. By contrast, all coastal provinces except P.E.I. have some port facilities. The 95 ports overseen by Transport Canada and the 17 Canada Port Authorities range from large deep-water ports such as those of Vancouver and Halifax, to remote facilities such as the Port of Bella Bella on the central British Columbia coast.[600] For ports operated by Transport Canada, Ontario has the largest number at 26, while the territories have none.

599 Transport Canada, "Backgrounder on Canada's Port System."
600 Transport Canada, "List of Ports Owned by Transport Canada," 2018, https://www.tc.gc.ca/en/services/marine/ports-harbours/list-ports-owned-transport-canada.html.

FIGURE 40

Number of ports, Canadian Port Authorities and Transport Canada (2018)



Source: Transport Canada

A small port facility in the territory located in Nanisivik opened in 2018; however, it is used as a refuelling facility for military and government vessels patrolling Arctic waters, and not for community needs. Plans for this port were initially announced in 2007, with the federal government committing to building a nearby airstrip.[601] These plans were later scaled back, omitting the airstrip, with upgrades focused on existing port infrastructure.[602]

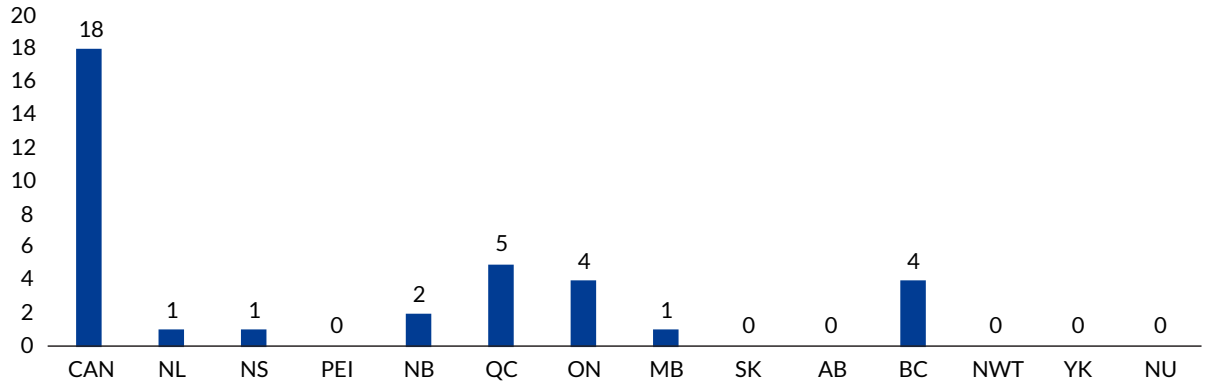
Canada's 18 public deep-water ports are distinguished by having approach channels, quays, and anchorages that can accommodate large ocean-going vessels that require water depths of at least 9 metres.[603] These ports comprise the 17 Canada Port Authority facilities, as well as the Port of Churchill. The Canada Port Authority facilities operate as major logistics and transportation hubs, generally include space to process shipping containers, and have direct links with rail lines and highways. For example, the Port of Vancouver, Canada's largest container port, processed 147,093 million metric tonnes of cargo in 2018, and almost 4 million shipping containers.[604] As of 2020, Quebec has the largest number of deep-water ports, with five along the St. Lawrence Seaway, followed by British Columbia and Ontario with four each. Private deep-water ports such as the Port of Kitimat in British Columbia are not captured in Figure 41.

All of Nunavut's communities rely on marine access for vital supplies, including annual sealifts bringing non-perishable foods, heavy goods, as well as fuel for power and heating.

601 CBC News, "Nanisivik, Nunavut, naval facility breaks ground," 2015, https://www.cbc.ca/news/canada/north/nanisivik-nunavut-naval-facility-breaks-ground-1.3158798.
602 CBC News, "Arctic naval facility at Nanisivik completion delayed to 2018," 2015, https://www.cbc.ca/news/canada/north/arctic-naval-facility-at-nanisivik-completion-delayed-to-2018-1.2980312.
603 Research interviews, 2020.
604 Port of Vancouver, "Vancouver Fraser Port Authority, Financial Report 2018," 2018, https://www.portvancouver.com/wp-content/uploads/2019/05/2018_FinancialReport.pdf.

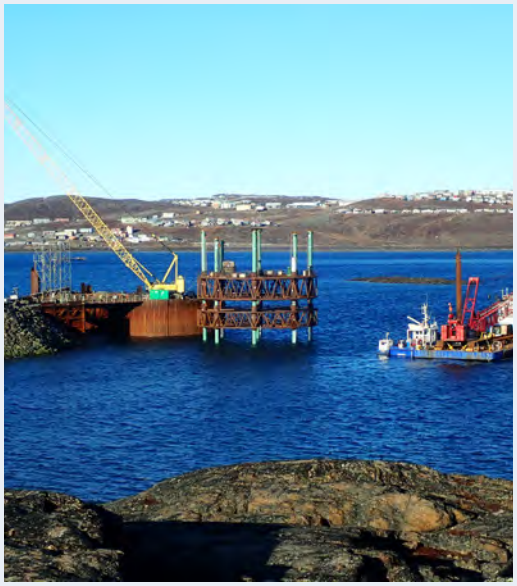
FIGURE 41

Number of deep-water ports (2020)



Source: Transport Canada

In Iqaluit, the territorial government is building a deep-water port that is expected to be operational in 2021.[605] Although it is much smaller than ports in other parts of Canada, this facility will allow all-tide access for vessels, and eliminate the need to "double-handle" cargo by transferring it from vessels to barges, and then on to land, as cargo can be placed directly on the deep sea wharf.[606]



NUNAVUT DEEP-WATER PORT PROJECT

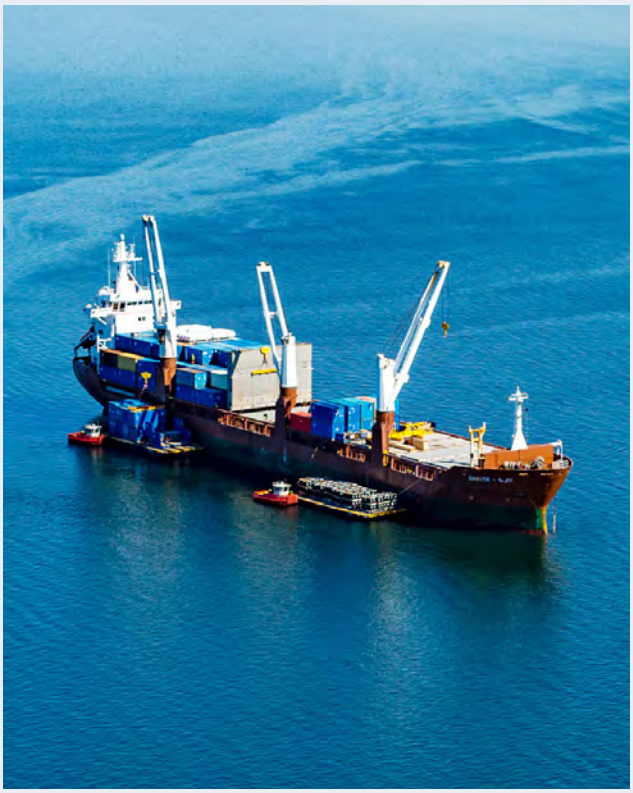
The approximately $84-million project in Iqaluit will significantly simplify the process of unloading cargo. Upon project completion, vessels will have all-tide access to the port, and be able to directly offload cargo. Currently, unloading cargo can occur only at high tide, and requires barges to move materials from cargo vessels to land (as ships cannot dock in Iqaluit, and must remain in deeper water in Frobisher Bay). The new deep-water port includes 4 hectares for cargo, double the currently available space. Although the new port is larger, some concerns have been raised that the design is too focused on current needs, as opposed to accounting for future population and economic growth in Iqaluit.[607] It is expected port operations will begin in 2021.

605 Nunavut Impact Review Board, "Iqaluit Marine Infrastructure – Deep Sea Port," https://www.nirb.ca/project/125103; see also Dredging Today, "Works to continue on Iqaluit deepwater port," 2019, https://www.dredgingtoday.com/2019/05/28/works-to-continue-on-iqaluit-deepwater-port/

606 For more details on the Iqaluit Deep Sea Port, see Nunavut Impact Review Board, "Iqaluit Marine Infrastructure – Deep Sea Port."

607 Research interview, 2020.

The proposal for the Grays Bay Road and Port Project in the Kitikmeot region also includes a deep-water port to support delivery, storage, and export of materials, and could serve as a docking site for commercial and government vessels on transarctic routes, including cruise ships.[608] Described as a "nation-building" initiative, the new port would be connected to the Northwest Territories by road, creating the first road linkage between Nunavut and rest of Canada.[609] In 2019, the Canadian government announced $21.5 million for an environmental assessment as well as to finalize the project design.[610]



SEALIFT DELAYS IN KITIKMEOT

In 2018, the final sealift for Cambridge Bay and Kugluktuk was cancelled because of impassible sea ice, forcing expensive airlifts of essential goods.[611] In the absence of road and rail connections, all of Nunavut's 25 communities depend on summer sealifts to deliver critical supplies, including fuel, chlorine for water treatment, vehicles, and non-perishable foods. Bad weather, along with limited port and harbour infrastructure, can leave communities vulnerable to sealift cancellations and delays, sometimes causing communities to wait until the following summer for goods to arrive. Short runway lengths in both communities compounded the challenge in 2018, as only smaller cargo jets could land safely, limiting the amount of materials that could be delivered at any given time. The high cost of airlifted food contributes to food insecurity.

608 Grays Bay Road & Port, "Project Proposal" accessed June 6, 2020, http://www.gbrp.ca/?page_id=4012.
609 Nunavut News, "Ottawa gives $21.5 million to Kitikmeot road and port project," 2019, https://nunavutnews.com/nunavut-news/ottawa-gives-21-5-million-to-kitikmeot-road-and-port-project/
610 Nunavut News, "Ottawa gives $21.5 million to Kitikmeot road and port project,"
611 Nunatsiaq News, "MTS barge cancellation leaves western Nunavut customers calling for action," 2018, https://nunatsiaq.com/stories/article/65674mts_barge_cancellation_leaves_w_nunavut_customers_calling_for_action/

Indicator: number of harbours

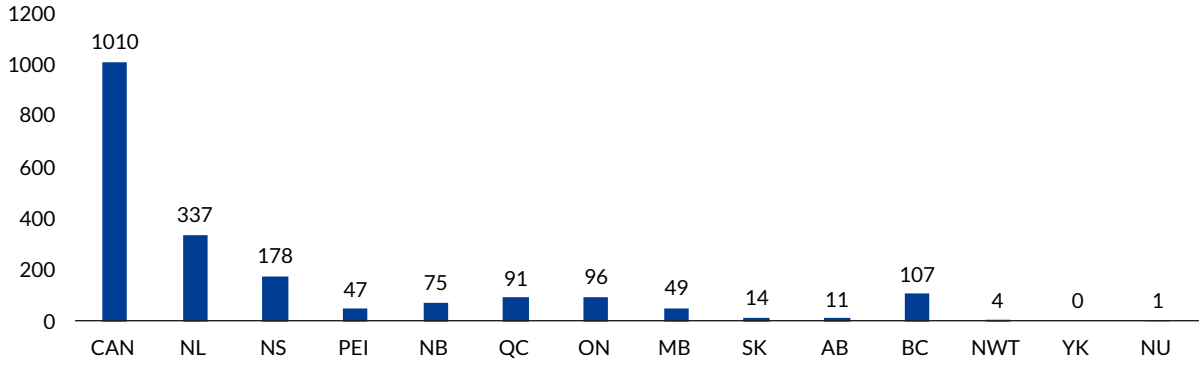
Harbours can improve safety for commercial fisheries and strengthen access to communities.[612] The ability to safely access waterways is also important for maintaining local food sovereignty and connecting communities. As of 2019, 1,010 harbours are recognized by Fisheries and Oceans Canada across the country. Newfoundland and Labrador has the most with 337, followed by Nova Scotia with 178.[613]

At present, Nunavut only has only one harbour, in Pangnirtung. A new harbour is under construction in Pond Inlet, and a third is expected to open in Iqaluit as part of its deep-water port project.[614] Two additional harbours are expected to be constructed as part of the Tallurutiup Imanga Benefit Agreement, in Arctic Bay and Clyde River.[615] That leaves 20 Nunavut communities without a harbour. Recently, 19 Nunavut communities identified new or renovated harbour infrastructure as a priority in their Government of Nunavut Infrastructure Plans.[616] Common requests are for multi-use harbours including breakwaters, larger docks, and launching ramps, as well as improved staging areas for sealifts.[617]

Out of 1,010 recognized harbours in Canada, only one is in Nunavut. The ability to safely access waterways is important for maintaining local food sovereignty and connecting communities.

FIGURE 42

Number of harbours (2019)



Source: Fisheries and Oceans Canada

612 Government of Nunavut, "Nunavut Small Craft Harbours Report," pp. 8–9.
613 Fisheries and Oceans Canada, "Harbours List."
614 Research interviews, 2020.
615 CBC News, "With marine conservation area comes $55M for Inuit communities, PM announces," 2019, https://www.cbc.ca/news/canada/north/trudeau-iiba-tallarutiup-imanga-1.5234149.
616 Government of Nunavut, Integrated Community Sustainability Plans, "Community Profiles," accessed July 27, 2020, http://www.buildingnunavut.com/en/communityprofiles/communityprofiles.asp.
617 Three communities (Gjoa Haven, Qikitarjuaq, and Chesterfield Inlet) also identified a need for a deep-water port. See Government of Nunavut, Integrated Community Sustainability Plans, "Community Profiles."

Telecommunications

Nunavut is the only province or territory in Canada without any terrestrial fibre-optic infrastructure. As a result, Internet service is slow, unreliable, and frequently unable to meet demand. As a result of COVID-19, even more of Canadian life is now "digital first," with work, education, and community-building moving online. However, these increasingly common features (such as videoconferencing, streaming television, or cloud-based collaborating) can be difficult or impossible in Nunavut.

The convenience of digital services—and the inconvenience of their absence—is amplified in remote locations. For many Canadians, online banking is a convenient way of saving a short drive to their local branch. For many Nunavut Inuit, online banking is the only kind of banking available within hundreds of miles. The jurisdiction in Canada that might benefit the most from effective online technologies has the worst overall Internet services in the country.

HIGH INTERNET COSTS

Before COVID-19, a household in Nunavut using the same amount of broadband as the average Canadian household would likely pay more than *six times* the price for the same amount of data. Part of this difference is the high overage fees associated with Internet packages in Nunavut. The fastest possible speed the household could access (15 Mbps) remains *eight times slower* than the Canadian household weighted average for 2018 (126 Mbps).[618]

There is a broad consensus that closing the Internet gap in Nunavut would help shrink other gaps in well-being that are intensified by territory's geographic barriers and relative isolation. According to the Canadian government's Arctic and Northern Policy Framework "almost everyone [during the public engagement process] who spoke about infrastructure mentioned reliable broadband access as a priority, given its role in enabling business, research, education, justice and health."[619] Our research team also heard consistently from our interviews and advisory panel that broadband is urgently needed to support overall infrastructure efforts.[620]

Without high-speed Internet, businesses and other core institutions in Nunavut are being left further behind their southern counterparts, especially as industries like mining and fishing become increasingly data-driven and reliant on the Internet. Improved Internet access could radically transform the availability of online distance education. It could also markedly improve the availability of effective telehealth services and diagnostic processes, preventing both the expense and hardship of going out of territory for health care. With better broadband connections, the justice system could use remote hearings and other online processes to provide services faster. Instead, Nunavut Inuit consistently travel large distances or must find time-intensive solutions for services or opportunities that could be delivered digitally.

618 From posted retail prices and Open Government Portal, "CMR 2019—Retail Fixed Internet Sector and Broadband Availability," 2019, https://open.canada.ca/data/en/dataset/8a80c08b-ba7e-4a72-869e-f7fcdc6eb6e3.
619 "Canada's Arctic and Northern Policy Framework."
620 Research interviews, 2020.

Improved Internet access and quality is also a tool for cultivating Inuit self-determination. High-speed Internet can help build capacity and resource-sharing among Nunavummiut communities. Reliable fast Internet is necessary for Inuit rights-based organizations to communicate with orders of government and participate in key discussions about development and planning for Nunavut. Online spaces are already essential to strengthening and sharing Inuit languages, art, and culture, and the development of Inuit screen-based industries.[621] For Inuit artists and creators in remote locations, the Internet is an important vehicle not just to share and sell their work, but also to apply for grants and supports that play a critical role in supporting Canadian culture.

While Nunavut Internet speed is advancing, so is Canadian Internet speed, and at an even faster pace. This means that even as Nunavut makes significant improvements to basic Internet access, the gaps of *relative* Internet access continue to grow. Today, households in Nunavut have access to plans that match average household speeds for the rest of Canada in 2013. However, the speed of average household subscriptions in the rest of Canada increased by more than 700 percent between 2013 and 2018 (and has likely grown since).[622] In the case of broadband, comparative disadvantage is an important measure, as it represents a barrier to participation in online activities.

Compared with fixed broadband, both the actual and relative gap of mobile LTE access in Nunavut vs. Canada is less acute; however, Nunavut has only recently "caught up" to 4G technology. As Canada plans for 5G technologies, it is crucial that rural and remote communities in the Arctic are not left with outdated and inequitable access to mobile services.

Gap analysis

To measure the gaps in telecommunications infrastructure between Nunavut and the rest of Canada, this report includes three indicators:

- Availability of fibre-optic technology
- Internet speed and capacity
- LTE availability

Indicator: availability of fibre-optic technology

The percentage of households that have access to any kind of broadband is technically higher in Nunavut than the Canadian average (99.3 percent vs. 98.8 percent). However, all broadband in Nunavut is provided using Geostationary (GEO) satellite (see box for further information on GEO). Nunavut is the only jurisdiction in Canada to be serviced entirely by satellite. This is the backbone infrastructure of the Internet in Nunavut. From this backbone, broadband is delivered into homes and businesses through fixed wireless and mobile wireless last-mile connections.[623]

621 Nunavut Film Development Corporation, "Scoping the future of broadband's impact on Nunavut," 2020, https://nunavutfilm.ca/wp-content/uploads/2020/05/Broadband-Impact-Nunavut-Screen-Based-Industry.pdf.
622 Open Government Portal, "CMR 2019—Retail Fixed Internet Sector and Broadband Availability."
623 SSi Micro, "Planning backbone redundancy for Nunavut Communications," 2016, https://www.qiniq.com/wp-content/uploads/2016/11/SSI-2016-11-24.pdf.

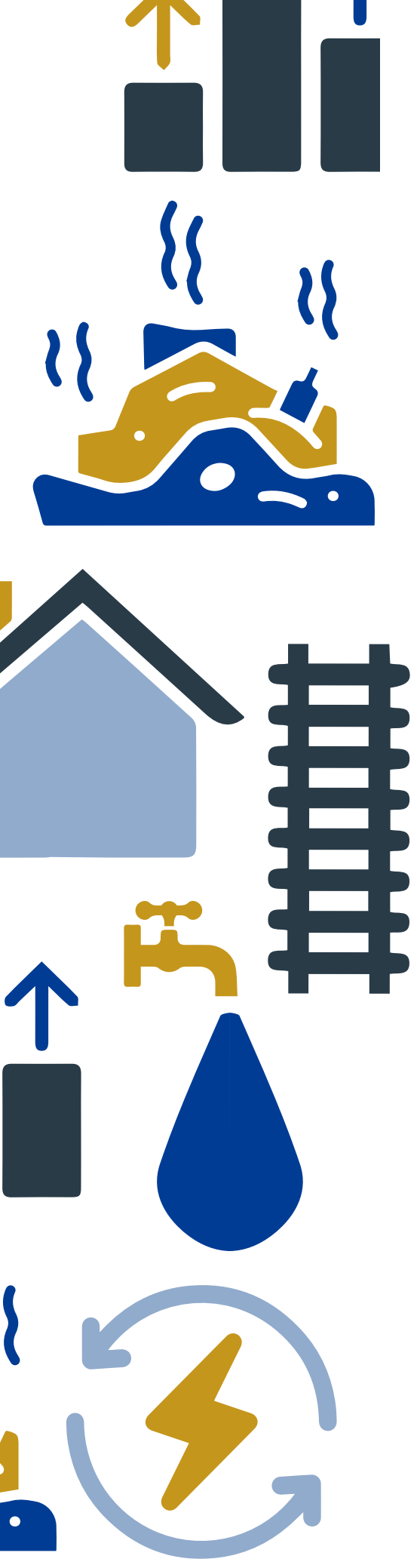


TABLE 17

Share of residents and type of broadband, Nunavut and Canada

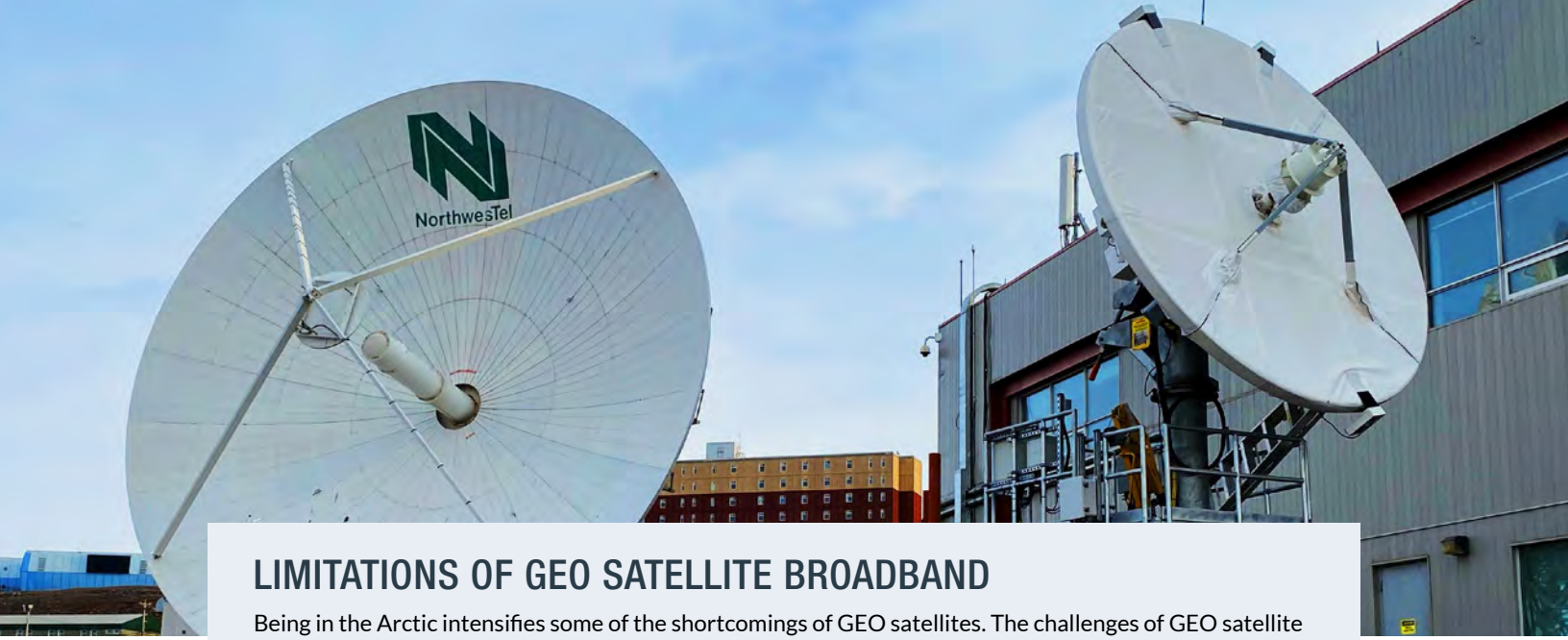
Percentage of Canadian Residential Internet Subscribers using Satellite Broadband
5.7%

Percentage of Nunavut Residential Internet Subscribers using Satellite Broadband
100%

Percentage of Canadian residences with access to terrestrial broadband
84%

Percentage of Nunavut Residences with access to terrestrial broadband
0%

While areas in the Northwest Territories and the Yukon still rely on satellite broadband, the capitals of each city are connected to terrestrial fibre lines. As a result, core services (such as government and major industries) have access to fixed terrestrial fibre, unlike Iqaluit.



LIMITATIONS OF GEO SATELLITE BROADBAND

Being in the Arctic intensifies some of the shortcomings of GEO satellites. The challenges of GEO satellite broadband include:

- **Angle and distance:**
  The GEO satellites currently serving Nunavut orbit above the Earth more than 35,000 kilometres[624] above the earth's equator. Therefore, for Arctic users, GEO satellites are both further away and at a sharper angle than users closer to the equator. The increased angle makes satellite signals more susceptible to "terrestrial blockage," resulting in signal interference for Northern users.
- **Interference:**
  While reliability is improving, satellite broadband signals are still susceptible to more and different interference compared with fibre-optic connections. These include weather and atmospheric interruptions, such as from heavy snow or rain. Because the signal to Northern users must travel through more of Earth's atmosphere, Internet users in the Arctic are at higher risk of interference than other satellite users, resulting in slow service or even stoppage.
- **Latency:**
  Latency describes the time between sending a signal and receiving a signal. Even though satellite signals can travel almost at the speed of light, the signals have a long way to travel between Arctic ground stations and GEO satellites at the equator. When two people in Nunavut are using satellite broadband to communicate with one another, the problems with latency increase: while they may be geographically close, each of their signals must travel vast distances before being received by the other. Many Internet applications rely on "real-time" connection to provide service: as a result of problems with latency and overall speed (discussed below), users in Nunavut can be cut off from these applications.
- **Limits on spectrum and capacity:**
  Geostationary satellites have strict limitations on capacity, which is passed down to users in the form of usage or capacity control mechanisms. When customers use up their allocated capacity, their ability to access the advertised plan speed plummets.
- **Inability to "keep up" with terrestrial fibre advancement:**
  Fibre-based broadband speed and quality has been increasing by significant orders of magnitude. According to a white paper for the America Federal Communications Commission "Even with the new satellite platforms, satellite-based broadband has been unable to keep pace with the rapidly increasing customer demands for speed and capacity, and future prospects for doing so remain highly questionable."[625] Apps and websites will continue to become more complex. The technological limitations of GEO satellites mean they are not scalable to meet growing needs.

624 Telesat, "Why Satellite? An Introduction to the Technology and Services," accessed June 10, 2020, https://www.telesat.com/about-us/who-we-are/why-satellite.
625 Vantage Point, "Satellite broadband remains inferior to wireline broadband," 2017, https://ecfsapi.fcc.gov/file/7520956711.pdf.

Current plans to bring better broadband infrastructure to Nunavut, include both fibre-optic cables and LEO (Low Earth Orbit) satellites. Not all projects would provide services to all Nunavut communities. However, each new piece of broadband infrastructure helps alleviate traffic and bandwidth limitations affecting the current infrastructure. If a fibre-optic cable could service Iqaluit and Kimmirut, that would remove a large amount of traffic from existing Telesat GEO satellites, improving available speeds and bandwidth for subscribers elsewhere in Nunavut.

The following plans have been proposed:

- **Iqaluit and Kimmirut Fibre-Optic Link (proposed completion 2023)**
  The proposed 1,700-kilometre cabled link between Nuuk, Greenland, and the Iqaluit and Kimmirut region of Nunavut would provide fibre-optic access to Nunavut's most populated area and its administrative hub. The expected cost is $209 million, funded through the governments of both Canada and Nunavut. The cable was to have been laid in 2022: however, COVID-19 may delay the project.[626]

- **The Kivalliq Hydro-Fibre Link (subject of a feasibility study)**
  Proposed by the Kivalliq Inuit Association (KIA), this fibre line would connect Nunavut's Kivalliq region to Manitoba's hydroelectric and fibre-optic networks. In early 2019, the government of Canada dedicated $1.6 million to a two-year feasibility study to assess the viability of a proposed link.[627] In February 2020, the Canadian Infrastructure Bank signed a Memorandum of Understanding to serve an advisory role in the planning and development of the proposed project, which project leaders called a "significant step forward." Once the link is complete and project partners are paid for their investment, the link would be Inuit-owned.[628]

- **Telesat LEO Satellites (as early as 2021)**
  In comparison to GEO satellites, LEO satellites have a lower orbit and more flexible pathways of motion, resulting in less interference and latency. While still an emerging technology, LEO satellites are considered a promising form of infrastructure that could help remote communities improve broadband access by several orders of magnitude.

  The Government of Canada has committed to spending $600 million over ten years to buy broadband Internet capacity from Telesat's low-earth orbit (LEO) satellites once they are in space. The funding depends on the successful launch and operation of the proposed satellite constellation, expected as early as 2022.[629]

626 CBC News, "MLAs shocked at $80 million cost increase to Nunavut-Greenland fibre cable," 2019, https://www.cbc.ca/news/canada/north/nunavut-fibre-link-cost-1.5334784.
627 Nunatsiaq News, "Ottawa gives $1.6 million to Kivalliq hydro-fibre link study," 2019, https://nunatsiaq.com/stories/article/ottawa-gives-1-6-million-to-kivalliq-hydro-fibre-link-study/
628 Nunatsiaq News, "Canada infrastructure bank to advise on Kivalliq hydro-fibre project," 2020, https://nunatsiaq.com/stories/article/canada-infrastructure-bank-to-advise-on-kivalliq-hydro-fibre-project/
629 Financial Post, "Canada backs Telesat in Internet space race with $600-million deal," 2019, https://business.financialpost.com/telecom/canada-backs-telesat-in-Internet-space-race-with-600-million-deal.

TELESAT SATELLITE GLITCH

Relying entirely on satellite technology for core telecommunications functions leaves Nunavut at risk of disruption: not just causing individual inconvenience, but rendering territory-wide systems incapable of functioning. On October 6, 2011, a problem with Telesat satellite "Anik F2" resulted in a 16-hour-long outage of communications services. Every community in Nunavut (as well as several in the Northwest Territories and the Yukon) lost cellular service, Internet access, long-distance telephone access, and some television channels. As a result, flights were grounded, ATMs and key banking services were unusable, and, of course, Internet and satellite services were cut off.

During the outage, CBC radio became the only way to effectively broadcast across the territory, serving as a "communications lifeline."[630] The day-long communications outage was a reminder of the vulnerability of a satellite-only broadband system. Connecting Nunavut to a fibre-optic cable will not just bring faster Internet speeds to the territory, it will also provide crucially needed "redundancies" (back-up systems) necessary to keep Nunavummiut safe and connected. The proposed Kivalliq Hydro-Fibre Link, led by the Kivalliq Inuit Association with Anbaric Development Partners, would provide a broadband link from Manitoba that would provide cheaper, more reliable, and faster Internet connections.

Indicator: Internet speed and capacity

CRTC uses two types of data to measure broadband penetration—subscription data and availability data.

Subscription data measure the number of users who subscribe to certain levels of service. Nunavut has the lowest overall Internet subscription rate (by percentage of households) of any jurisdiction in Canada (67.3 percent vs. a CDN average of 84.6 percent).[631]

Availability data indicate how many households/locations have access to a certain level of service, as characterized by speed and capacity. The goal of the federal government is to have 50/10 Mbps *available* to all Canadians by 2030, even if users do not subscribe to plans of that speed.[632]

Internet speed can be characterized by download speed/upload speed (i.e., 50 Mbps/10 Mbps), but frequently download speeds are used on their own as a proxy (50 Mbps). The greater the Mbps, the faster the Internet is.

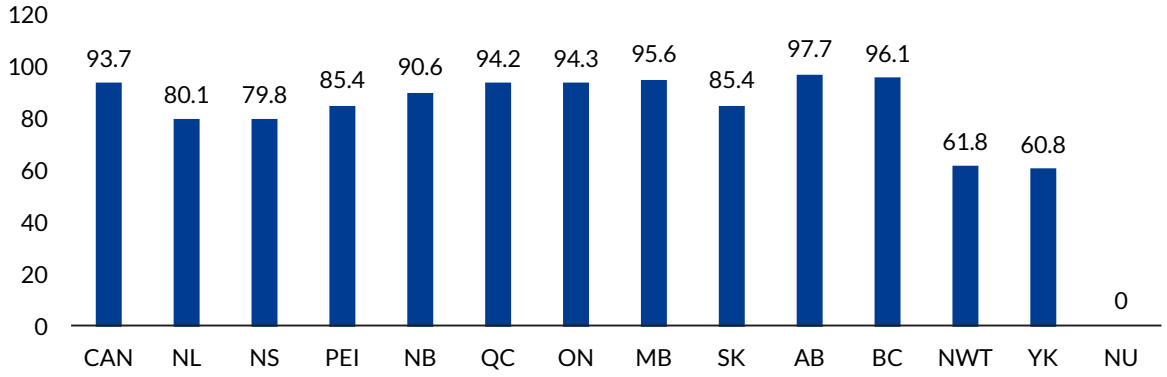
630 Nunatsiaq News, "Northern Telcom service restored after 16-hour Telesat Canada satellite glitch," October 7, 2011, https://nunatsiaq.com/stories/article/65674telesat_canada_screw_up_knocks_out_northern_telcoms/
631 Open Government Portal, "CMR 2019—Retail Fixed Internet Sector and Broadband Availability."
632 Government of Canada, "High-Speed Access for All: Canada's Connectivity Strategy," 2019, https://www.ic.gc.ca/eic/site/139.nsf/vwapj/ISEDC_19-170_Connectivity_Strategy_E_Web.pdf/$file/ISEDC_19-170_Connectivity_Strategy_E_Web.pdf.

BROADBAND SPEED

Nunavut is the only jurisdiction in Canada in which no household can access broadband speeds higher than 25 Mbps, as illustrated by Figure 43.

FIGURE 43

Availability of 25 Mbps+ by percentage of households, 2018, CRTC[633]



Source: CRTC

Broadband speeds are increasing rapidly in the rest of the country. Across Canada, average household download speeds increased by 88 percent in just one year (from 2017 to 2018).[634] From 2013 to 2018, average download speeds for residential subscriptions became more than seven times faster, with average upload speeds becoming more than 10 times faster. The weighted average of residential Internet speeds for Canadian subscriptions was 126 Mbps in 2018.[635]

As of 2019, plans with an advertised speed of 15 Mbps are available in all of Nunavut's 25 communities through Tamarmik Nunaliit. Northwestel and Bell promoted the service as providing speeds up to six times faster than those previously offered.[636] There are no data on the number of Nunavut subscribers who receive service at these speeds. It is also worth noting that these plans are twice as expensive as many southern equivalents.

Only about 1.5 percent of Canadian households subscribe to a plan with speeds of less than 5 Mbps: until 2019, that was the fastest possible speed available to about half of Nunavut households.[637]

Nunavut is the only province or territory where there is no access* to

internet speeds over 25 Mbps

In 2018, the weighted average of residential internet speeds for Canadians was **126 Mbps**

*residential access

633 Open Government Portal, "CMR 2019—Retail Fixed Internet Sector and Broadband Availability."(Table 9.2)
634 Open Government Portal ,"CMR 2019—Retail Fixed Internet Sector and Broadband Availability."
635 All numbers in this paragraph from Open Government Portal,"CMR 2019—Retail Fixed Internet Sector and Broadband Availability."
636 Nunavut News, "Northwestel announces high-speed Internet, LTE wireless now available in all 25 Nunavut communities," 2019, https://nunavutnews.com/nunavut-news/northwestel-announces-high-speed-Internet-lte-wireless-now-available-in-all-25-nunavut-communities/
637 Open Government Portal, "CMR 2019—Retail Fixed Internet Sector and Broadband Availability."

BROADBAND CAPACITY

Canadian households used an average of 209 gigabytes (GB) per month in 2018.[638] This number represents typical Internet use for everyday tasks: schoolwork and research, streaming, shopping, and communication.

The weighted average "cap" imposed by subscriptions that households choose across Canada is 264 GB per month. Three out of four Canadian households subscribe to a service that allows them at least 160 GB.[639] Although the CRTC does not track residential subscription costs in relation to usage capacity, average costs for monthly plans are in the $60 to $75 range. In Nunavut, usage caps exist for every household plan: 100 GB is the highest monthly cap available to households.

Plan usage caps are already becoming an obsolete measure of household plan comparison in the rest of Canada. More and more plans are either very high capacity or unlimited (or have a low-cost upgrade to unlimited). Very few Internet subscribers across Canada exceed their monthly limit: only 2.3 percent of residential accounts and 1.4 percent of business accounts did so in 2018.[640] For those in Nunavut, managing usage and overage fees is an important part of everyday broadband use.

The federal government has set a benchmark prescribing that households should be able to access a plan with unlimited data transfer by 2030. Most households across Canada already have this option, but those in Nunavut do not.

TABLE 18

Access to unlimited data transfer for Nunavut and Canada, 2019, CRTC

% of Canadian households with access to unlimited data transfer service (2018)	% households in Canadian territories (including Nunavut) with access to unlimited data transfer (2018)
85.7%	0%

COSTS

Using more than one's allotted cap is costly in Nunavut. Fixed wireless Northwestel and Bell Mobility users are charged $4 for each additional GB used over their plan cap. An Iqaluit household subscribing to what Northwestel calls its "heavy user" package ("for streaming video and online gaming," a cap of 100 GB) would pay $436 dollars in additional overage fees just to meet the Canadian average of 209 GB. This would result in a monthly bill of about $570.[641]

For Qiniq plans, the highest usage cap is 55 GB (for speeds of 5 Mbps) with an additional 10 GB costing $120, meaning an exorbitant monthly bill of $520 for just 65 GB of capacity, a GB allowance far below Canadian norms of household use.[642]

638 The 2018 average for households in the United States was 268.7 GB, for Australia about 196GB. See OpenVault, "Broad-Based Broadband Usage Acceleration in 2018," 2019, http://openvault.com/openvault-broad-based-broadband-usage-acceleration-in-2018-1tb-power-users-double-to-4-12-of-all-households/; Canadian data from Open Government Portal, "CMR 2019—Retail Fixed Internet Sector and Broadband Availability."
639 Open Government Portal, "CMR 2019—Retail Fixed Internet Sector and Broadband Availability."
640 Open Government Portal, "CMR 2019—Retail Fixed Internet Sector and Broadband Availability," T9.21.
641 See plans featured: Northwestel, "Internet Packages," accessed June 10, 2020, https://www.nwtel.ca/shop/internet/plans-rates/iqaluit.
642 See plans featured: Qiniq, "Internet Plans," accessed June 10, 2020, https://www.qiniq.com/Internet/

Service providers do not have much incentive to invest in increased speeds for Nunavut users. From a service-provider perspective, the economies of scale available in other areas in Canada do not apply in Nunavut. The average monthly revenue from customers to Canadian service providers for residential speeds of "1.5 to 4 Mbps" is $56, but revenues from customers with 50 Mbps or higher rise only to $75.[643] Meanwhile, the marginal cost of providing better service using the same fibre-optic infrastructure in higher population density areas is relatively low.[644] By contrast, even relatively small increases in both speed and capacity drive up costs for Nunavut users, due to satellite costs and overall bandwidth constraints. Improving speeds using only satellite technology is difficult and expensive. Without fibre-optic technology, the gap in available speeds between Canada and the rest of Nunavut will continue to grow.

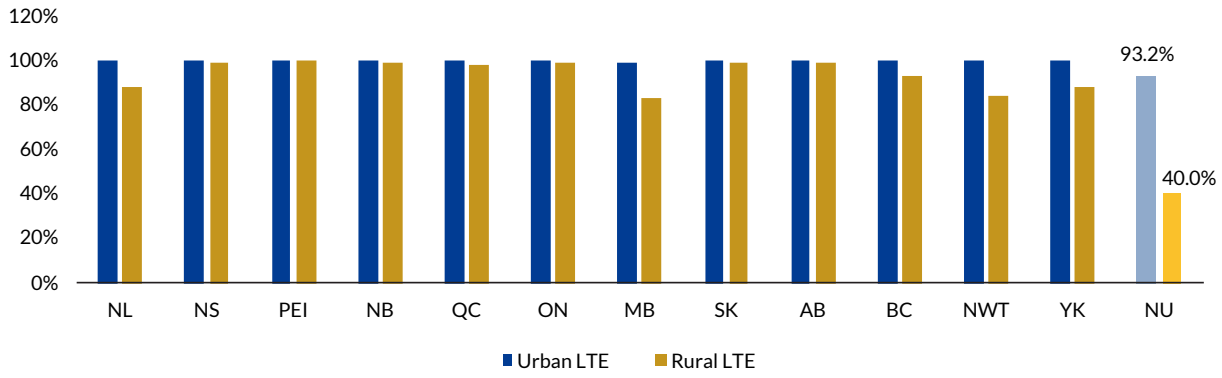
Indicator: LTE coverage in Nunavut

In the absence of affordable and reliable fixed broadband services, access to LTE and mobile connectivity is of heightened importance in Nunavut. Adoption of mobile technology is increasing in the territories: the number of cellphone users in "the North" who used a data plan increased by 9 percent from 2016–17, the second-highest growth rate of any jurisdiction.[645]

Mobile technology advances quickly: in 2020, a report by OpenSignal showed a significant increase in year-over-year rural area mobile speeds. According to that report, rural Canada's download speeds increased by a minimum of 33.8 percent to a maximum of 71.4 percent between 2019 and 2020.[646] Similarly, many improvements have occurred with Nunavut's mobile coverage in recent years, meaning that the most recently published national data on LTE coverage may no longer be strictly comparable. However, CRTC data show that mobile coverage in Nunavut lagged behind other Canadian jurisdictions as recently as 2018.

FIGURE 44

LTE population coverage, by region, urban centres vs rural communities (%), 2018, CRTC[647]



Source: CRTC

643 Open Government Portal, "CMR 2019—Retail Fixed Internet Sector and Broadband Availability."
644 Open Government Portal, "CMR 2019—Retail Fixed Internet Sector and Broadband Availability."
645 Open Government Portal, "CMR 2019—Retail Fixed Internet Sector and Broadband Availability," Table 6.7.
646 IT World Canada News, "Canada's rural 4G speed up 70% year over year," 2019, https://www.itworldcanada.com/article/canadas-rural-4g-speed-up-70-year-over-year-according-to-opensignal-report/431849.
647 CRTC, "Communications Monitoring Report 2019 – Retail Mobile Sector," 2019, https://crtc.gc.ca/eng/publications/reports/policymonitoring/2019/cmr10.htm.

In 2020, 4G mobile service is available in all 25 Nunavut communities, through either SSi or Bell Mobility. Gjoa Haven was the last community in Nunavut to get 4G cell service in December 2018.[648] However, Canada is preparing to adopt 5G technology, which would result in another transformative leap forward in connectivity, latency, and bandwidth for mobile phones. As with many new technologies, 5G networks debuted in Canada's urban centres.[649] Without plans to bring 5G coverage to Nunavut in the coming years, the territory once again risks falling behind in mobile capabilities.

The choice of mobile providers in the territories is either limited or non-existent. On average, Canadians in most provinces had access to two or three facilities-based networks; however, those in "the North" (the three territories) generally had access to only one network.[650] Canada is known for having high prices for mobile phone plans in comparison with many other countries, and prices in the North are even higher than Canadian averages. According to CRTC data from 2017, territories had the highest monthly average mobile revenues per subscriber compared with other Canadian provinces.[651]

Without plans to bring 5G coverage to Nunavut in the coming years, the territory once again risks falling behind in mobile capabilities.

648 CBC News, "For the 1st time, all Nunavut communities have cell service," 2018, https://www.cbc.ca/news/canada/north/bell-ssi-nunavut-cell-service-1.4961158.
649 The Globe and Mail, "Rogers rolls out 5G wireless networks in major Canadian cities," 2020, https://www.theglobeandmail.com/business/article-rogers-rolls-out-5g-in-major-canadian-cities/
650 CRTC, "Communications Monitoring Report 2019 – Retail Mobile Sector."
651 Open Government Portal, "CMR 2018 – Retail Mobile Sector," Government of Canada, 2018, https://open.canada.ca/data/en/dataset/f4233c69-f639-4cab-a234-80dbdd04eaa0.Table 6.1

SMALL COMMUNITY SNAPSHOT: THE POTENTIAL FOR IMPROVED BROADBAND ACCESS

Rural and small-community access to broadband is a hot-button policy issue in Canada that has taken on new dimensions and increased urgency during the recent global pandemic. The CRTC has set a national broadband speed benchmark of 50 Mbps. Currently, no community in Canada's territories meets that speed.[652] The same market forces that privilege southern Canada over northern Canada tend to benefit larger communities in the North over smaller ones. The capitals of Whitehorse and Yellowknife are connected to terrestrial fibre-optic cable, and Iqaluit will be the first community to benefit from a Nunavut-Greenland submarine cable currently under construction. The smallest communities in Canada's North typically have the most expensive, least reliable, and slowest broadband in the country.

While other circumpolar countries face similar challenges in building broadband infrastructure, some have connected even low-population communities to Internet speeds that outpace those available in Nunavut. Even with the slowest speeds in the United States, Alaska's *average* broadband speed—17.3 Mbps—is still better than Nunavut's *fastest* broadband speed, which was recently improved to 15 Mbps.[653] Alaska has also been able to bring competitive speeds to some communities outside larger population centres. Through satellite technology, small and remote towns in Alaska such as Ninilchik (pop. 506) can access speeds of up to 21.7 Mbps.[654]

Submarine cables have allowed Greenland to connect certain small communities to high-speed broadband. Despite their small population size, residents in Qeqertarsuaq (pop. 854) and Kangaatsiaq (pop. 558) can access Internet speeds of 30 Mbps through TELE Greenland.[655] In contrast, similarly sized communities in Nunavut such as Kugaaruk and Coral Harbour recently experienced an upgrade to only half of that speed (15 Mbps, from Northwestel).

Planned investments in Nunavut's broadband infrastructure are not enough to bridge the gap faced by smaller communities. The submarine cable link to Nunavut from Nuuk will directly connect only one small community outside Iqaluit, Kimmirut (pop. 387). The Kivalliq hydro fibre link would provide terrestrial fibre access to five communities in Kivalliq (Rankin Inlet, Whale Cove, Chesterfield Inlet, Baker Lake, and Arviat).[656] Nunavut's remaining 18 communities (all with populations of less than 2,000) would not be connected to fibre through these projects, but would potentially benefit from the relief of pressure on satellite capacity.

Given the uneven quality and affordability of connection for low-population areas in the Arctic, some believe a pan-Arctic approach is the best approach to serving small communities. While several broadband projects with circumpolar ambitions have experienced difficulties or disbanded, efforts by Telesat and SpaceX remain under way to bring Low Earth Orbit satellite technology to small communities across the Arctic.[657]

Some small communities are taking a hyper-local approach, even while large multinational efforts continue. One successful model is community-led networks, where local people build infrastructure to improve Internet connectivity in their area. One example is a young woman in Ulukhaktok, N.W.T., who is using funds donated by the Internet Society to create an Indigenous-led community network.[658] If successful, the LTE network will be owned and operated by the community, and will provide residents with higher Internet speeds at a lower price.

652 Open Government Portal, "CMR 2019—Retail Fixed Internet Sector and Broadband Availability."
653 Wired, "Alaska will finally get its own terrestrial fiber-optic line," 2019, https://www.wired.com/story/alaska-finally-get-own-fiber-optic-line/
654 Alaska Business, "Alaska Trends: Broadband Internet in Alaska," accessed June 17, 2020, https://digital.akbizmag.com/issue/january-2020/alaska-trends/; Tusass, "Internettit akii apparpavut," n.d., accessed June 17, 2020, https://tusass.gl/
655 Tusass, "Internettit akii apparpavut."
656 From planned route posted on Kivalliq Hydro-Fibre Link, "Kivalliq Hydro-Fibre Link," accessed June 17, 2020, https://www.kivalliqlink.ca/
657 Failed projects that were projected to include Nunavut include the bankruptcy of OneWeb and slowdown of Quintillion: Ars Technica, "OneWeb goes bankrupt, lays off staff, will sell satellite-broadband business," accessed June 17, 2020, https://arstechnica.com/information-technology/2020/03/oneweb-goes-bankrupt-wont-challenge-spacex-in-satellite-broadband-race/; Bloomberg, "Quintillion CEO's promise to wire the Arctic was $1 billion scam," accessed June 17, 2020, https://www.bloomberg.com/news/features/2019-10-08/quintillion-ceo-s-promise-to-wire-the-arctic-was-1-billion-scam.
658 CBC News, "Woman spearheads local internet service provider in Ulukhaktok, N.W.T.," 2019, https://www.cbc.ca/news/canada/north/ulukhaktok-community-internet-1.5349234.

Roads and sidewalks

Nunavut is the only jurisdiction in Canada that cannot be reached by road. Unlike Yukon and the Northwest Territories, Nunavut lacks a road connection to other parts of the country, and there are also no roads connecting communities. The roads that do exist are found only *within* communities. It is not possible to drive between population centres, some of which are relatively close together—such as the 90km separating Chesterfield Inlet and Rankin Inlet. Air travel is the only practical way to travel between communities. The lack of roads also means goods cannot be moved between communities by trucks, as is common in other parts of the country.

Nunavut's community roads are more likely to be in poor condition than all other parts of the country, with the exception of Nova Scotia and Quebec. In the spring, a lack of proper drainage can make roads impassable, while potholes are an ongoing problem.[659] Before recent upgrades, the federal road which connects central Iqaluit with the airport was in such poor condition that parts of the road were "indistinguishable from the surrounding ditches."[660] Roads in poor condition are tough on vehicles, which adds maintenance costs and can shorten vehicle lifespans.

Nunavut also differs from the rest of Canada in that almost all of Nunavut's roads are unpaved. There are about 26 km of paved municipal roads in Rankin Inlet and Iqaluit, which represents about 2 percent of its total road network.[661] In comparison, the national average is closer to 40 percent of all roads being paved, with the Northwest Territories having around 20 percent paved roads in its network, and 40 percent in Yukon. Although paved roads are generally considered a higher standard of road, they are expensive to maintain in an Arctic climate, and can have safety implications, as paved roads produce less friction for braking than gravel roads in cold weather.[662]

There are also few formal sidewalks in Nunavut beyond a few blocks in front of the Legislative Assembly in Iqaluit. A lack of sidewalks combined with poorly maintained gravel roads can be particularly dangerous for pedestrians and motorists attempting to share space. In addition to the health impacts of dust exposure, as of 2018, Nunavut had the highest rate of motor-vehicle fatalities in the country, at 74.2 per 100,000 licensed drivers. The national average is 7.2 per 100,000 licensed drivers.[663]

There are proposals to increase Nunavut's road network, and to link the territory by road to the rest of Canada. The Grays Bay Road and Port proposal includes a 230-km road linking Grays Bay with the Northwest Territories, and in future, all-season road access as far south as Yellowknife.[664] This proposal is in preliminary stages, having received federal funding to begin preparatory work, including an environmental assessment of the proposed route, but not approval to begin construction.[665]

659 Research interviews, 2020.
660 Nunatsiaq News, "Iqaluit pushes the start button on upgrade to federal road," 2018, https://nunatsiaq.com/stories/article/65674iqaluits_new_airport_roadway_to_get_a_facelift_this_summer/
661 Research Interviews, 2020.
662 Research interviews, 2020.
663 Khan and Strand, "Road Dust and Its Effect on Human Health: A Literature Review"; Government of Canada, "Canadian Motor Vehicle Traffic Collision Statistics: 2018 - Transport Canada," 2018, https://www.tc.gc.ca/eng/motorvehiclesafety/canadian-motor-vehicle-traffic-collision-statistics-2018.html.
664 Kitikmeot Inuit Association, "Project Proposal—Grays Bay Road & Port Project," http://www.gbrp.ca/?page_id=4012
665 Government of Canada, "Government of Canada invests in transportation infrastructure improvements in Nunavut," 2019, https://www.newswire.ca/news-releases/government-of-canada-invests-in-transportation-infrastructure-improvements-in-nunavut-846006032.html; Nunatsiaq News, "Canada announces $71 million for Nunavut transportation projects," 2019, https://nunatsiaq.com/stories/article/canada-announces-71-million-for-nunavut-transportation-projects/

A 920-km highway linking Rankin Inlet to Sundance, Manitoba, with a connection to Churchill (and on to Winnipeg) has also been identified as having potential, and a separate project to build a 450-km road connecting Rankin Inlet with Kivalliq communities on the western shore of Hudson Bay received federal funding to proceed with an environmental assessment in 2019.[666] In future, this road could link Nunavut and Manitoba.

Gap Analysis

To measure the gaps in roads and sidewalks infrastructure between Nunavut and the rest of Canada, this report includes two indicators:

- Length of roadway and sidewalks (per 100,000 km^2)
- Physical condition of roadway

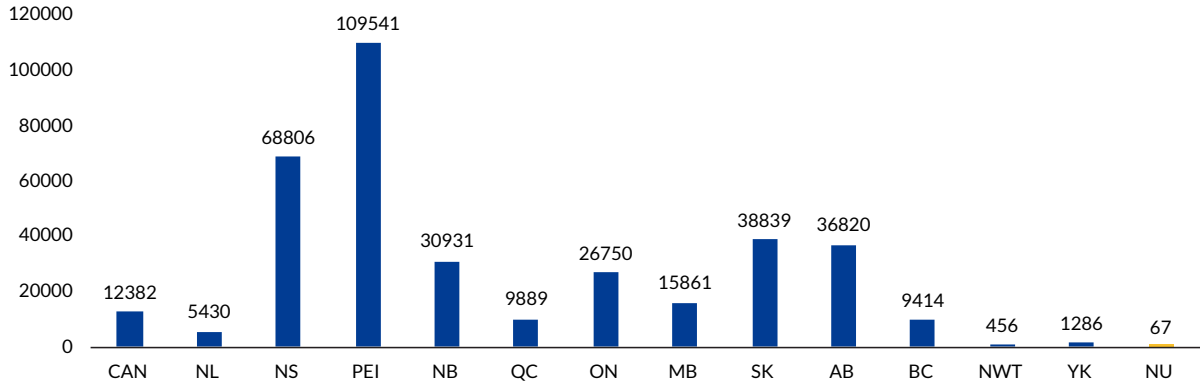
Indicator: length of roadway and sidewalks

Nunavut has the fewest kilometres of roads of any jurisdiction in Canada. Nunavut has 67 km of roads per 100,000 km^2, far below the national average of 12,382 km per 100,000 km^2. Prince Edward Island has the most roadway, at 109,541 km per 100,000 km^2. While it may not be feasible or practical to connect all communities by road in Nunavut, links between communities closer together, such as in the Kivalliq region or between Kugluktuk and Bathurst Inlet in Kitikmeot could lower transportation costs and make it easier to travel between communities.

Nunavut's neighbouring territories have more roads, and direct road connections to the rest of Canada. Yukon has direct road connections to British Columbia, Alaska, and the Northwest Territories, which itself has a road linking Yellowknife with Alberta. Both territories also have routes that are part of the national highway system.[667] A road also connects the Northwest Territories and Yukon, allowing vehicle access from Whitehorse as far north as Tuktoyaktuk.

FIGURE 45

Km of roadway per 100,000 km^2 (2016)



Source: Transport Canada

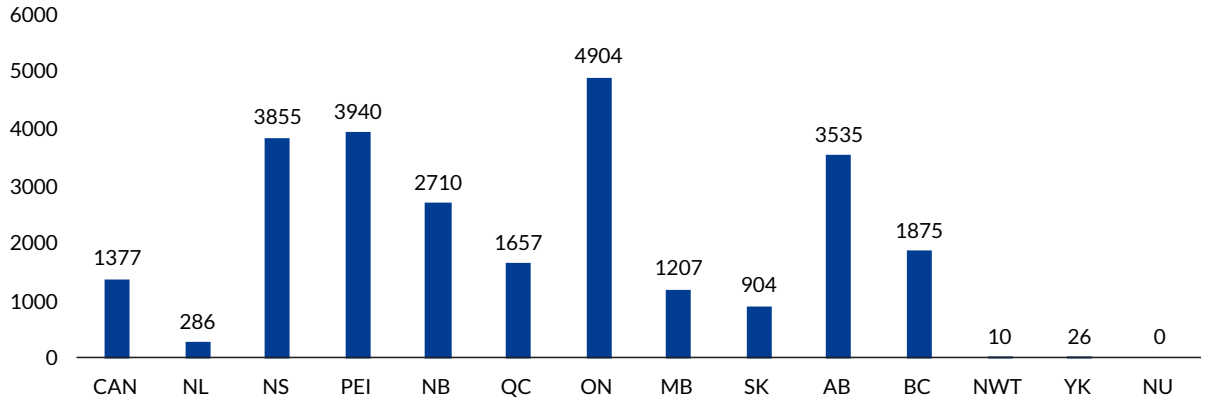
666 For details on the Kivalliq Trade Corridor, see Transport Canada, "Projects Funded by the National Trade Corridors Fund – Transport Canada," 2020, https://www.tc.gc.ca/en/programs-policies/programs/projects.html.
667 Transport Canada, "Transportation in Canada, Statistical Addendum," 2018, Table R01.

Measured by total distance, there are 1,126,000 km of public roads in Canada. Ontario has the greatest road length, with 245,500 km, followed by Alberta with 236,500 km. Nunavut has 1,300 km, the lowest number in Canada, and lower than its territorial neighbours. There are 5,400 km of roads in the Northwest Territories, and 6,100 km in the Yukon.[668]

Nunavut also has no formal sidewalks, although there are a small number of walkways for pedestrians in front of some buildings, such as the Legislative Assembly. In comparison, the national average is 1,377 km of sidewalks per 100,000 km^2.[669] Both Yukon and the Northwest Territories have some sidewalk infrastructure, including in central Yellowknife and Whitehorse.

FIGURE 46

Km of sidewalks per 100,000 km^2 (2016)



Source: Transport Canada

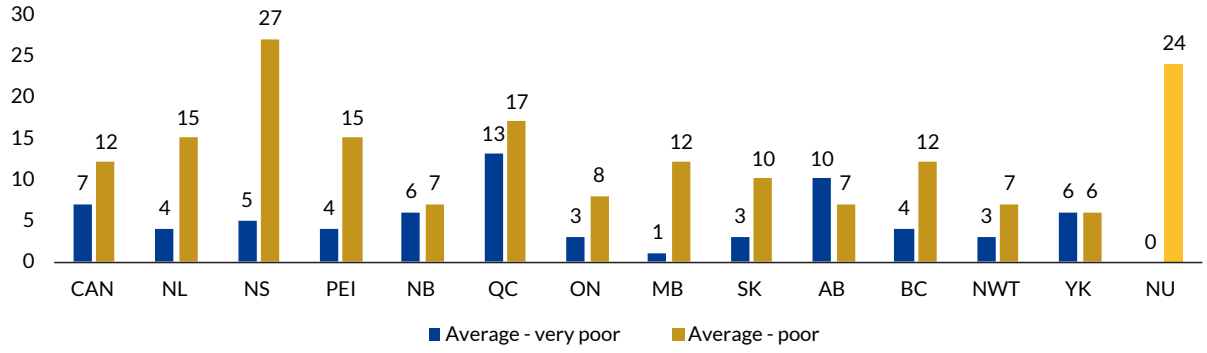
668 Transport Canada, "Transportation in Canada, Statistical Addendum," 2018, Table R02: Length of Public Road Network in Canada, 2016.
669 Infrastructure Canada; Statistics Canada, "Inventory of Publicly Owned Road Assets," 2016, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410017601.

Indicator: physical condition of roadways

According to data from the Statistics Canada Core Public Infrastructure Survey, almost one-quarter of Nunavut roads are in poor condition, which is the second-highest rate in the country after Nova Scotia.[670] The percentage of roads in Nunavut in poor condition is twice the national average of 12 percent, and well above its territorial neighbours: only six percent of roads in the Yukon are in poor condition, and seven percent of roads are in poor condition in the Northwest Territories. In addition, the percentage of roads in poor condition in Nunavut exceeds the combined share of roads in poor and very poor condition in all provinces and territories except Nova Scotia and Quebec.

FIGURE 47

Roadway condition, percentage in poor and very poor condition, by province and territory (2016)



Source: Canada's Core Public Infrastructure Survey

670 Infrastructure Canada and Statistics Canada, "Inventory Distribution of Publicly Owned Road Assets by Physical Condition Rating," 2016, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410007001.

Nunavut is the only jurisdiction in Canada that cannot be reached by road. Unlike Yukon and the Northwest Territories, Nunavut lacks a road connection to other parts of the country, and there are also no roads connecting communities.

Air

Air travel is critical to Nunavut's economy and society. It is the only province or territory in Canada that cannot be reached by road and there are no roads connecting its communities. In addition to moving people, air travel is used to deliver critical supplies and is required for Nunavut Inuit needing medical care not available in smaller communities. Most of the territory's air infrastructure was built decades ago to serve as Cold War airbases and surveillance stations, rather than to support current community needs.[671] As of 2020, the territory has only two paved runways, in Iqaluit and Rankin Inlet; the other 26 are gravel. While gravel runways are easier to maintain than asphalt in Arctic conditions, they restrict the types of planes that can land safely.[672] Jet aircraft certified to land on gravel runways in Canada are old, no longer in production, and nearing the end of their service lives. Unless Nunavut's runways are updated, the retirement of these types of aircrafts will make it nearly impossible to serve Nunavut's communities by air.[673] For example, none of Air Canada's current jet fleet could land at airports other than Iqaluit or Rankin Inlet.

Even if additional runways were paved, runway length is a significant infrastructure challenge. Out of the 28 runways in Nunavut, only four are 6,000 feet or longer, the typical runway distance required for modern narrow-body aircraft, such as the Airbus A320.[674] The average length of runways in Nunavut is less than half of those in the National Airport System (airports serving provincial and territorial capitals, as well as those handling more than 200,000 passengers). Short runways cause logistical challenges for supplying communities with goods and materials that cannot be carried by small planes or are too time-sensitive to wait for annual sealifts.

Recent investments in air infrastructure in Nunavut have been focused on Iqaluit. In 2017, the Iqaluit Airport received $300 million in upgrades, including the construction of a new passenger terminal eight times the size of the original, which is expected to meet passenger traffic volumes for the next 50 years.[675] The project included construction of a new lighting system, and repairs to the runway with materials designed to limit the impact of melting permafrost, such as filling cracks in the runway with Styrofoam insulation.[676]

671 Michael J. Widener, Shoshanna Saxe, and Tracey Galloway, "The relationship between airport infrastructure and flight arrivals in remote Northern Canadian communities," Arctic 70, 3 (September 1, 2017): 249–58, https://doi.org/10.14430/arctic4663, p. 250.
672 Government of Nunavut, "Nunavut Airport's 20-Year Infrastructure Needs Assessment 2014–2034," 2014, https://assembly.nu.ca/nunavut-airports-20-year-infrastructure-needs-assessment-2014-2034; Auditor General of Canada, "Report 6—Civil Aviation Infrastructure in the North—Transport Canada," 2017, https://www1.oag-bvg.gc.ca/internet/English/parl_oag_201705_06_e_42228.html; Association of Canadian Travel Agencies, "One size doesn't fit all: The future growth and competitiveness of Canadian air travel," accessed June 17, 2020, https://www.acta.ca/news-releases/sc0516.
673 Government of Nunavut, "Nunavut Airport's 20-Year Infrastructure Needs Assessment 2014–2034."
674 Data on Nunavut airports from NAV Canada, "Nav Canada: Products and Services – Canadian Airports Charts," 2020, https://www.navcanada.ca/en/products-and-services/pages/aeronautical-information-products-canadian-airports-charts.aspx. Information on required take off distances is sourced from www.skybrary.aero
675 CBC News, "Iqaluit's new $300m airport opens today," 2017, https://www.cbc.ca/news/canada/north/iqaluit-airport-opens-1.4239486.
676 Wallace, "Beyond frozen: Canada's permafrost is turning to mud. Here's why."

Despite the vital importance of air travel, there are currently no training programs for pilots, flight attendants, or for careers in aviation more generally in the territory, which limits the extent Nunavut Inuit can benefit from this important sector of the economy. While the territorial government does provide scholarships for aviation education, Nunavummiut must leave the territory to pursue studies in this sector (including to an Air Inuit program based in Nunavik).[677]

Gap analysis

To measure the gaps in air infrastructure between Nunavut and the rest of Canada, this report includes two indicators:

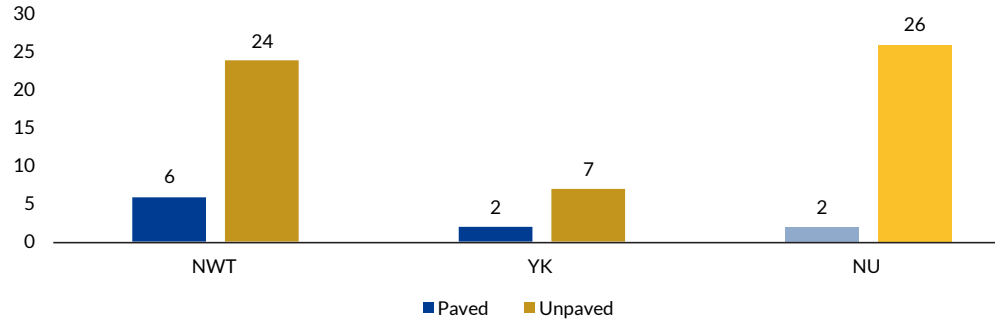
- Number of paved runways
- Average runway length

Indicator: number of paved runways

Out of Nunavut's 28 runways, only two are paved—those in Iqaluit and Rankin Inlet. All other runways, including the runway in Cambridge Bay, the hub for the Kitikmeot region, are gravel. The Northwest Territories has paved facilities in six locations, including Inuvik, Fort Simpson, and Hay River. Like Nunavut, Yukon only has two paved runways, in Whitehorse and Watson Lake.

FIGURE 48

Number of paved and unpaved runways, by territory



Source: Research team calculations based on NAV Canada Airport Charts

While paved runways are a common standard of airport infrastructure in larger Canadian centres, they are about four times as expensive to maintain in an Arctic climate as gravel, and can be more difficult to brake on in cold weather.[678] The prevalence of unpaved runways is not unique to Nunavut, as many northern and remote airports in Canada are also gravel.

A recent Auditor General's report identified 117 remote and northern airports in the country, including many that share similarities to Nunavut communities, including having runways that are unpaved (such as Attawapiskat, Ontario).[679] The Auditor's report concluded that Transport Canada should continue to address and support infrastructure needs in northern airports to maintain an "accessible and efficient transportation system in the North."[680]

677 The Globe and Mail, "Where sparrows soar: Inside Air Inuit's program to turn Nunavik youth into pilots," , 2020, https://www.theglobeandmail.com/canada/article-where-sparrows-soar-inside-air-inuits-program-to-turn-nunavik-youth/; Government of Nunavut, "Aviation Scholarship," accessed July 21, 2020, https://www.gov.nu.ca/edt/programs-services/aviation-scholarship.
678 Research interviews, 2020.
679 Auditor General of Canada, "Report 6—Civil Aviation Infrastructure in the North—Transport Canada."
680 Auditor General of Canada, "Report 6—Civil Aviation Infrastructure in the North—Transport Canada."

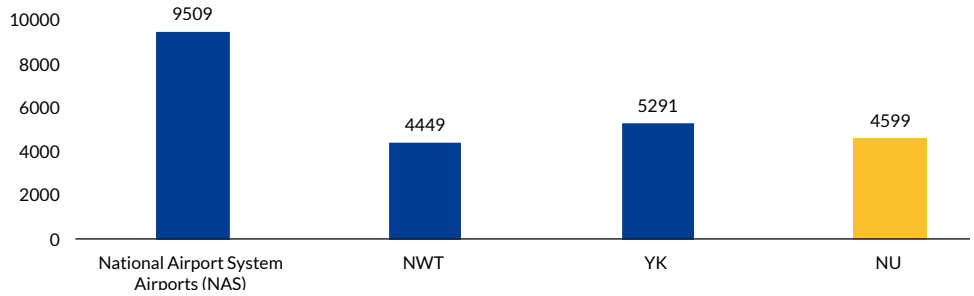
Indicator: average length of runways

Runway distance is measured by take-off run available (TORA), a measurement used by NAV Canada to capture the distance available on a runway to take off. The short runway length means that even if more runways were paved, only smaller aircraft would be able to land on them, such as Dash-8s.

Among the Canadian territories, Nunavut has the second-shortest runway lengths, with an average of 4,599 feet. This is less than half the average length of runways for airports that are part of the National Airport System.[681] Particularly small runways in some Nunavut communities, including Grise Fiord, Clyde River, and Pangnirtung means the territorial government has to maintain dedicated aircraft just to service these communities, adding cost and complexity to the transportation system.[682]

FIGURE 49

Average Runway Length (Feet)



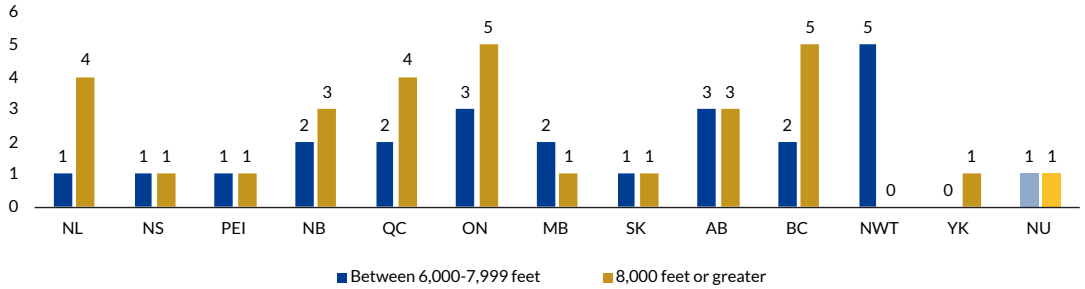
Source: Research team calculations based on NAV Canada Airport Charts

While not all Canadian airports have runways capable of servicing wide-body aircraft that can travel longer distances, there are many more long paved runways in southern Canada. Most Canadians have access to an airport with a longer runway by road if there is not one within the immediate vicinity (e.g., residents of Belleville, Ontario, can travel by road to either Ottawa or Toronto).

The provinces in Canada all have one to five runways longer than 8,000 feet (which can accommodate large wide-body aircraft), and all provinces have at least one runway between 6,000 and 7,799 feet to support narrow-body jet aircraft associated with their 10 largest population centres.[683] The Northwest Territories has five paved runways 6,000-8,000 feet long compared with Nunavut.

FIGURE 50

Number of paved runways, by length (Territories and 10 largest population centres by province)



Source: Research team calculations baesd on NAV Canada Airport Charts

681 For more on Canada's National Airport System, see Transport Canada, "Chapter 6—Airports – Transport Canada," 2017, https://www.tc.gc.ca/eng/civilaviation/publications/tp13549-chapter6-406.htm.
682 Research interviews, 2020.
683 Provincial data are for airports associated with the top 10 population centres only. See methodology section for more details.

Customs and tourism

Tourism is a significant part of Canada's economy, with a record high of 22.2 million visitors to Canada in 2019.[684] The tourism sector alone contributes about $43.5 billion to Canada's GDP, and supports about one-in-ten jobs nationally.[685] Nunavut's natural beauty, varied geography, and deep culture should make it a natural draw for expeditions and polar tourists. But Nunavut's limited tourism infrastructure is holding it back.

Nunavut receives far fewer international visitors than other parts of Canada or other northern jurisdictions. In the third quarter of 2019, Nunavut received only 37 overnight visitors from the United States, compared with 98,548 U.S. tourists visiting the Yukon.[686] In 2018, Nunavut was visited by 3,400 cruise passengers, while Greenland received more than 28,000 passengers in the same year.[687] Among all provinces and territories, tourism contributed the least to Nunavut's economy, at 1.2 percent of GDP, and the sector accounted for only 1.9 percent of jobs in the territory, compared with a national average of 3.6 percent. In contrast, about 7.5 percent of jobs in Yukon are in the tourism sector, the highest in the country.[688]

Many hotels in Nunavut are small, with only four or five guest rooms. As 2014, there were only 117 rooms in the whole territory in larger hotels (measured as having 30 rooms or more).[689] Facilities tend to be designed for government employees or construction workers, in some cases with bookings available for beds in shared rooms, as opposed to individual hotel rooms.[690] Shared bathroom facilities are also common.[691] In many communities, there are few restaurants or other amenities that could serve tourists. For example, local business hours may not align with flight schedules in and out of the community, resulting in tourists arriving after all local businesses have closed.[692] These factors limit the number and type of tourists who will stay in Nunavut.

In 2018, Nunavut was visited by 3,400 cruise passengers, while Greenland received more than 28,000 passengers in the same year.

Customs infrastructure affects the ease with which international visitors can come to Nunavut, in addition to its role in facilitating trade. Of the 1100 Canadian Border Services Agency (CBSA) offices in Canada, only one is in Nunavut. Nunavut does not have a CBSA office that can process cruise ships, meaning Nunavut cannot be an international ship's first port of arrival.

684 Statistics Canada, "The Daily—Travel between Canada and Other Countries, December 2019," 2019, https://www150.statcan.gc.ca/n1/daily-quotidien/200221/dq200221b-eng.htm.
685 Destination Canada, "Canada experiences third consecutive record-breaking year for tourism in 2019," 2019, https://www.destinationcanada.com/en/news/canada-experiences-third-consecutive-record-breaking-year-tourism-2019.
686 Destination Canada, "Tourism Spend," 2019, https://www.destinationcanada.com/en/tourism-spend.
687 Government of Nunavut, "Annual Tourism Report 2018–2019," 2019, https://assembly.nu.ca/tabled-documents.
688 Statistics Canada, "The Daily—Provincial and Territorial Tourism Satellite Account, 2014," 2018, https://www150.statcan.gc.ca/n1/daily-quotidien/181010/dq181010b-eng.htm.
689 HLT Advisory, "Branded Hotel Inventory in Canada (2015)," 2015, https://www.hlta.ca/hlt-case-study-branded-hotel-inventory-canada-2015/
690 Research interviews, 2020.
691 Travel Nunavut, "Hotels and Inns," accessed June 10, 2020, https://www.travelnunavut.ca/plan-and-book/accommodations/hotels-and-inns/
692 Research interviews, 2020.

Gap analysis

To measure the gaps in customs and tourism infrastructure between Nunavut and the rest of Canada, this report includes three indicators:

- Number of travel accommodation employers
- Customs and border service locations
- GDP per capita generated by tourism

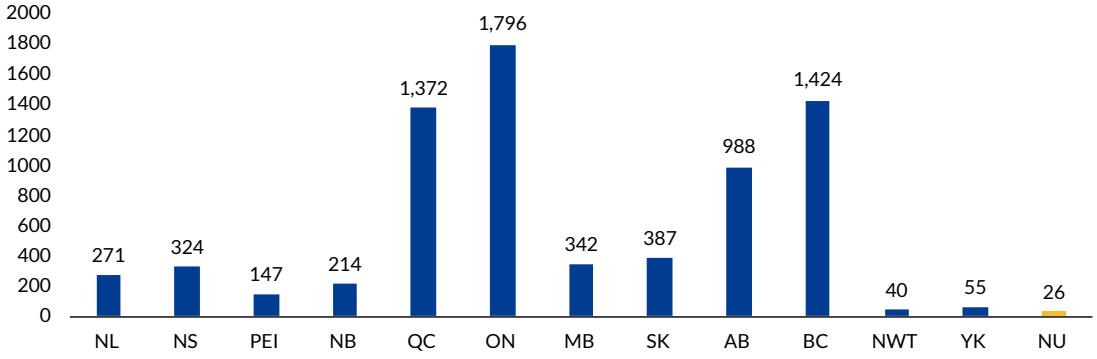
Indicator: number of employers running travel accommodation businesses

Privately owned traveller accommodation is a core part of infrastructure for tourism. Having sufficient accommodation of the right kind means that more travellers can stay in communities overnight, rather than disembarking from cruise ships for day trips.

Innovation, Science and Economic Development Canada tracks the number of employers operating traveller accommodation businesses. Nunavut has only 26 employers running this kind of business, the fewest in Canada, with Northwest Territories as the second-fewest with 40 and Yukon with 55.[693] Since some employers may operate more than one hotel, this measure does not indicate exactly how many hotels there are in each province and territory.

FIGURE 51

Employers running travel accommodation businesses



Source: Innovation, Science and Economic Development Canada

This information doesn't tell the full story of the gap between hotels in Nunavut and elsewhere in Canada. A large share of hotels in Nunavut—at least 30 of the 35 that are currently members of the Travel Nunavut Industry Association, for example—have fewer than 30 guest rooms.[694] Although there are no directly comparable data on the capacity of all hotels nation-wide, research suggests that this represents an infrastructure gap. For example, a 2014 report found there were only 117 rooms in hotel facilities with 30 or rooms in Nunavut, the smallest number in the country. In comparison, there were 739 rooms in Yukon, and 410 in the Northwest Territories. In contrast, there were almost 83,000 rooms in hotel facilities with 30 or more rooms in Ontario, and almost 41,000 in British Columbia.[695]

693 Innovation Science and Economic Development Canada, "Traveler Accommodation – 7211 – Businesses – Canadian Industry Statistics," 2019, https://www.ic.gc.ca/app/scr/app/cis/businesses-entreprises/7211.
694 Travel Nunavut, "Hotels and Inns."
695 HLT Advisory, "Branded Hotel Inventory in Canada (2015)—HLT Advisory Inc."

A new hotel owned by Qikiqtaaluk Corporation, and anticipated to have 100 guest rooms and a 600-person conference facility, is currently under construction in Iqaluit. The construction process, however, highlights some of the ways in which overlapping infrastructure challenges impact the development of tourist infrastructure. The hotel rooms themselves were constructed in Shanghai to be shipped to Nunavut by sealift, arriving assembled, complete with TVs and chairs. Upon arrival in Nunavut, the lack of a deep-water port meant the pre-fabricated hotel rooms had to be offloaded by smaller barges to carry materials to land—a process put at risk by sea ice in Frobisher Bay in summer 2019.[696]

The reason given for taking this approach was that building the rooms in place in Nunavut would have taken too long, in part because the local skilled labour pool is not large enough to do the work. In addition, the hotel requires improvements to local infrastructure: it is expected to put increased demand on water and sewer lines in Iqaluit, requiring negotiations on how to fund expansion of already taxed systems.[697]

Indicator: customs and border service locations

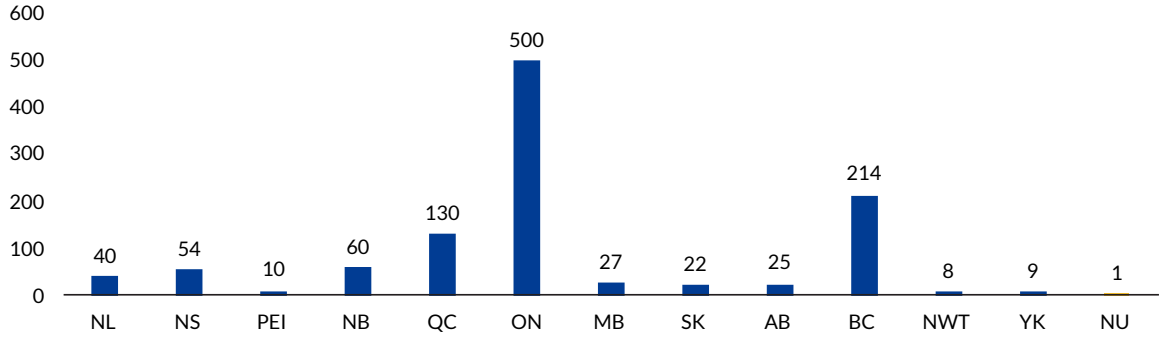
There are 1,100 offices providing CBSA services in Canada. Nunavut's sole CBSA office is at the Iqaluit airport. In comparison, the Northwest Territories has eight CBSA offices, Yukon has nine, and PEI has ten. In Ontario, 500 sites provide CBSA services.[698]

At the CBSA facility at the Iqaluit airport, CBSA officers can process only 15 passengers at a time, making it impractical for larger aircraft coming from international destinations to land without first clearing passengers at another Canadian airport. In contrast, CBSA officers in Whitehorse can process up to 225 international arrivals, removing a barrier to international flights (in summer 2019, Whitehorse Airport had a direct flight to Frankfurt).[699]

The CBSA office in Iqaluit is classified as an "inland office," meaning it could provide services to other sites in Nunavut—such as the Rankin Inlet Airport, since the hub for the Kivalliq region is the second most visited area in the territory after Iqaluit.[700]

FIGURE 52

Number of CBSA Offices



Source: Canada Border Services Agency

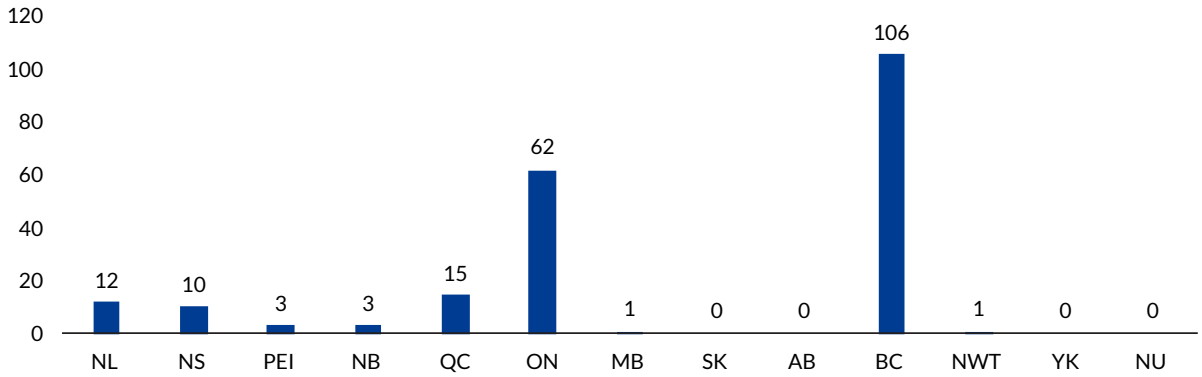
696 Nunatsiaq News, "Sea ice delays unloading of sealift to Iqaluit, officials say."
697 CBC News, "Shanghai-constructed rooms for new hotel on their way to Iqaluit," 2019, https://www.cbc.ca/news/canada/north/iqaluit-hotel-rooms-built-in-shanghai-china-1.5212876.
698 Canada Border Services Agency, "Nunavut: Directory of CBSA Offices and Services," accessed June 10, 2020, https://www.cbsa-asfc.gc.ca/do-rb/provinces/nu-eng.html.
699 CBC News, "Condor flights will return to Yukon next year, company says," 2019, https://www.cbc.ca/news/canada/north/condor-yukon-flights-thomas-cook-1.5299169.
700 Government of Nunavut, "Annual Tourism Report 2018–2019."

Other types of CBSA offices can help facilitate trade and tourism, and Nunavut is well behind other jurisdictions in terms of CBSA sites that can provide these supports.

For example, despite having the most coastline of any Canadian jurisdiction, Nunavut has no CBSA office dedicated specifically to providing services to marine arrivals. In particular, Nunavut does not have an office operating as a "Commercial Vessel" office, that is, an authorized marine port of entry where cargo and commercial vessels (other than ferry boats or cruise boats, but including other commercial passenger vessels) report to the CBSA. There are 213 offices providing these services in Canada, including one in Northwest Territories. Of the provinces and territories with access to tidewater, only Yukon and Nunavut do not have offices providing this service.

FIGURE 53

Number of "Commercial Vessel" CBSA Offices



Source: Canada Border Services Agency

The federal government has acknowledged the challenges this gap poses, and as part of the Arctic and Northern Policy Framework is introducing the Private Vessel Remote Clearance pilot, which will serve non-commercial pleasure crafts seeking to enter Canada in the eastern parts of the Arctic.[701] This proposal offers a limited response to the customs and tourism infrastructure gap.

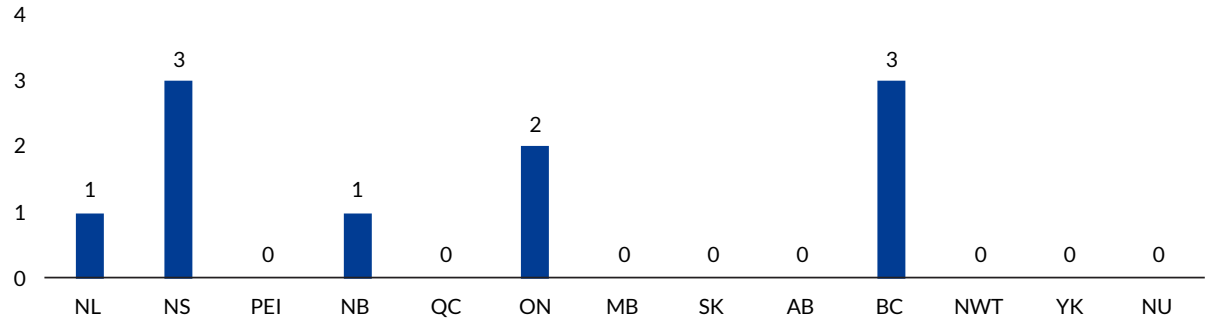
Despite having the most coastline of any Canadian jurisdiction, Nunavut has no CBSA office dedicated specifically to providing services to marine arrivals.

Similar to the Northwest Territories and Yukon, Nunavut also has no offices authorized to allow disembarkation for any type of cruise ship passenger—a potentially significant barrier given the rise in adventure cruises in northern waters.[702] The ability to disembark cruise ship passengers would allow international cruise ships to come to Nunavut as their first port of entry. Elsewhere in Canada, British Columbia, Ontario, Nova Scotia, New Brunswick, and Newfoundland and Labrador all have at least one of these offices.

701 Canada Border Services Agency, "Private Vessel Remote Clearance Pilot Project," accessed June 10, 2020, https://www.cbsa-asfc.gc.ca/travel-voyage/pv-vp-eng.html. See also Government of Canada, "Canada's Arctic and Northern Policy Framework."
702 Canada Border Services Agency, "Cruise Ship Operations (CSO): Directory of CBSA Offices and Services," accessed June 10, 2020, https://www.cbsa-asfc.gc.ca/do-rb/services/cso-onc-eng.html; see also Peter Garapick of Quark Expeditions, panel discussion on Financing the Infrastructure Gap: Shipping in the North American Arctic Ocean, Arctic 360 Second Annual Conference, Toronto, February 2-3, 2020, https://www.arctic360conference.org/conference-agenda.

FIGURE 54

Number of Cruise Ship Operations, CBSA Offices (CBSA)



Source: Canada Border Services Agency

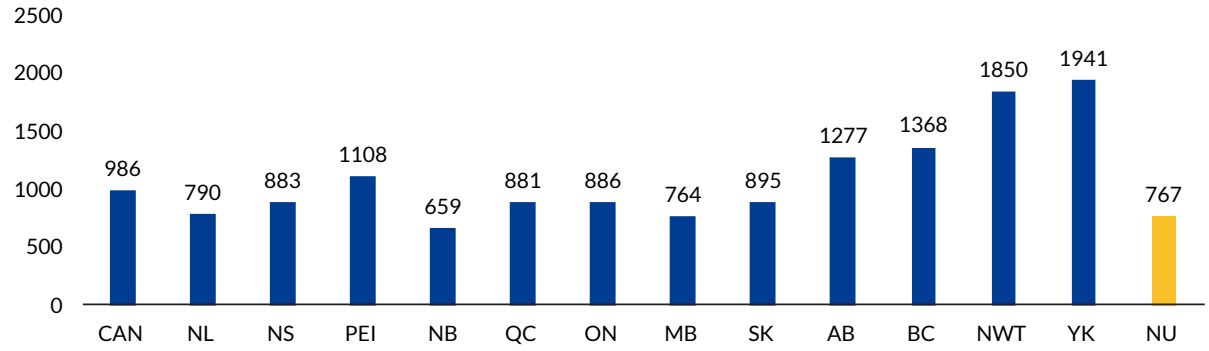
Indicator: GDP per capita generated by tourism

According to data released by Statistics Canada in 2018 (based on 2014 figures), tourism accounted for $27.6 million of Nunavut's GDP. This is the lowest absolute amount of any province or territory—the next closest is Yukon, with $72.1 million. The contribution of tourism to the territory's total GDP is also the lowest in Canada, at 1.2 percent compared with a national average of 1.9 percent and as high as three percent in P.E.I.[703]

On a tourism GDP-per-capita basis, Nunavut ranks third-lowest in Canada, with spending per capita at approximately $767, which put it above both New Brunswick ($659) and Manitoba ($764).

FIGURE 55

GDP tourism per capita (2014)



Source: Statistics Canada

Tourism figures may be inflated by the need for Nunavut Inuit to travel and stay overnight for work and other aspects of day-to-day life. Since the costs of living and doing business are much higher in Nunavut than elsewhere in Canada, the cost of tourist services like accommodation are also higher, making it difficult to compete as a tourist destination.

703 Statistics Canada, "The Daily—Provincial and Territorial Tourism Satellite Account, 2014."

Banking

Banking infrastructure is not typically considered public infrastructure. However, the infrastructure for financial services is essential to daily living, personal financial stability, and collective economic development.

Important financial services for personal and business banking require some in-person component, for example, in setting up a new account, or obtaining a mortgage or a loan.[704] This means physical proximity to a branch is an important measure of access to financial services.

Many Nunavut communities do not have local bank branches, and therefore are effectively cut off from basic financial services. Although the number of banks and bank-owned ATMs within Nunavut has increased in recent years, (through the partly Inuit-owned First Nations Bank of Canada), many locations offer only a limited range of personal banking services (and no business services).

People in Nunavut face the highest costs in the country for financial services, with minimal competition and costly alternatives where banking services are not available in the majority language, Inuktut. While data on Inuit populations specifically are scarce, broader research on Indigenous populations in Canada indicates that Indigenous people are more likely to be "unbanked."[705] Nunavut Inuit living in communities without financial institutions, or those without bank accounts, are more vulnerable to service monopolies and fees charged by private retailers for financial transactions.[706] Programs specifically designed to alleviate inequality require specific types of bank accounts less commonly used by Nunavut Inuit. For example, low-income children elsewhere in Canada are 20 times more likely to receive Canada Learning Bond payments from the federal government than low-income children in Nunavut.

Online banking options in Canada are increasingly popular and could present an especially welcome alternative to in-person banking in Nunavut. However, Nunavut's long-standing broadband gap (and corresponding latency issues) can limit the effectiveness of online banking services for people in the territory. Even with improvements to online banking services, a lack of physical financial institutions will keep Nunavut Inuit at a disadvantage in accessing a full suite of services.[707]

The shortage of banking infrastructure in Nunavut is an obstacle to economic development, financial well-being, and equal treatment as Canadians.

704 Government of Canada, "Access to Basic Banking Services Regulations," accessed June 11, 2020, https://laws-lois.justice.gc.ca/eng/regulations/sor-2003-184/page-1.html.
705 Prosper Canada, "Financial Literacy and Aboriginal Peoples," accessed June 11, 2020, https://prospercanada.org/getattachment/f988e655-6033-40b1-8445-cd539bfdcf09/Financial-Literacy-and-Aboriginal-Peoples.aspx.
706 Research interview, 2020.
707 Research interview, 2020.

Gap analysis

To measure the gaps in banking infrastructure between Nunavut and the rest of Canada, this report includes four indicators:

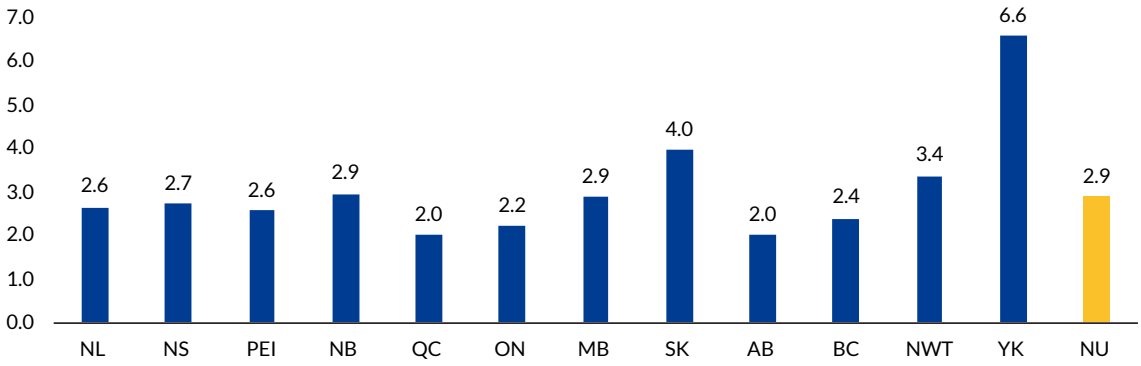
- Bank branches per capita
- Bank-owned ATMs per capita
- Average household spending on financial services
- Take-up rate for tax-advantaged savings accounts: Registered Education Savings Plans (RESPs) and Registered Retirement Savings Plans (RRSPs)

Indicator: bank branches per capita

On a strict per-capita comparison, Nunavut's banks or credit unions are near the median for Canadian provinces and territories, averaging 2.9 branches per 10,000 people—the same rate as New Brunswick or Manitoba.[708]

FIGURE 56

Bank branches per capita, 2018, Canadian Banker's Association[709]



Source: Canadian Bankers Association; First Nations Bank of Canada; Payments Canada; Canadian Credit Union Association

Less than one-third of Nunavut communities, however, have bank branches and only Iqaluit, Cambridge Bay, and Rankin Inlet are served by major national banks. Aside from some limited options to establish accounts by mail or during occasional community banking visits, Nunavut Inuit in most communities have to rely on trips to Iqaluit or outside the territory for banking, or else rely on expensive and limited alternative financial services through private retailers like Northmart or Arctic Co-op stores.[710] New rules passed under amendments to Nunavut's Consumer Protections Regulations have set limits to the fees that retailers can charge for cashing government-issued cheques, a move intended to help protect people receiving social assistance from these extra costs.[711]

708 Calculations based on data from Canadian Bankers Association, "Bank Branches in Canada by Province," 2018, https://cba.ca/bank-branches-in-canada; Canadian Credit Union Association "Canadian Credit Union National Sector Results Third Quarter 2019," 2019. Data from First Nations Bank of Canada; Payments Canada Payments Canada, "Financial Institutions Branch Directory," accessed June 6, 2020, https://www.payments.ca/our-directories/financial-institutions-branch-directory.
709 Canadian Bankers Association, "Bank Branches in Canada by Province."
710 Nunatsiaq News, "QIA delivers financial literacy workshop on Baffin community tour," 2018, https://nunatsiaq.com/stories/article/65674qia_delivers_financial_literacy_workshop_on_baffin_community_tour/
711 Nunatsiaq News, "Government of Nunavut puts limits on certain cheque cashing fees," 2018, https://nunatsiaq.com/stories/article/65674government_of_nunavut_puts_limits_on_certain_cheque_chasing_fees/

Indicator: bank-owned ATMs per capita

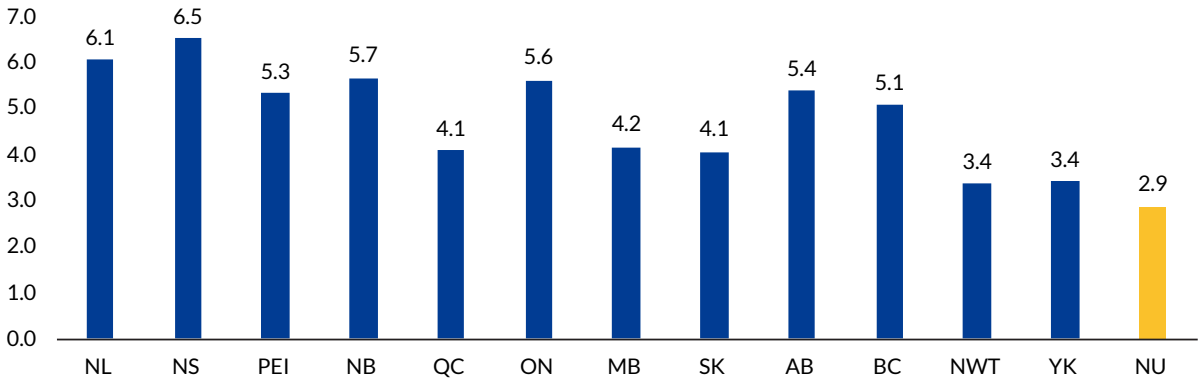
Bank-owned ATMs can perform banking services beyond cash withdrawals, such as paying bills or depositing money, whereas private ATMs only dispense cash (often with high fees). Given limited banking hours in the Nunavut communities that do have banks, ATMs are an important feature of banking infrastructure.

Here, the gap between Nunavut and the rest of Canada is pronounced. Nunavut has the fewest bank-owned ATMs per 10,000 of any province or territory. Nunavut sits at 2.9 bank-owned ATMs per 10,000, compared with 5.6 per 10,000 in Ontario.[712]

Most Nunavut communities have no major bank-owned ATMs at all (in addition to having no bank branches). Available online banking options do not allow for deposits of cheques or cash or for withdrawals. Even where transactions can be completed online, limited broadband infrastructure makes accessing online services in Nunavut challenging.

FIGURE 57

Bank-owned ATMs per 10,000 people[713]



Source: Bankers Association of Canada; First Nations Bank of Canada

Indicator: average household spending on financial services

The infrastructure gap and the lack of competition—only three banks (RBC, CIBC, and First Nations Bank of Canada) have any permanent presence in Nunavut—contribute to higher costs of financial services for Nunavut Inuit. Based on Statistics Canada's Survey of Household Spending, residents of Iqaluit spend more on average on financial services than residents of other provinces and territories.[714] This spending includes both bank fees and other financial services (which could include transfer or cheque-cashing fees at an alternative financial services provider).

712 Data from Canadian Bankers Association, "Number of ABMs in Canada by Province," 2018, https://cba.ca/abms-in-canada. With data from First Nations Bank of Canada added
713 Canadian Bankers Association, "Number of ABMs in Canada by Province."
714 Statistics Canada, "Household Spending, Canada, Regions and Provinces," accessed June 6, 2020, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1110022201; Statistics Canada, "Household Spending, Three Territorial Capitals," accessed June 6, 2020, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1110023301.

TABLE 19

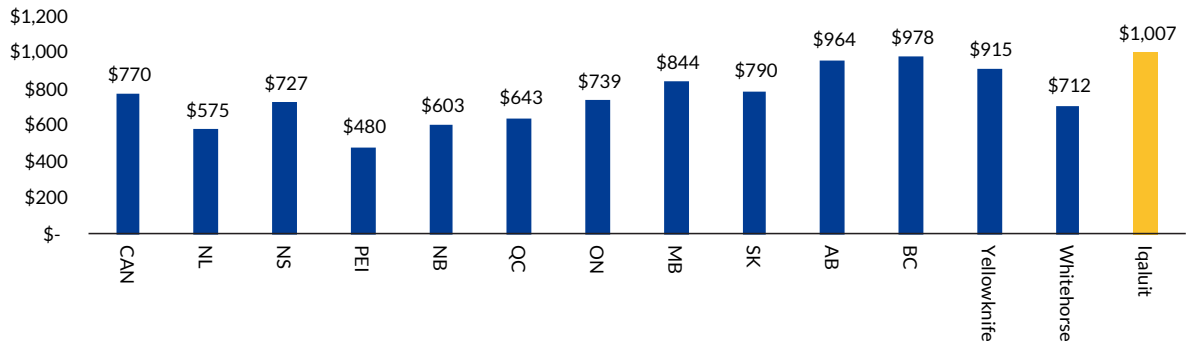
Average annual spending on financial services by household, Nunavut and Canada, Statistics Canada

Average annual spending on financial services for a Canadian household	Average annual spending on financial services for a household in Iqaluit
$770	$1,007

It is also significant that the chart measures costs for Iqaluit only, which is the community in Nunavut best resourced with banking and financial services. It is safe to assume that those in smaller communities—*those* without banking branches, or with limited financial institutions—would face even higher costs.

FIGURE 58

Average annual spending on financial services by household, Statistics Canada[715]



Source: Statistics Canada

Indicator: Take-up rate for tax-advantaged savings accounts - Registered Education Savings Plans and Registered Retirement Plans

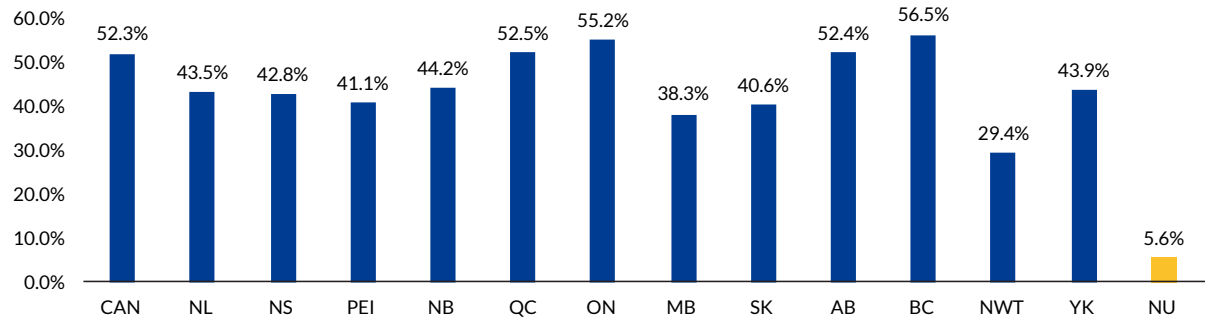
Registered Retirement Savings Plans (RRSP) and Registered Education Savings Plans (RESP) are tax-advantaged accounts that allow Canadians to invest and save money for education, retirement, or other designated expenses. Despite the financial benefits of these accounts, the use of these kinds of savings vehicles is much is lower in Nunavut than the Canadian average.

Aside from being a savings vehicle, RESPs represent an access point to "free money" available to those who have an account. Government contributions will match a portion of savings (Canada Education Savings Grants) and provide additional support for low-income children (Canada Learning Bonds). To access these government contributions, families need to open dedicated accounts in eligible financial institutions. The take-up rate for Canada Education Savings Grants is 52.7 percent nationally and 5.6 percent in Nunavut.[716] No other province or territory is below a 30 percent take-up rate for eligible children as of 2018.[717]

715 Statistics Canada, "Household Spending, Canada, Regions and Provinces."
716 Government of Canada, "Canada Education Savings Program: 2018 Annual Statistical Review," accessed June 6, 2020, https://www.canada.ca/en/employment-social-development/services/student-financial-aid/education-savings/reports/statistical-review.
717 Government of Canada, "Canada Education Savings Program: 2018 Annual Statistical Review."

FIGURE 59

Canada Education Savings Grant take-up, 2018, Canada Education Savings Program[718]



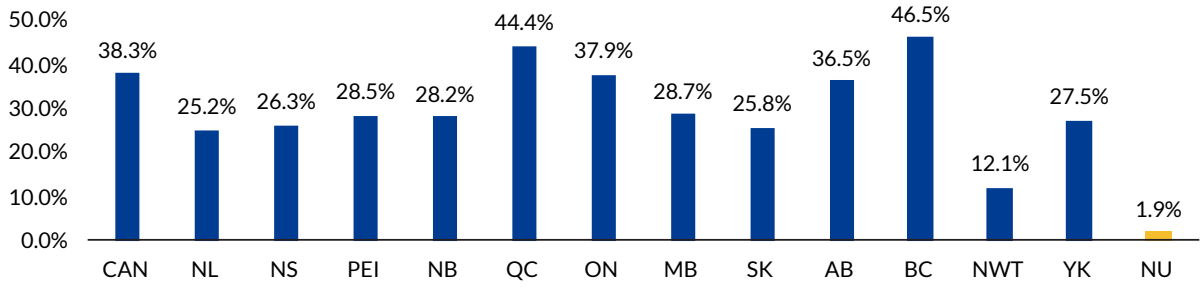
Source: Employment and Social Development Canada

The comparison is even starker for Canada Learning Bonds. These are government contributions towards education savings for lower-income children—and they do not require matching contributions. The take-up rate for Canada Learning Bonds is 1.9 percent in Nunavut compared with 38.3 percent nationally.[719]

A child from a lower-income household in British Columbia is 24 times more likely to receive Canada Learning Bond payments from the federal government than a child from a similar income bracket in Nunavut.

FIGURE 60

Canada Learning Bond take-up, 2018, Canada Education Savings Program[720]



Source: Employment and Social Development Canada

718 Government of Canada, "Canada Education Savings Program: 2018 Annual Statistical Review."
719 Government of Canada, "Canada Education Savings Program: 2018 Annual Statistical Review."
720 Government of Canada, "Canada Education Savings Program: 2018 Annual Statistical Review."

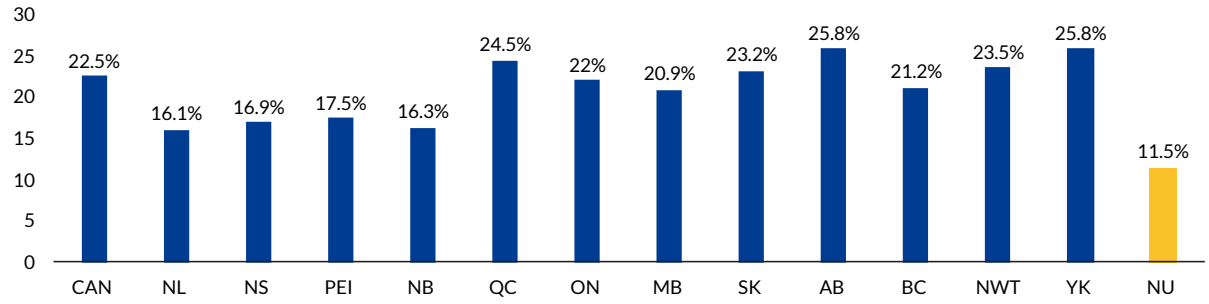
A contributing factor for this gap is the existence of the Financial Assistance for Nunavut Students (FANS) program: a program that the Government of Nunavut has in place to make sure that "financial need is not a barrier to higher education."[721] Because families or prospective students believe that government loans and grants will be available to cover costs, it is possible that they feel less pressure to open a dedicated RESP.[722] However, FANS does not necessarily meet all the expenses of students, who must then seek other forms of funding.[723] Parents or students who do not open an RESP lose out on the benefit of government-matched contributions. A lack of access to financial services in Nunavut is a clear barrier to opening an RESP.

People in Nunavut face the highest costs in the country for financial services, with minimal competition and costly alternatives.

As with RESPs, the take-up rate for Registered Retirement Plans was notably lower in Nunavut. Only 11.5 percent of 2016 tax filers in Nunavut contributed to their RRSP.

FIGURE 61

Registered retirement savings plan contributors by PT, 2016, Statistics Canada[724]



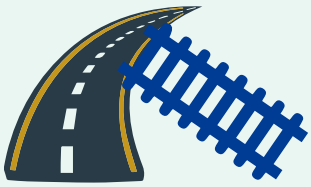
Source: Statistics Canada

Despite having the lowest percentage of tax filers making an RRSP contribution, Nunavut had the highest median RRSP contribution: $4,600, compared with a Canadian median of $3,000.[725] Nunavut's documented income inequality and wage gap between Inuit and non-Inuit earners could help explain this discrepancy.

721 Nunavut News, "Nunavut students are stressed, going into debt due to decade-old assistance formula," 2019, https://nunavutnews.com/nunavut-news/nunavut-students-are-stressed-going-into-debt-due-to-decade-old-assistance-formula/
722 Research interview, 2020.
723 Nunavut News, "Nunavut students are stressed, going into debt due to decade-old assistance formula."
724 Statistics Canada, "Registered Retirement Savings Plan Contributors – Canada, Provinces and Territories," accessed June 11, 2020, https://www150.statcan.gc.ca/n1/daily-quotidien/180216/t001d-eng.htm.
725 Benefits Canada, "Total RRSP contributions rise as number of contributors declines slightly," 2018, https://www.benefitscanada.com/news/total-rrsp-contributions-rise-as-number-of-contributors-declines-slightly-110950.

Rail

Nunavut has no rail infrastructure or connections by rail to other parts of the country. It is the only Canadian territory without some form of rail, though rail lines in Yukon and the Northwest Territories are limited compared with the rest of Canada. The closest rail link is the recently reopened tracks to the Port of Churchill in Northern Manitoba, approximately 260 km from Arviat, Nunavut.



Nunavut is the only province or territory with **no highways or railways**

In the Northwest Territories, the Mackenzie Northern rail provides a direct link to the North American rail network, providing a less expensive way to import goods and materials (including diesel fuel). About 50 percent of all surface freight to the Northwest Territories comes by rail, with lower transport costs helping reduce the cost of living.[726] Railways in Yukon are used for tourism, bringing passengers from Port Skagway, Alaska, to Carcross, Yukon. The rail lines in Yukon are isolated from the North American rail network, although they are connected to the Pacific coast by a deep-water port in Port Skagway.

Railways are an important part of Canada's transportation infrastructure, moving more than 331.7 million tonnes of freight and 4.8 million passengers in 2018.[727] Canada has about 41,500 km of tracks that link major population centres, support commuter transit, deliver resources to seaports for export, and facilitate tourism.[728] The rail sector employs nearly 39,000 Canadians, with average annual earnings for employees close to $100,000.[729]

TABLE 20

Comparison of rail infrastructure in Nunavut, Northwest Territories, Yukon, and Alaska

	Nunavut	Northwest Territories	Yukon	Alaska (USA)
Rail Infrastructure	No	Yes	Yes	Yes
Primary Purpose	N/A	Freight	Tourism	Tourism, passenger services, and freight
Link to other transportation system	N/A	Yes—North American rail network	Yes—deep water port (in Alaska)	Yes—deep water ports

726 Government of Yukon, "Northern Connections: Multi Modal Transportation for the North," accessed June 17, 2020, https://gov.nu.ca/sites/default/files/files/Northern_connections.pdf.
727 Transport Canada, "Transportation in Canada 2018," accessed June 5, 2020, https://www.tc.gc.ca/eng/policy/transportation-canada-2018.html.
728 Transport Canada, "Transportation in Canada 2018."
729 Railway Association of Canada, "Rail Trends 2019," accessed June 5, 2020, https://www.railcan.ca/resources/our-publications/

There has been some interest in building rail infrastructure in the territory. A rail connection between communities in the Kivalliq region and the existing rail terminus at the Port of Churchill could be used to transport people and goods. However, the presence of discontinuous permafrost in the Kivalliq could leave rails vulnerable to damage, and expensive to maintain.[730]

The Baffinland rail project proposes to build a railway from the Mary River Mine to Milne Port.[731] The Baffinland railway would be an isolated system, dedicated to mining. In general, building rail infrastructure is less of an urgent priority than improving other transportation assets in Nunavut, such as improved marine infrastructure. However, experiences in Alaska show that rail is possible in some areas of the North (see box).

RAIL INFRASTRUCTURE IN ALASKA

Alaska has significantly more rail infrastructure than the Canadian territories, about 1130 km of track in the state in two separate rail systems.[732] All but 32 km are operated by Alaska Railroads, which maintains a rail network connecting the cities of Fairbanks and Anchorage (as well as many smaller communities) with deep-water ports in Seward, Whittier, and Anchorage. The rails are used for passenger and freight services, with 522,101 passengers using the rail network in 2019.[733] About 3.48 million tons of freight were also shipped by the rail network in 2019, with gravel and coal being the most common loads.[734] Direct access to ports from the rails facilitates marine connections to Prince Rupert and Seattle, either by ship or rail barge.

While the Alaskan Railway is isolated from the North American rail network, there is a proposal to link the network to the North American grid in Northern Alberta through the Alaska to Alberta rail (A2A) project.[735] If constructed, the new rail link between Alberta and Alaska (passing through the Northwest Territories and Yukon) would reduce shipping times for commodities exports to Asia by providing easier access to the port in Anchorage.

In addition to the Alaska Railroad, about 32 km of tracks on the White Pass and Yukon Railway operate within the state (from Port Skagway to the British Columbia boundary).[736] These rails are privately owned and used for tourism.

Gap analysis

To measure the gaps in rail infrastructure between Nunavut and the rest of Canada, this report includes one indicator:

- Kilometres of track per 100,000 km^2

730 Research interviews, 2020.
731 Baffinland, "Baffinland: Expansion Project," accessed June 5, 2020, http://www.baffinland.com/expansion-project/
732 Alaska Railroad, "Annual Report 2019," p. 15, accessed June 17, 2020, https://www.alaskarailroad.com/corporate/leadership/reports.
733 Alaska Railroad, "Annual Report 2019."
734 Alaska Railroad, "Annual Report 2019," p. 9.
735 Details on the proposed Alaska to Alberta railway are available at Alaska to Alberta Railway, "Our Railway," accessed June 5, 2020, https://a2arail.com/our-railway/
736 White Pass and Yukon Railway, "History," accessed June 5, 2020, https://wpyr.com/history/

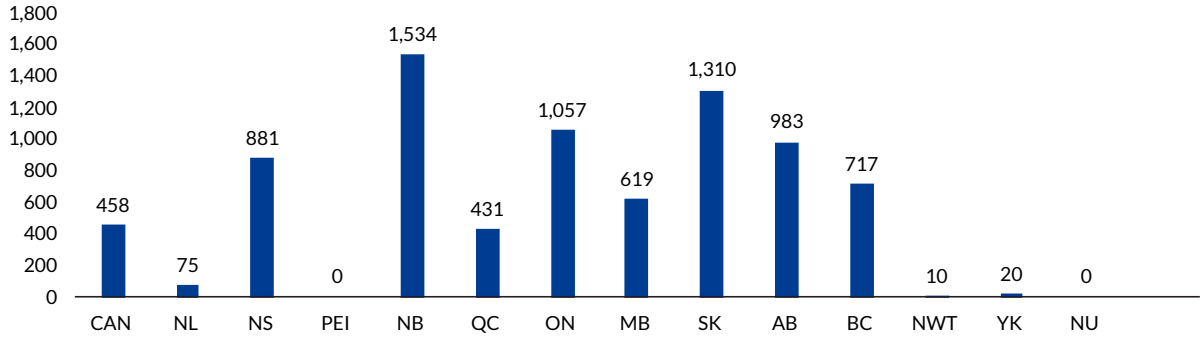
Indicator: kilometres of track per 100,000 km^2

Nunavut is the only Canadian territory without some form of rail, though the amount of rail in Yukon and Northwest Territories is limited compared with the rest of Canada. As of 2018, the Northwest Territories had 10 km of rail per 100,000 km^2 and Yukon had 20 km per 100,000 km^2 (although the tracks between Carcross and Whitehorse are not currently operational).

The Canadian average is 458 km of operated track per 100,000 km^2, with New Brunswick having the most rail infrastructure, with 1,534 km of track per 100,000 km^2. Prince Edward Island is the only province with no rail infrastructure.

FIGURE 62

Km of track per 100,000 square kilometres (2018)



Source: Railway Association of Canada; White Pass & Yukon Route Railway

CROSS-CUTTING FACTORS THAT IMPACT NUNAVUT'S INFRASTRUCTURE

The six cross-cutting factors described here provide insights into other dimensions of the infrastructure in Nunavut and the context of its infrastructure gaps. They are:

Skills and human capacity

The availability of local workers to build, maintain, and operate infrastructure.

Accessibility

The extent to which infrastructure accommodates and supports access by everyone in a community, regardless of disability or impairment.

Energy efficiency and environmental sensitivity

The effects of infrastructure operation and performance on environmental outcomes.

Climate change

Resilience to withstand the projected effects of climate change in the Arctic.

Governance and ownership

Who makes decisions about and operates the infrastructure.

State of repair

The physical condition and useful operating life of infrastructure assets.

These areas do not lend themselves to the same systematic comparison with the rest of Canada as the infrastructure priority areas, but they do explain how well infrastructure serves Nunavummiut.

Skills and human capacity

Infrastructure cannot be built and maintained without the right human capital in place. In turn, training and education cannot take place without the infrastructure to support those activities; both instructional infrastructure (classrooms and appropriate labs and training spaces) and broader infrastructure (affordable housing for students and workers, high-speed broadband, shipping infrastructure for supplies and equipment).

Because of the lack of concerted effort and support to build Inuit capacity at the local level, infrastructure projects in Nunavut face unique limitations and cost pressures. Costs include not only the building materials and equipment that need to be shipped to Nunavut, but also the human resources that must be brought in from outside the territory. In these cases, project leaders may also have to factor in the expense associated with flying in trained workers, housing them, feeding them, and even providing additional compensation for the hardship of working in a remote location. Meanwhile, Inuit do not benefit from infrastructure investment in terms of job creation.

Skills needed to support infrastructure in Nunavut

Closing the infrastructure gap requires skilled workers beyond those most strongly associated with building, including the people drawing up blueprints, operating excavators, or installing drywall. While these people are essential, the personnel needed to support the lifespan of an infrastructure project requires a staggering diversity of skills and capacities.

INFRASTRUCTURE PLANNING AND PROJECT MANAGEMENT

Infrastructure projects require a large amount of skilled work before a single shovel hits the ground, including determining needs, managing RFPs, working with different orders of government, developing a project plan, and doing an environmental assessment. The work of delivering programs and maintenance while under-resourced means that the Government of Nunavut, Inuit organizations, municipalities, and other organizations cannot easily take on the challenge of planning and supervising new projects.

The Government of Nunavut solicits, distributes, and administers infrastructure funding, but faces persistent staffing shortages.[737] According to 2018 employment numbers, for every three jobs in the Government of Nunavut, one job is held by an Inuk, the second held by a non-Inuk, and the third is vacant.[738] The high vacancy rate is a result of several factors, an important one being the education gap in the local labour force.

BUILDING INFRASTRUCTURE

Many new infrastructure projects require a large pool of labour for a limited time period. In the 2016 census, 5.7 percent of Nunavut's labour force was in construction. This is only slightly below the Canadian average of 7.3 percent, but represents only 930 people for the whole territory.[739] The margin

737 Employment and Social Development Canada, "Nunavut Inuit Labour Force Analysis Report," 2018, https://www.canada.ca/en/employment-social-development/corporate/reports/research/nunavut-inuit-labour-force-analysis-summary.html#h2.02.
738 APTN News, "Kivalliq youth want next 20 years in Nunavut to be devoted to jobs," 2019, https://www.aptnnews.ca/national-news/kivalliq-youth-want-next-20-years-in-nunavut-to-be-devoted-to-jobs/; Employment and Social Development Canada, "Nunavut Inuit Labour Force Analysis Report."
739 Statistics Canada, "Census Profile, 2016 Census – Nunavut and Canada," 2016, https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/Page.cfm?Lang=E&Geo1=PR&Code1=62&Geo2=&Code2=&Data=Count&SearchText=Nunavut&SearchType=Begins&SearchPR=01&B1=All&GeoLevel=PR&GeoCode=62.

of error for either "too much" or "not enough" work for these industries is incredibly small, especially when factoring in Nunavut's short building season. Compounding this difficulty, public infrastructure projects often need to compete with (higher-paying) mining and resource industries for personnel with specialized skills, such as welders or electricians.[740] Contractors often rely on fly-in, fly-out (FIFO) workers even for consistently available projects, like building housing.[741]

MAINTAINING AND REPAIRING INFRASTRUCTURE

After an infrastructure project is complete, it needs maintenance workers, especially in Nunavut, where equipment and facilities are prone to breaking down in the harsh climate. A lack of locally available personnel increases the cost, duration, and expense of even "routine" or predictable maintenance events. For example, if a building's fire alarm system malfunctions, the community may be forced to close the building, or require 24-hour in-person fire watching, while waiting for a fly-in, fly-out contractor to fix the problem.[742] In some instances, effective infrastructure solutions are passed over because they would require maintenance or expertise not readily available in Nunavut.

STAFFING FOR INFRASTRUCTURE

Staffing for community infrastructure is especially challenging in Nunavut's smallest communities, but has impacts all across the territory.

In 2019, Iqaluit's only Inuktut daycare had to close for several weeks due to a lack of qualified staff, leaving a fully equipped child care centre empty.[743] When it reopened, it relied on parents to serve as "staff" in order to keep going. During the last several years, the territory has dealt with persistent personnel shortages for essential workers (teachers, nurses, and police officers have all been scarce at different times). When it comes to community wellness programming, finding appropriate personnel to deliver services is a persistent challenge, even if purpose-built space is available.[744]

The uneven benefits of economic growth

Nunavut's economy is projected to continue to grow in the coming years, in large part because of investments in mining and related economic activities. In 2018, Nunavut had the greatest rate of GDP growth in Canada, led by the construction and mining sectors.[745] However, that same year, the overall employment rate declined, going from 55 percent to 54 percent (the second lowest rate in Canada). Evidence indicates that the benefits of Nunavut's economic growth are felt unevenly, and income inequality is on the rise.[746] Inuit are not benefitting from the job creation associated with this boom.

740 Nunavut News, "Nunavut MLA insists government can hire more Inuit in construction," 2019, https://nunavutnews.com/nunavut-news/nunavut-mla-insists-government-can-hire-more-inuit-in-construction/
741 Research interview, 2020.
742 Research interview, 2020.
743 CBC News, "Iqaluit's only Inuktitut daycare closes temporarily due to staff shortage," 2019, https://www.cbc.ca/news/canada/north/tumikuluit-inuktitut-daycare-short-staff-1.5263475; Nunatsiaq News, "Iqaluit's Inuktut daycare calls for greater government support," open letter to Nunavut Premier Joe Savikataaq and Education Minister David Joanasie, October 9, 2019, https://nunatsiaq.com/stories/article/iqaluits-inuktut-daycare-calls-for-greater-government-support/
744 Research interview, 2020.
745 Nunatsiaq News, "Nunavut led Canada in economic growth in 2018," 2019, https://nunatsiaq.com/stories/article/nunavut-led-canada-in-economic-growth-in-2018/
746 Nunatsiaq News, "Has Nunavut's economic boom left the small communities behind?," 2019, https://nunatsiaq.com/stories/article/has-nunavuts-economic-boom-left-the-small-communities-behind/

Articles 23 to 26 in the *Nunavut Agreement* are designed to improve Inuit participation in the waged labour market. But despite this, Inuit participation in the workforce remains disproportionately low.[747] Even though Inuit make up 85 percent of Nunavut's population, and 80 percent of the working-age labor force, they make up only 67.5 percent of the employed population. This gap is especially prevalent in specialized skill areas, which require some form of postsecondary credential (degree, diploma, or trade certification).

To date, the Government of Nunavut has been unable to meet its goal of 85 percent Inuit employment, and has struggled to exceed 50 percent.[748] Agnico-Eagle Mining has a stated goal of 50 percent Inuit employment, and has invested considerable resources in training, but has achieved only 37 percent Inuit employment. Baffinland has the same target but has only 14–25 percent Inuit workers.[749] In both instances, Inuit who are employed are disproportionately represented in lower-paying jobs.

Building up human capacity takes time, and resource extraction is (comparatively) fast. Without better support for skills and training for Inuit workers, many of the economic benefits of resource development will leave the territory with the FIFO workers. Inuit Impact Benefit Agreements (IIBAs) help create and maintain ongoing benefits not captured in the form of wages, and many include investments in training and skills-development programs for Inuit.[750] These investments are designed in part to match short-term labour gaps, and in part to have long-term benefits for the ongoing success of built infrastructure in Nunavut.

Education and training: closing the skills gap

A lack of appropriate education and skills within the territory remains the primary barrier to matching vacant jobs with unemployed Nunavut Inuit who want to work. In 2018, 42 percent of Nunavut residents had less than high school as their highest level of education (compared with 8 percent of Canadians)[751]. A three-year study by the Auditor General of Canada published in 2019 concluded that Nunavut's education system had "a number of gaps and barriers" that made it difficult for Nunavut Inuit to successfully transition to postsecondary opportunities.[752] Current education pathways also fall short of providing Nunavut students with the basic math and literacy skills they need to enter the Nunavut trades school: for four out of the five years before 2019, more Nunavut students failed the trades entrance exam test than passed it.[753]

Another challenge is the fact that Nunavut has a relatively small labour force (16,660 people) spread across 25 widely separated communities, each with distinct and varying human resource needs. Even with higher educational attainment within Nunavut, it would be unusually difficult to ensure the available labour force was in the right location with the right skills to meet local infrastructure needs.[754]

747 Kathryn Lupton, "Evaluating key informant perspectives on Inuit self-determination and economic participation in Nunavut," University of Ottawa master's thesis 2019, https://ruor.uottawa.ca/bitstream/10393/39078/1/Lupton_Kathryn_Alix_Colleen_2019_thesis.pdf.
748 Nunatsiaq News, "Nunavut government aims for 58 percent Inuit employment by 2023," 2020, https://nunatsiaq.com/stories/article/nunavut-government-aims-for-58-per-cent-inuit-employment-by-2023/
749 CTV News, "Inuit hope fresh deals with mining companies boost employment at new projects," 2019, https://www.ctvnews.ca/business/inuit-hope-fresh-deals-with-mining-companies-boost-employment-at-new-projects-1.4339015.
750 The Polar Connection, "Inuit Impact and Benefit Agreements (Part I): What are they?," 2016, http://polarconnection.org/inuit-impact-benefits-agreementsi/
751 Statistics Canada, "37-10-0130-01: Educational Attainment of the Population Aged 25 to 64, by Age Group and Sex, Organisation for Economic Co-Operation and Development (OECD), Canada, Provinces and Territories," accessed June 4, 2020, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3710013001.
752 Auditor General of Canada, "Support for High School Students and Adult Learners."
753 Nunavut News"GN to expand trades tutoring; aspiring plumber Kenny Enuaraq delighted," July 2, 2019, https://nunavutnews.com/nunavut-news/gn-to-expand-trades-tutoring-aspiring-plumber-kenny-enuaraq-delighted/
754 Nunatsiaq News, "For Nunavut, it's always about capacity," 2017, https://nunatsiaq.com/stories/article/65674for_nunavut_its_always_about_capacity/

Finally, the "skills gap," as discussed here, is a colonial paradigm not shared by many Inuit. The skills required to participate in the waged economy are not the same skills needed to participate in Nunavut's land-based economy. There is a concern that future efforts to close the "skills gap" through increased workforce participation may result in the loss of other, important skills that are central to Inuit culture and well-being. A report shows that in 2017, 68 percent of working-aged Nunavut Inuit hunted, fished, or trapped in that year.[755] Interestingly, that same report indicated that employment in the waged labour force was positively correlated with land-based activities.

Infrastructure required to improve human capacity in Nunavut

Building and retaining human capital to create more infrastructure within Nunavut also rely on the availability and quality of existing infrastructure:

- **Broadband**
  Consistent feedback indicates that a primary barrier to postsecondary success for Nunavut Inuit is the challenge of relocation away from their own communities. Reliable, affordable, high-speed broadband could bring high-quality education options to Inuit in their own communities. A lack of reliable Internet has been a substantial challenge for program delivery through Arctic College and other educational institutions in Nunavut, a problem made more acute during the COVID-19 outbreak of 2020.[756]
- **Housing**
  Affordable, adequate housing is required to house both Nunavut Inuit who are receiving education and skills training (especially for those who must leave their communities), as well as those in the workforce. Housing is a consistent challenge to recruiting and retaining staff in the territory.
- **Classrooms and learning spaces**
  In small communities, community learning centres for adults are only a few rooms, often in a state of disrepair.[757] A recent expansion to Nunavut Arctic College will provide much-needed learning facilities for program delivery in Iqaluit, including new laboratory spaces.[758] The territory's trade school in Rankin Inlet is a resource for those who want to learn the skilled trades, but students who wish to get their qualifications in welding or heavy equipment operation need to relocate to the South to complete their training.[759]

Closing the gap: human capacity and infrastructure

Improving infrastructure in Nunavut will inevitably require significant capital investments, but closing the gap will also depend on efforts to develop and retain human capacity within the territory. Future efforts to provide better resourcing for Nunavut's infrastructure must include human resources as a core consideration.

755 Employment and Social Development Canada, "Nunavut Inuit Labour Force Analysis Report."
756 One Carleton professor testifying to the special Senate Committee on the Arctic described the difficulties her Northern students experienced when trying to participate in her online graduate program in Indigenous policy and administration: "They have to battle with really crappy broadband access. It's terrible. They can't submit their assignments on time and they can't be sure they can be part of online tutorials." From Senate of Canada, "Proceedings of the Special Senate Committee on the Arctic Issue No. 10 – Evidence – May 28, 2018," 2018, https://sencanada.ca/en/Content/Sen/Committee/421/ARCT/10ev-54102-e.
757 Nunatsiaq News, "Nunavut MLAs decry state of community adult learning centres," 2019.
758 Nunatsiaq News, "Nunavut Arctic College expansion gets a $10m federal infusion," 2016, https://nunatsiaq.com/stories/article/65674nunavut_arctic_college_expansion_gets_a_10m_federal_infusion/
759 CBC News, "Families of trade apprentices need support to succeed, say Nunavut communities," 2020, https://www.cbc.ca/news/canada/north/apprenticeship-act-gets-updates-through-community-feedback-1.5447253.

Accessibility

Accessibility "means that everyone can get to and use information and spaces and places," regardless of disability or impairment. Ensuring accessibility through the identification and removal of barriers is an integral part of upholding the human rights of all Canadians. However, life in Canada's North presents unique barriers, which in turn create distinct challenges to meeting accessibility goals. These barriers relate to many infrastructure priority areas, including transportation, housing, health, and recreation facilities.

The ways in which accessibility and infrastructure intersect affect the well-being and quality of life of Nunavut Inuit. Some intersections are obvious, such as the presence of ramps, elevators, or accessible toilets in public facilities. However, many gaps affect disabled Nunavut Inuit in ways that are less immediately apparent. For example, a growing portion of assistive technologies (such as speech recognition and automatic transcription software) rely on high-quality broadband. Also, repairing or replacing much-needed assistive equipment depends on sealifts, which occur only in the summer months.

Survey data show that Nunavut has a lower rate of disability than the rest of Canada, both in the number of people reporting a disability and degree of severity.[760] This finding could be explained by Nunavut's comparatively young population, as well as a documented trend of Indigenous populations' under-reporting disability.[761] However, there is also evidence that people with disabilities choose to relocate elsewhere in Canada where there are fewer barriers to well-being (especially those with severe disabilities or complex needs). Several parents of children with disabilities report they were encouraged to move outside Nunavut to give their children better access to care.[762] One medical doctor who works in Iqaluit regularly was interviewed in 2018 and was frank about her assessment of available services: "If I had a child with high needs, I would have to leave the North, even though I would be super sad about it."[763]

Among the advocates working to improve accessibility in Nunavut is the Nunavummi Disabilities Makinnasuqtit Society. However, implementing successful accessibility measures is challenging in northern environments. One representative of the Makinnasuqtit Society described Nunavut as "one of the most inaccessible communities in Canada."[764]

760 According to StatsCan, 23.3 percent of Canadians over 15 identified as having a disability, compared to 18.2 percent of Nunavummiut. The same survey indicated that the proportional severity of disabilities in Nunavut is less acute: 25 percent of people with disabilities in Nunavut were categorized as "severe" or "very severe," as compared with 43 percent of Canadians with disabilities. From Statistics Canada, "Table: 13-10-0375-01: Severity of Disability for Persons with Disabilities Aged 15 Years and over, by Age Group and Sex, Canada, Provinces and Territories," 2017, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310037501&pickMembers%5B0%5D=1.1.

761 Disability rates were also higher for Inuit outside Inuit Nunangat at 27 percent, compared with 16 percent for those living within the Inuit homeland region. Tara Hahmann, Nadine Badets, and Jeffrey Hughes, "Indigenous people with disabilities in Canada: First Nations people living off reserve, Métis and Inuit Aged 15 Years and Older," 2019, https://www150.statcan.gc.ca/n1/pub/89-653-x/89-653-x2019005-eng.htm.

762 See CBC News, "Iqaluit teen with terminal illness can't enjoy public pool—just 1 of city's many accessibility woes," 2018, https://www.cbc.ca/news/canada/north/yugh-ahuja-accessibility-issue-aquatic-centre-iqaluit-1.4764912; Nunatsiaq News, "Nunavut family struggles to raise autistic child with no services," accessed June 4, 2020, https://nunatsiaq.com/stories/article/65674familly_struggles_to_raise_autistic_child_with_no_services/

763 Holland Bloorview Hospital, "Her son's stroke puts a Nunavut doctor on the other side of care," 2018, https://www.hollandbloorview.ca/stories-news-events/BLOOM-Blog/her-sons-stroke-puts-nunavut-doctor-other-side-care.

764 Quoted from BBC News, "Blind in the Arctic: A survivor's guide to living in Nunavut," 2016, https://www.bbc.com/news/disability-38132001.

Legislation and regulation

The rights of Nunavut Inuit with disabilities are protected under the *Nunavut Human Rights Act*. Unlike some Canadian jurisdictions (Ontario, Manitoba, and Nova Scotia) Nunavut does not have stand-alone accessibility legislation. Federal accessibility legislation (the *Accessible Canada Act*) was passed in 2019, but Nunavut and the other territories are exempt from many of the requirements.[765]

Accessibility requirements for built infrastructure are governed by the *Nunavut Building Code Act*, which is based on the National Building Code of Canada. The Nunavut Building Code Act legislates an Advisory Committee, which must include a member nominated by the Nunavummi Disabilities Makinnasuaqtiit Society.[766]

There is evidence that people with disabilities choose to relocate elsewhere in Canada where there are fewer barriers to well-being.

Accessibility of infrastructure in Nunavut

Little information is available on the accessibility of infrastructure in Nunavut, or comparing Nunavut with other Canadian jurisdictions. The only two recently reported data sets that include accessibility dimensions for Nunavut are from Infrastructure Canada and capture information on public housing and public recreation infrastructure. Collecting better data on accessibility in Nunavut would help close the infrastructure gap in an equitable and inclusive way. However, available literature provides some insights on how accessibility and infrastructure intersect in several key priority areas.

ROADS, SIDEWALKS, AND TRANSPORTATION

The lack of sidewalks in Nunavut is a mobility barrier for people using wheelchairs or other types of mobility devices. Even for places that are paved, infrastructure solutions that work in the South do not always translate well to Northern conditions: "curb cuts" (a ramp or slope from a roadway to the sidewalk) quickly fill with snow, ice, and gravel. Conventional wheelchairs are both much more likely to break and more costly and time-intensive to repair.[767] One nurse working in Rankin Inlet reported, "I helped fix a wheelchair once that was six months old, but looked more like it had seen 10 years' worth of hard labour."[768] The lack of sidewalks or paved walkways is also a challenge for people who are visually impaired.[769]

765 Federal Accessibility Legislation Alliance, "Accessible Canada Act in Plain Language," accessed June 4, 2020, https://www.include-me.ca/federal-accessibility-legislation-alliance/resource/accessible-canada-act-plain-language.
766 Government of Nunavut "Current Consolidated Statutes and Regulations," https://www.nunavutlegislation.ca/en/consolidated-law/current?title=B.
767 Jenna Machlachlan and Danielle Nason, "Wheelchair considerations for Northern Canadian communities," Canadian Seating and Mobility Conference, 2011, http://www.csmc.ca/docs/archives/2011_archive/ml/2011%20CSMC%20PROGRAM%20AND%20PROCEEDINGS.pdf.
768 Carol Cruden, "Being disabled in Nunavut," Qualicare Family Homecare, accessed June 4, 2020, https://www.qualicare.com/wp-content/uploads/2019/12/Disabilities-Nunavut-template.pdf.
769 According to the Canadian National Institute for the Blind (CNIB) there are 1,280 people in Nunavut who identify as being blind. CNIB, "Blindness in Canada," accessed June 4, 2020, https://cnib.ca/en/sight-loss-info/blindness/blindness-canada?region=on.

HOUSING

Data on public housing show that Nunavut has a lower-than-average number of public housing units categorized as "barrier-free" (purpose-built or renovated to be accessible). The gap is particularly wide for "detached single houses," which make up nearly half of public housing units in Nunavut. Only one percent of these houses are categorized as barrier-free (the Canadian average for barrier-free public detached houses is eight percent).[770] This lack of barrier-free units puts disabled Nunavut Inuit at a distinct disadvantage when waiting for public housing that is already scarce.

Overcrowding, a persistent feature of housing in Nunavut, can make life disproportionately difficult for those who live with disabilities and those who care for them. Getting adequate clearance for a wheelchair, walker, or bed indoors becomes even more difficult when people are squeezed into tight living quarters. For disabled individuals looking for homes in the private market, adaptations suited to life in Nunavut present barriers to people with mobility challenges. For example, houses are elevated to protect against permafrost, or have bathrooms that are raised relative to the rest of the floor to prevent pipes from freezing. Although there are several dedicated funds provided by the Government of Nunavut to help disabled or elderly homeowners with needed renovations, the high cost of construction and renovation, and reliance on fly-in labour remain barriers.

ACCESS TO HEALTH CARE AND REQUIRED SERVICES

Many people with disabilities have more frequent interactions with the health care system, and some require regular contact with specialists accessible to them only by air transportation. People with mobility issues face unique challenges in getting to the airport. The Nunavut Department of Health does not provide any non-emergency medical ground transportation (including wheelchair transportation) in many communities for insurance reasons. Non-emergency transportation to the airport for approved medical travel is covered by Non-Insured Health Benefits for eligible Nunavut Inuit in only four communities (Coral Harbour, Whale Cove, Arctic Bay, and Resolute Bay) in which the distance to the airport is more than six kilometres.[771]

PUBLIC SPORTS AND RECREATION FACILITIES

According to the 2016 Infrastructure Canada Core Public Infrastructure Survey, Nunavut has a higher-than-average level of accessibility for publicly owned culture, recreation, and sports facilities: 100 percent of pools, ice arenas, and arts and culture facilities in Nunavut registered by the survey were categorized as accessible.[772]

Closing the gap: accessibility

All Nunavut Inuit face barriers to using spaces and services (including distance, climate, and availability), and access to core infrastructure is often inequitable (compared with their Southern Canadian peers). For Nunavut Inuit with disabilities, these barriers and inequities are compounded. All Nunavut Inuit have the right to thrive in Nunavut, regardless of disability or impairment. Thoughtful and continued collaboration between government, communities and Nunavut Inuit will be needed to ensure that diverse needs are being met, and no one feels displaced by their level of ability.

770 Infrastructure Canada and Statistics Canada, "Table: 46-10-0015-01: Percentage of Publicly Owned Social and Affordable Housing Assets That Is Barrier Free, Infrastructure Canada," 2016, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=4610001501.and Infrastructure Canada; Statistics Canada, "Table: 46-10-0001-01: Inventory of Publicly Owned Social and Affordable Housing Assets," 2016, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=4610000101.
771 Nunatsiaq News, "Lack of local transport leaves Nunavut man in wheelchair stranded," 2019, https://nunatsiaq.com/stories/article/lack-of-local-transport-leaves-nunavut-man-in-wheelchair-stranded/
772 Statistics Canada, "Table: 34-10-0190-01: Percentage of Publicly Owned Culture, Recreation and Sport Facilities Which Allow Accessibility, Infrastructure Canada," 2016, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410019001.

Energy efficiency and environmental sensitivity

Energy-efficient infrastructure can help reduce local pollution while supporting broader territorial efforts to address climate change.[773] It is also contributes to public health and the social and economic well-being of Nunavut Inuit.

However, a reliance on off-grid diesel power generation, fuel tank farms, and a transportation network dependent on older fuel-inefficient aircraft and sealifts undercut the goals of energy efficiency and environmental sensitivity. Wastewater and solid waste facilities in Nunavut also lack adequate protections for the local environment.

Energy efficiency and environmental sensitivity of Nunavut infrastructure

POWER

Nunavut is powered by 25 off-grid diesel power plants. Unlike other parts of Canada, including both other territories, Nunavut is almost entirely dependent on petroleum for power generation and lacks renewable energy sources. The reliance on diesel power has significant cost and environmental implications.

Diesel fuel is reliable but costs are high to service small population centres that cannot share power, including the cost to import millions of litres of fuel annually from Southern Canada.[774] These costs, along with high fixed overhead costs to deliver power, contribute to Nunavut's having much higher electricity prices than Southern Canada, and to the Government of Nunavut's subsidizing consumer electricity prices.

Diesel power generation creates noise pollution and emits greenhouse gases—both from direct emissions and from being transported over long distances by sealifts and trucking within communities. Although rates of spillage are declining, about 100,000 litres of fuel spill into the local environment each year, especially in summer when fuel is offloaded from sealifts for storage in communities.[775] This is significantly more than the 13,000 litres of fuel lost to spills in the Northwest Territories in 2018, where about half of all power is generated from diesel.[776] Spillages create risks for people and the local environment, as diesel fuel is poisonous to people, animal, and plants when first released.[777]

773 Environmental and Energy Study Institute, "Energy Efficiency," accessed June 2, 2020, https://www.eesi.org/topics/energy-efficiency/description.
774 Nunavut Climate Change Centre, "Nunavut's Energy System."
775 CBC News, "Nunavut fuel spills are down, but accidents still happen," 2014, https://www.cbc.ca/news/canada/north/nunavut-fuel-spills-are-down-but-accidents-still-happen-1.2612118.
776 Government of Northwest Territories, "2018 Northwest Territories Spills Report," 2018, https://www.enr.gov.nt.ca/sites/enr/files/resources/spill-report_2018_web.pdf; see also Canada Energy Regulator, "Market snapshot: Overcoming the challenges of powering Canada's off-grid communities," October 3, 2018, https://www.cer-rec.gc.ca/nrg/ntgrtd/mrkt/snpsht/2018/10-01-1cndffgrdcmmnts-eng.html?=undefined&wbdisable=true.
777 Environmental Science and Engineering Magazine, "Latest spill shows North still struggling to prevent and control oil events," 2018, https://esemag.com/hazmat-remediation/latest-spill-shows-north-still-struggling-prevent-control-oil-events/

PORTS AND HARBOURS

Without roads connecting communities, marine transportation is the only practical way to bring heavy goods, building materials, and fuel to communities. Limited marine infrastructure means that ships cannot directly dock, and must offload hazardous cargo, such as diesel and jet fuel, either using smaller vessels to transport freight to land, or by pumping fuel to land via hoses.[778]

Until the deep-water port in Iqaluit opens, the 60 million litres of fuel required annually by the city for heating and power generation are transferred from ships in Frobisher Bay to the city's fuel reservoirs using long hoses. This activity is described as "high risk" by the Nunavut Economic Forum, particularly given the inadequate local resources to contain a spill, as well as the potential for damage from a spill to contaminate Iqaluit's food supply.[779] Iqaluit has equipment capable of recovering up to 1,000 tonnes of oil from a spill, but community resupply vessels can carry up to 18,000 tonnes of fuel.[780] Smaller communities with fewer resources would have even more difficulty responding to a fuel spill. Additional port infrastructure could help mitigate marine risks by allowing resupply vessels to directly offload supplies to land.

The vessels providing sealifts to Nunavut communities are often powered by heavy fuel oil, which is a greater environmental risk than other fuels used for shipping. Heavy oil is extremely dense, evaporates slowly, and can easily become trapped in ice should a spill occur. The federal government has recently announced its support for banning the use of heavy oils for Arctic shipping, with a phased approach through 2029.[781] Heavy oils are already banned in Antarctic waters.

FUEL STORAGE FACILITIES

Nunavut imports close to 215 million litres of fuel each year for power generation, home heating, and aviation, as well as gasoline and diesel for cars and trucks.[782] Each community in Nunavut has large fuel tank farms to store these fuels, including 6.1 million litres of space for gasoline storage in Iqaluit alone.[783] Many facilities are aging, and four fuel farms recently faced Environment Canada Compliance Orders for not safely storing fuel.[784] The Government of Nunavut committed almost $18 million to address safety and environmental shortages in 2016; repairs are ongoing.[785]

Individual homes and buildings also have smaller fuel storage facilities, which are at risk of leaks. Aging home heating tanks were responsible for almost 325,000 litres of fuel spilling into the environment between 2001 and 2011.[786]

778 CBC News, "5 quick facts about fuel in Iqaluit."
779 CBC News, "5 quick facts about fuel in Iqaluit."
780 World Wildlife Federation, "Oil spill response capacity in Nunavut and the Beaufort Sea," 2017, http://awsassets.wwf.ca/downloads/170405___oilspillresponsecapacitynunavut_web.pdf?_ga=1.60976172.1829272820.1475691822, p. 4.
781 Government of Canada, "News release: The Government of Canada supports a global ban on heavy fuel oil in the Arctic," 2020, https://www.canada.ca/en/transport-canada/news/2020/02/the-government-of-canada-supports-a-global-ban-on-heavy-fuel-oil-in-the-arctic.html.
782 Government of Nunavut, "Petroleum Products Division," accessed July 17, 2020, https://www.gov.nu.ca/petroleum-products-division.
783 CBC News, "Nunavut gov't looks to expand Iqaluit's fuel farm as gas sales approach storage capacity," 2017, https://www.cbc.ca/news/canada/north/iqaluit-gasoline-fuel-farm-expansion-1.4223387.
784 Nunatsiaq News, "Nunavut fuel tanks lag years behind environmental standards," 2016, https://nunatsiaq.com/stories/article/65674nunavut_fuel_tanks_years_behind_new_environmental_standards/
785 Nunatsiaq News, "Nunavut fuel tanks lag years behind environmental standards."
786 CBC News, "How an Iqaluit homeowner's leaky tank cost her $250K," 2019, https://www.cbc.ca/news/canada/north/iqaluit-leaky-tank-costly-1.5174545.

AIR

Most Nunavut airports have short runways, and all but two are gravel. Although gravel surfaces are easier to maintain in Arctic climates, only older jet aircraft are certified to land on gravel (such as the Boeing 737 models from the 1960s and 1970s). Short runways also limit the size of aircraft that can safely land or take off, therefore most communities in Nunavut can be served only by small, fuel-inefficient planes (and not, for example, by Air Canada's current jet fleet).

HOUSING

Homes in Nunavut are heated by oil and have dedicated fuel tanks. Spillage from these tanks is a risk to the local environment. There have been modest initiatives to move away from a reliance on oil for heating, including through Iqaluit's district heating system that powers the Iqaluit Aquatic Centre. In comparison, *all* of Nuuk, Greenland, is heated from a district heating system, which allows heating of buildings without creating additional local emissions.

Nunavut has the highest rate of housing in the country requiring major repairs. A recent Senate report noted that many homes lack sufficient insulation and are not built with materials designed to last in Arctic conditions, which requires more energy and therefore makes them more costly to heat.

According to CMHC, Nunavut also has the highest rate of housing in the country requiring major repairs.[787] A recent Senate report noted that many homes lack sufficient insulation and are not built with materials designed to last in Arctic conditions, which requires more energy and therefore makes them more costly to heat.[788] Initiatives to improve efficiency include efforts by the Nunavut Housing Corporation to improve insulation in public housing units to limit heat loss, as well as equipping homes with energy-efficient lighting and appliances.[789] However, government-owned housing, which represents a majority of all housing in Nunavut, is not eligible for many federal energy-efficiency programs, as these programs are targeted at private owners.[790]

SOLID WASTE AND WASTEWATER

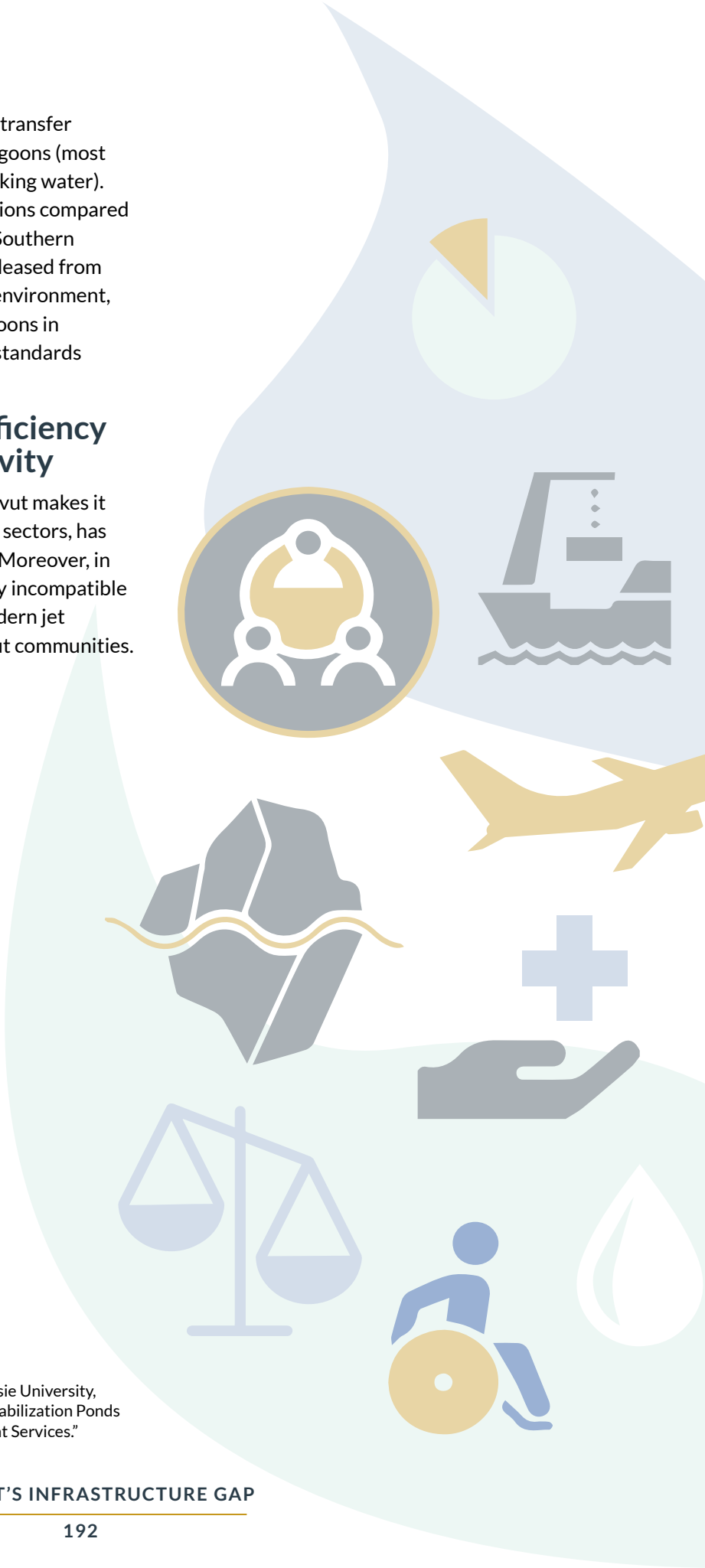
Unlike other parts of Canada, Nunavut does not have any waste diversion facilities, so all solid waste is transferred to engineered landfills or dumps. Currently, all but two communities practise open burning of waste, which exposes nearby residents to airborne pollutants, and may contaminate local water supplies.[791] The existing Iqaluit landfill is aging, and in 2014, was the site of a four-month-long fire that exposed residents to harmful pollution.

787 Statistics Canada, "Table: 46-10-0043-01: Housing Suitability and Dwelling Condition, by Tenure Including Social and Affordable Housing."
788 Senate of Canada, "We Can Do Better: Housing in Inuit Nunangat."
789 Auditor General of Canada, "Climate Change in Nunavut," 2018, http://www.oag-bvg.gc.ca/internet/English/nun_201803_e_42874.html.
790 Research interview, 2020.
791 Globe and Mail, "The Nunavut we don't see" accessed June 3, 2020, https://www.theglobeandmail.com/opinion/article-the-nunavut-we-dont-see/

Twenty-two communities rely on trucks to transfer sewage to treatment facilities or sewage lagoons (most communities also use trucks to deliver drinking water). Using trucks leads to additional local emissions compared with the piped systems commonly used in Southern Canada. There is also a risk that effluent released from sewage lagoons could damage the marine environment, and a recent study showed that several lagoons in Nunavut fail to meet national wastewater standards consistently.[792]

Closing the gap: energy efficiency and environmental sensitivity

The current state of infrastructure in Nunavut makes it difficult to be energy-efficient, and in some sectors, has negative local environmental implications. Moreover, in some cases, existing infrastructure is simply incompatible with more efficient technology, such as modern jet aircraft, which cannot land in many Nunavut communities.



792 Centre for Water Resources Studies and Dalhousie University, "Treatment Performance of Municipal Wastewater Stabilization Ponds in Nunavut Prepared for: Community and Government Services."

Aging home heating tanks were responsible for almost 325,000 litres of fuel spilling into the environment between 2001 and 2011.

Climate change adaptation

Climate change can reduce the effectiveness and lifespan of infrastructure, including transportation, buildings, and marine infrastructure.[793] The risk to Nunavut infrastructure is greater than the Canadian average, given the unique nature of Nunavut's geography and economy (e.g., permafrost, coastal communities). Resilient infrastructure is key to mitigating these risks.[794]

Climate change in Nunavut

Canada's Arctic faces the potential of extreme change under a range of scenarios, including warming at two to three times the global average.[795] Both scientific research and local Inuit knowledge confirm changes in temperature, differences in the length and onset of seasons, and more frequent and unpredictable storms.[796] This warming also reduces sea ice and permafrost.[797] There is evidence that the Arctic Ocean is changing more quickly than any other place in the world,[798] contributing to sea-level rise and coastal erosion.[799] In certain parts of Nunavut, however, such as Arviat, land pressed down by glaciers is rising as the ice recedes.[800]

A 2018 report from the Auditor-General of Canada found that Nunavut was not adequately prepared to respond to climate change.[801] Interviews with Elders and community members highlight new difficulties in travelling by boat and the fact that hunting and camping are now more dangerous on the land.[802]

Risks to infrastructure

WATER AND WASTEWATER

Changing climate conditions—especially active permafrost layers at greater depths—are a significant vulnerability and cost pressure for Nunavut's water and wastewater systems. These conditions increase the cost of repairs and make it necessary to bury pipes at greater and greater depths.[803] It is also unclear to what extent changing conditions could affect the safety and effectiveness of the sewage lagoon systems used to treat wastewater in Nunavut.

Climate change also places significant pressures on sourcewater for communities. For example, as an island with limited fresh water supplies, Sanikiluaq faces acute risks from climate-related water vulnerabilities. At times the community has been forced to fly in bottled water.[804]

793 Julie Dekens, Jessica Boyle, and Maxine Cunningham, "Climate Change Adaptation and Canadian Infrastructure: A Review of the Literature," The International Institute for Sustainable Development, 2013, https://www.iisd.org/publications/climate-change-adaptation-and-canadian-infrastructure-review-literature.
794 OECD, "Climate-Resilient Infrastructure," 2018, http://www.oecd.org/environment/cc/policy-perspectives-climate-resilient-infrastructure.pdf.
795 Government of Canada, "Canada's Arctic and Northern Policy Framework."
796 Auditor General of Canada, "Climate Change in Nunavut."
797 Auditor General of Canada, "Climate Change in Nunavut."
798 Canadian Press, "First federal assessment of Arctic Ocean finds drastic change," CBC News, 2020, https://www.cbc.ca/amp/1.5545655.
799 Natural Resources Canada, "Implications of Changing Climate for the Arctic Environment," 2019, https://www.nrcan.gc.ca/environment/resources/publications/impacts-adaptation/reports/assessments/2008/ch3/10325.
800 Tyler Ross, Frøydis Reinhart, Beate Bowron, David Mate, and Robert Chapple Michael Westlake, "Changing Times: Impacts and Adaptation in Nunavut," 2011, https://www.gov.nu.ca/sites/default/files/changing_times_-_english_low_res.pdf.
801 Auditor General of Canada, "Climate Change in Nunavut."
802 Auditor General of Canada, "Climate Change in Nunavut."
803 Research interview, 2020; George, "City of Iqaluit says climate change is contributing to its water pipe woes."
804 CBC News, "Sanikiluaq residents warned not to drink tap water—even if boiled," 2016, https://www.cbc.ca/news/canada/north/sanikiluaq-advisory-tap-water-sodium-1.3650378.

TRANSPORTATION INFRASTRUCTURE

Nunavut's reliance on air travel places transportation networks at greater risk from storm disruptions—a storm can isolate communities entirely.[805] Permafrost changes have already affected air infrastructure in Nunavut, leading to degradation in the runways at the Iqaluit airport, a major factor in the decision to carry out a $300-million renovation project at the airport.[806] The renewed infrastructure has been built with a unique set of cooling pipes to adapt to the shifting permafrost conditions.[807] While the majority of runways in Nunavut are gravel and not subject to the same challenges, climate change effects are also creating more difficult conditions in wind and precipitation patterns for aviation.[808]

The rapid changes to conditions in the Arctic Ocean create new pressures and demands on port and harbour infrastructure. Melting sea ice creates greater navigability and could create greater demand for port infrastructure.[809]

Roads are also highly vulnerable to climate impacts. Flash floods in Pangnirtung in 2008 damaged key bridges that connect the hamlet, cutting off residents from the water reservoir, sewage plant, and landfill.[810] Reduced ability to navigate safely on sea ice and semi-permanent trails places greater pressure on other transportation infrastructure.[811] Winter roads will likely become more expensive to maintain and less reliable. The Tibbit-to-Contwotyo Winter Road that crosses the Northwest Territories and Nunavut is the busiest heavy-haul winter road in the world.[812] A Transport Canada study from 2016 found that even if the road remains viable, there will be an estimated increase in maintenance costs of $55–155 million during a 35-year period.[813]

HOUSING AND OTHER BUILDINGS

Shifting permafrost and snow conditions may require costly adaptation measures to maintain the safety of Nunavut's housing stock, ranging from new techniques for pilings to the application of other technology like thermosyphons that reduce movement in permafrost.[814] Coastal erosion may also require many homes or buildings to be moved or replaced altogether.[815] For example, in Sanirajak, public housing is built along a shoreline facing significant erosion pressures.[816]

805 Donald Lemmen and Kathy Palko, ed., Climate Risks and Adaptation Practices – For the Canadian Transportation Sector 2016, 2017, https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/earthsciences/pdf/assess/2016/ClimatRisk-E-ACCESSIBLE.pdf., p. 13
806 Wallace, "Beyond frozen: Canada's permafrost is turning to mud. Here's why."
807 Government of Nunavut, "Iqaluit International Airport Improvement Project: Project Report," 2014, https://gov.nu.ca/sites/default/files/iqaluit_international_airport_improvement_project_report.pdf.
808 Ivan Semeniuk, "Changing winds herald climate risks for Arctic airports," The Globe and Mail, 2015, https://www.theglobeandmail.com/technology/science/arctic-airports-hit-with-changing-winds-and-safety-risks-due-to-climate-change/article23353583/
809 James D. Ford, Trevor Bell, and Nicole Couture, "Chapter 5: Perspectives on Canada's North Coast Region," in Canada's Marine Coasts in a Changing Climate, Alfred Wegener Institute, 2016, https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/earthsciences/pdf/assess/2016/Coastal_Assessment_Chapter5_NorthCoastRegion.pdf, p. 181.
810 CBC News, "Pangnirtung in state of emergency during heavy floods," 2008, https://www.cbc.ca/news/canada/north/pangnirtung-in-state-of-emergency-during-heavy-floods-1.725661.
811 Auditor General of Canada, "Climate Change in Nunavut"; Ford, Bell, and Couture, "Chapter 5: Perspectives on Canada's North Coast Region."
812 Ford, Bell, and Couture, "Chapter 5: Perspectives on Canada's North Coast Region," p. 43.
813 Ford, Bell, and Couture, "Chapter 5: Perspectives on Canada's North Coast Region," p. 44.
814 Thermosyphon refers to a method of passive heat exchange; Melody Schreiber, "Melting permafrost and the housing crisis in the Arctic," CityLab, 2018.
815 Matthew McClearn, "Tuktoyaktuk teetering: Hamlet's shoreline erosion a warning to rest of Canada's North," The Globe and Mail, 2019, https://www.theglobeandmail.com/canada/article-tuktoyaktuk-teetering-hamlets-shoreline-erosion-a-warning-to-rest-of/
816 Sarah Rogers, "Nunavut unprepared for rising levels of rain, snow, Auditor General hears," Nunatsiaq News, 2018, https://nunatsiaq.com/stories/article/65674nunavut_communities_unprepared_for_rising_levels_of_precipitation_audi/

Precipitation and melting conditions also create risks. Drainage pressures can create mould in homes and add to pressures on permafrost.[817] Flash floods can damage already scarce housing infrastructure as they did in a 2012 flood in Kimmirut.[818] These same pressures apply to all types of built infrastructure—flooding caused significant damage to the power plant in Grise Fiord, and wind damage to the power plant in Pangnirtung, for example.[819]

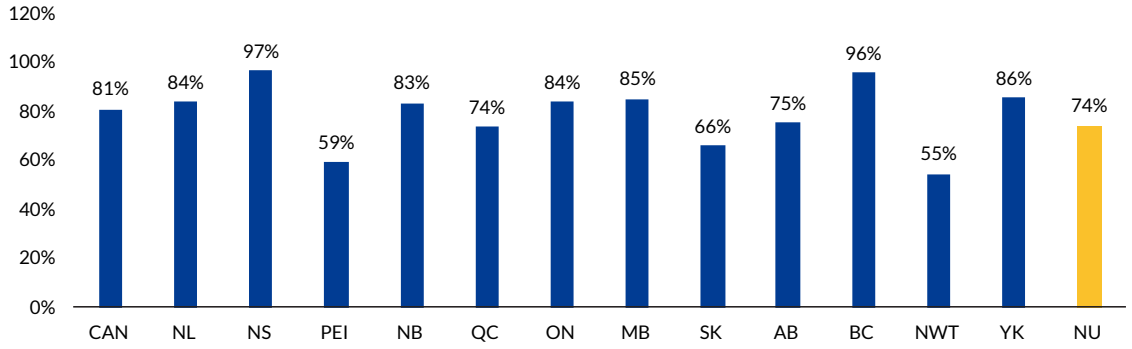
Planning for adaptation

Those planning for climate adaptation in Nunavut need better data.[820] Inuit Tapiriit Kanatami has called for greater investment in the assessment of climate vulnerability of infrastructure across Inuit Nunangat, including the incorporation of Inuit knowledge.[821] The situation is complicated by overlapping jurisdictions between the territorial government and municipalities, as well as staffing challenges in municipalities.[822]

The Core Public Infrastructure Survey asked organizations managing public infrastructure about the role that climate change adaptation plays in their decision-making. Although the sample size was small, Nunavut asset managers were slightly less likely than the Canadian average to report that climate change adaption plays a role in their decision-making, despite the acute pressures of climate change in the Arctic.

FIGURE 63

Share of public infrastructure owners that factored climate change into asset management



Source: Canada's Core Public Infrastructure Survey

The backlog of infrastructure needs and limited financial and planning capacity makes it more difficult to secure the additional funding and planning capacity for climate-resilient infrastructure—even if that investment would save money over time through reduced maintenance costs and extended asset life.[823] Nunavut faces a vicious cycle in which increased maintenance costs resulting from climate impacts undermine investment in new infrastructure and in climate resilience.

817 Rogers, "Nunavut unprepared for rising levels of rain, snow."
818 CBC News, "Flash flood hits Kimmirut, Nunavut," 2012, https://www.cbc.ca/news/canada/north/flash-flood-hits-kimmirut-nunavut-1.1159428.
819 Lisa Gregoire, "Nunavut's most northerly community may get new power plant by 2017," Nunatsiaq News, 2013, https://nunatsiaq.com/stories/article/65674nunavuts_most_northerly_community_may_get_new_power_plant_by_2017/ ; Steve Ducharme, "Nunavut power utility starts repairs in Grise Fiord, Pangnirtung," Nunatsiaq News, January 13, 2016, https://nunatsiaq.com/stories/article/65674nunavut_power_utility_starts_repairs_in_grise_fiord_pangnirtung/
820 Research interview, 2020.
821 Inuit Tapiriit Kanatami, "National Inuit Climate Change Strategy," 2019, https://www.itk.ca/wp-content/uploads/2019/06/ITK_Climate-Change-Strategy_English_lowres.pdf.
822 Ford, Bell, and Couture, "Chapter 5: Perspectives on Canada's North Coast Region."
823 Research interview, 2020.

Governance and ownership

Effective infrastructure planning, construction, and asset management depend on effective decision-making and clear ownership. Implementation of the *Nunavut Agreement* calls for an approach to infrastructure that includes a focus on promoting Inuit self-determination.

At the same time, the limited role of the private sector in Nunavut (driven by economic considerations) constrains the capacity to build and operate infrastructure.

Inuit organizations in Nunavut have been investing and building capacity to fill the infrastructure gap and ensure Inuit-led infrastructure development in the territory. These include investments in transportation infrastructure, daycare centres, and harbours and multi-use facilities that support Nunavut's harvesting economy. Inuit organizations also provide a range of investments to address the skills and human capacity gap through training programs to ensure Inuit capacity to build and operate infrastructure.

Inuit ownership and governance

Nunavut's "horizontal multilevel governance structure" is both unique and an important function of strengthening Inuit autonomy.[824] Inuit in Nunavut are participants in two democracies—as Canadian citizens, taking part in local, territorial, and federal elections, and as rights holders who elect representatives to their Regional Inuit Associations and Nunavut Tunngavik Inc. as part of an Inuit democracy that works together through Inuit Tapiriit Kanatami across the four regions of Inuit Nunangat.[825]

Closing Nunavut's infrastructure gap in a way that respects this democracy will necessitate a high level of coordination among federal, territorial, and local governments, the private sector, and Inuit organizations. Through the January 2020 Katujjiqatigiinniq Protocol, NTI and the Government of Nunavut have committed to working together to develop a long-term infrastructure plan to address Nunavut's infrastructure deficit, as well as to narrow "housing and other infrastructure gaps" and to "establish strategic partnerships for major infrastructure projects in Nunavut."[826]

Nunavut's distinct structures of governance require adequate time and resources for varied stakeholders and rights holders to participate fully in infrastructure planning processes. The *Nunavut Agreement* establishes key roles for Inuit organizations in infrastructure as decision-making bodies, investors, and service providers. About 18 percent of Nunavut lands are owned and controlled by Inuit organizations.

REGIONAL INUIT ASSOCIATIONS (RIAS)

Regional Inuit Associations are associated with NTI as Designated Inuit Organizations. The presidents of the three RIAs and NTI constitute the executive committee of NTI's board of directors. Inuit Impact Agreements, a feature of many infrastructure projects involving private entities, are negotiated with the relevant RIA, independent of municipalities or the Government of Nunavut.[827]

824 Phrasing from Thierry Rodon, "'Working Together': The Dynamics of Multilevel Governance in Nunavut 1," Arctic Review on Law and Politics 5, 2 (2014): 250–70.
825 Natan Obed, "Our Inuit Democracy in Canada," Arctic Journal, February 28, 2018, http://arcticjournal.ca/inuit-forum/inuit-democracy-canada/
826 "Katujjiqatigiinniq Protocol between Nunavut Tunngavik Incorporated and Government of Nunavut," 2020.
827 Rodon, "'Working Together': The Dynamics of Multilevel Governance in Nunavut 1."

RIAs and their affiliated organizations are active both as infrastructure advocates and as infrastructure creators. Some examples of RIA involvement in infrastructure include:

- Inuit investment and development corporations have financed and developed core public infrastructure such as the Qikiqtani General Hospital in Iqaluit, and the Kitikmeot Regional Health Centre in Cambridge Bay.
- Kivalliq Inuit Association is a core partner in the proposed Kivalliq Hydro-Fibre Link project, which would see the construction of a 1,200-kilometre, 150-megawatt transmission line between Nunavut and Manitoba. Through KIA, Inuit hold a 51 percent stake in the project, and the plan is for the proposed infrastructure to be 100 percent Inuit-owned eventually.[828]
- Qikiqtaaluk Corporation, as the regional development corporation of Qikiqtani Inuit Association (QIA), has been involved in several infrastructure projects, including the construction of wharves and commercial buildings.[829] Currently, the QIA-owned Qikiqtaaluk Business Development Corporation is building the first Inuit owned full-service hotel and conference facility in Iqaluit.[830]
- Kitikmeot Inuit Association is spearheading the Grays Bay and Port project through its subsidiary Nunavut Resources Corporation. The project involves the construction of a 227-kilometre all-weather road from a mineral-rich region of the Northwest Territories to a deep-sea port at Grays Bay in Nunavut.[831]

Private-sector investment

The development, delivery, and management of infrastructure in Nunavut is made more challenging by the limited role of the private sector. The lack of private involvement drives up costs, limits construction capacity, and places pressure on public institutions to fill gaps in the marketplace.

Private-sector involvement in Nunavut is limited because of the risks associated with challenging project conditions, the isolation of communities, the smaller project size that limits economies of scale, and a general lack of familiarity with the North. Even substantial requests for bidders on project construction can fail to attract competitive bids.[832]

Beyond construction and asset management, some areas of infrastructure that are generally "private" in other parts of Canada are public in Nunavut.

Housing is a prominent example of limited private-sector investment. The Nunavut Housing Corporation must address not only social and affordable housing needs, but also what would be considered "market housing" in other parts of Canada. Public funding and Inuit investment have also helped ensure that communities are served by broadband Internet and banking services. This challenge is also apparent in less visible infrastructure, such as a shortage of private funeral homes and cemeteries.[833]

828 Nunatsiaq News, "Canada Infrastructure bank to advise on Kivalliq hydro-fibre project."
829 See projects listed on http://www.qcorp.ca/en.
830 Qikiqtaaluk Corporation, "Iqaluit Hotel & Conference Centre," accessed June 2, 2020, https://www.qcorp.ca/en/project/iqaluit-hotel-conference-centre.
831 Grant Cameron, "New all-season gravel road in Canada's north a game-changer for region," Daily Commercial News , accessed June 2, 2020, https://canada.constructconnect.com/dcn/news/infrastructure/2020/03/new-all-season-gravel-road-in-canadas-north-a-game-changer-for-region.
832 Research interview, 2020.
833 Research interview, 2020.

Roles of municipal government

The small size of Nunavut communities limits the capacity of local government to fund and manage infrastructure. Iqaluit is the only municipal government in Nunavut that collects its own property tax, and the capital has a large role in funding, planning, and maintaining infrastructure. In the other 24 communities, the Government of Nunavut helps plan and deliver capital infrastructure projects. This unique responsibility for aspects of local infrastructure places further responsibility on the Government of Nunavut. Municipalities are, however, responsible for operating and maintaining local infrastructure assets, including water treatment facilities, wastewater treatment facilities, solid waste facilities, fire protection facilities, garages, community offices, recreation facilities.[834]

The unique shape of Nunavut's local government contributes to the infrastructure gap. One expert explained that hamlets may not have the capacity to apply for funding that would build that very capacity.[835] Federal infrastructure funding programs typically fail to take into account comparative capacity differences, meaning that Nunavut communities can struggle to secure adequate funding.

Role of the federal government

The role of the federal government within Nunavut differs from its role within the provinces and the other territories. Nunavut is the least devolved jurisdiction in Canada. The lack of devolved governance, at least at the present moment, means that more of the infrastructure decisions affecting Nunavut Inuit are made in Ottawa than in any other province or territory.

In 2019, the federal government, NTI, and the Government of Nunavut signed an agreement in principle for a devolution agreement. In the announcement of the agreement-in-principle, Premier Savikataaq highlighted that "our communities will begin to see the improvements with infrastructure and increase in employment."[836]

834 "Municipal Infrastructure Capital Standards and Criteria Manual," 2012, http://www.buildingnunavut.com/en/resourcesGeneral/Part_a_Standards_Manual_April_2012.pdf.
835 Research interview, 2020.
836 Nunavut News, "Nunavut Government, NTI, Feds Sign Devolution Agreement in Principle," 2019, https://nunavutnews.com/nunavut-news/full-story-nunavut-government-nti-feds-sign-devolution-agreement-in-principle/

State of repair

Much Nunavut infrastructure is operating close to or beyond its projected useful lifespan, including essential services such as power stations, water pipes, and health centres.[837] Most of it was built in the 1970s, 1980s, and 1990s, and is anticipated to require renewal or replacement in the near future. With limited resources and capacity, repair needs directly compete with new investment. For example, 41 percent of homes in Nunavut are in need of major repair, up from 20.2 percent in 2006.

Nunavut faces particular challenges to keep infrastructure in good repair. Mould, fires, leaks, and shifts in permafrost can render infrastructure unusable until repairs are made. Waiting for necessary supplies to be ordered and then shipped by sealift can prolong the amount of time a facility or asset is out of commission.[838]

The effective management of infrastructure across 25 communities is a logistical challenge, requiring coordination and monitoring. Equipment and personnel cannot be easily shared or redeployed. Hamlets have limited capacity to implement and maintain effective asset management practices; the resources required to inventory needed repairs across the territory, let alone organize solutions, are scarce.[839] This scarcity has compounding effects: asset management and preventative maintenance can help avert emergency repairs, but the consistent challenge of urgent repairs interferes with the ability to do asset management.[840] The urgent pushes out the important.

Challenges to maintaining good repair

The long Arctic winter, with its cold temperatures, high winds, and resulting short resupply season, makes maintenance and repair needs more frequent and more acute. Older buildings constructed by the federal government without adjustments for Arctic conditions have been particularly vulnerable to warping and disrepair.[841]

While managing the adverse impacts of freezing conditions requires vigilance, increasing levels of thaw have been even more destructive to infrastructure. Changes in permafrost have caused cracked foundations and sunken floors across the territory.[842] Climate change poses unique threats to infrastructure in the North.

Maintenance and repair challenges with one type of infrastructure can cause damage to other assets. A broken or underperforming furnace might cause a pipe to freeze and then break, leading to flooding or spilled sewage. A struggling ventilation system will contribute to mould, which can spread across entire structures. In 2012, a single burst pipe near an Iqaluit high school emptied nearly 20 million litres

837 This was a consistent theme in research interviews.
838 Carrol McCormick, "Iqaluit experience: A look at the $300M Iqaluit airport project," Rock to Road, 2018, https://www.rocktoroad.com/iqaluit-experience-5727.
839 From interviews; see also Infrastructure Canada, "Public Organizations with a Documented Asset Management Plan, by Core Infrastructure Assets," 2016. Nunavut and the Northwest Territories were the only two jurisdictions without any dedicated asset management plans.
840 More information on the value of asset management plans available in "The 2019 Canada Infrastructure Report Card," 2019.
841 CBC News, "'Smell of mould is always there': Nunavut housing crisis more dire as homes become too old to live in," 2018, https://www.cbc.ca/news/canada/north/nunavut-housing-crisis-worse-1.4948442.
842 CBC News, "Thawing permafrost sinks buildings, hikes costs in North," accessed June 2, 2020, https://www.cbc.ca/news/canada/north/thawing-permafrost-sinks-buildings-hikes-costs-in-north-1.1108686; Schreiber, "Melting permafrost and the housing crisis in the Arctic."

of water, effectively draining the city's reservoir.[843] These challenges are amplified by the practical challenges of repair. Even small home repairs are more difficult in Nunavut; "running to the hardware store" is not an option in many small communities.

Nunavut also faces high rates of fire damage, and the expense of repairing or rebuilding fire damaged infrastructure is higher too. As a result, getting adequate insurance for public assets is either expensive or impossible. The insurance deductible for schools in Nunavut was raised to $20 million in 2017, rendering six schools uninsurable.[844] From 2011 to 2019, the estimated cost of fire damage to housing units owned by the Nunavut Housing Corporation (NHC) was more than $23 million.[845]

State of repair issues in different sectors

HOUSING

According to the NHC, nearly half of public housing in Nunavut is more than 30 years old, either nearing or exceeding its projected lifespan of 40 years.[846] Because of the overall housing shortage, Nunavut Inuit continue to live in housing units where disrepair poses safety hazards and contributes to negative health outcomes.[847] Mould can cause respiratory issues like asthma; under-functioning ventilation systems can help spread tuberculosis, and a lack of running water or breaks in septic system pose sanitation risks. The improvement of housing units is urgent, but the funding needed to restore houses to a state of "livability" also reduces the budget available to build new units to reduce overcrowding. The NHC spends about $28,000 a year on utilities and maintenance for every unit it manages, with about $6,600 going to repairs and routine upkeep.[848]

POWER

Currently, 11 of the 25 diesel facilities are operating near or beyond their lifespan. Reliance on aging diesel infrastructure means that communities are more vulnerable to service interruptions or power outages, and that the Qulliq Energy Corporation must invest considerable funds to replace equipment.[849]

COMMUNITY, CULTURAL AND RECREATION

Mould and heating and ventilation challenges have put arenas in Resolute Bay and Cambridge Bay out of service for multiple seasons at significant cost.[850] Structural problems linked to permafrost shift closed the Cambridge Bay pool for most of the 2019 season.[851] Many of the repair needs of community infrastructure are linked to climate change and to vulnerabilities in other areas of local infrastructure.

843 Alyshah Hasham, "Broken water main forces most of Iqaluit to close," Toronto Star, 2012, https://www.thestar.com/news/canada/2012/01/13/broken_water_main_forces_most_of_iqaluit_to_close.html.
844 Nick Murray, "6 Nunavut schools are uninsurable because of past arsons."
845 Nunavut News, "Housing money going up in smoke due to fires," 2019, https://nunavutnews.com/nunavut-news/housing-money-going-up-in-smoke-due-to-fires/
846 Nunavut Housing Corporation, "Nunavut Housing Corporation, Annual Report 2018–19"; Frizzell, "'Smell of mould is always there.'"
847 CBC News, "'Smell of mould is always there.'"
848 Nunavut Housing Corporation, "Nunavut Housing Corporation, Annual Report 2018–19."
849 Environment and Natural Resources Standing Senate Committee on Energy, "Powering Canada's Territories," 2014, https://sencanada.ca/content/sen/Committee/412/enev/rep/rep14jun15-e.pdf.
850 Derek Neary, "Resolute seeks to reopen arena; close to $100,000 in repairs needed," Nunavut News, 2020, https://nunavutnews.com/nunavut-news/resolute-seeks-to-reopen-arena-close-to-100000-in-repairs-needed/
851 Kate Kyle, "Cambridge Bay swimmers left high and dry after community pool forced to close," CBC News, 2019, https://www.cbc.ca/news/canada/north/cambridge-bay-pool-closed-for-repair-1.5231195.

TRANSPORTATION

Because of the cost of paving and maintenance, few roads are paved and newly paved roads are not necessarily maintained, thereby increasing wear and tear on vehicles. The cost of road-mending equipment is also a major barrier. Likewise, a lack of paved runways significantly increases the cost and service time for aircraft.

In Nunavut, vehicles themselves are an essential component of many infrastructure systems. These include not only trucks for water, sewage, and fire protection, but also school buses, Zambonis, and construction vehicles. A major factor causing the disrepair of public-service vehicles is a lack of appropriate space for storage.[852] The supply of adequate structures for people is scarce, so equipment storage is often a lower priority. However, vehicles without heated garage space are more susceptible to breakdown, leaving communities vulnerable.

The supply of adequate structures for people is scarce, so equipment storage is often a lower priority. However, vehicles without heated garage space are more susceptible to breakdown, leaving communities vulnerable.

852 See, for example, Derek Neary, "Cambridge Bay DEA wants GN to take over school bus service," Nunavut News, 2020, https://nunavutnews.com/nunavut-news/cambridge-bay-dea-wants-gn-to-take-over-school-bus-service/; CBC News, "Life or death situation: 2 Nunavut hamlets get $300K for fuel truck garages," August 22, 2016, https://www.cbc.ca/news/canada/north/nunavut-funding-fuel-truck-garages-1.3730227; CBC News, "No fuel delivery in Sanikiluaq over weekend as all 3 trucks break down," 2015, https://www.cbc.ca/news/canada/north/no-fuel-delivery-in-sanikiluaq-over-weekend-as-all-3-trucks-break-down-1.2979311; Sarah Rogers, "Down to one sewage truck, Nunavut community declares state of emergency," Nunatsiaq News, 2015, https://nunatsiaq.com/stories/article/65674down_to_one_sewage_truck_nunavut_community_declares_state_of_emergency/

CONCLUSION

Nunavut stands apart in Canada in many ways. It is Canada's newest, youngest, and fastest-growing territory. It is Canada's only Indigenous-majority territory, defined by a unique structure created by the 1993 *Nunavut Agreement* to ensure Inuit self-determination. Yet, the territory's mother tongue, Inuktut, is still not recognized as one of Canada's official languages.

As this study makes clear, Nunavut also stands apart because of the realities of the infrastructure gap faced by Nunavut Inuit. Inadequate infrastructure was put in place decades ago when permanent communities were created in locations determined largely by Canada's trade and military interests. There was inadequate infrastructure when the *Nunavut Agreement* was signed. And there remains a gaping inequality today in the quality and quantity of infrastructure provided to Nunavut Inuit as compared with that provided to other citizens of Canada.

The infrastructure gap is felt in every aspect of life in Nunavut, such as in health care, where services can be limited and even routine medical procedures need to be accessed outside the territory. Infrastructure is often in poor repair, such as in housing. More than 40 percent of Nunavut housing requires major repairs and the gap between Nunavut and the rest of the country is growing. Infrastructure is often entirely absent, as in fibre-optic cable for broadband service. Nunavut still depends on unreliable satellite Internet. This absence is also reflected in national data, which sometimes ignore Nunavut because of its small population and other factors.

The infrastructure gap is exacerbated by Nunavut's history and geography. Nunavut Inuit live in 25 separate communities, so they cannot share infrastructure as is common in the South. The territory is also affected by climate change at a pace that outstrips other parts of the country, with major effects on a wide range of infrastructure assets.

The federal government has acknowledged and committed to closing the infrastructure gap, including through the Inuit-Crown Partnership Committee. The Arctic and Northern Policy Framework released in 2019 pledged to "close the gaps that exist between this region, particularly in relation to its Indigenous peoples, and the rest of the country." Sector-specific promises have been made as well, such as to eliminate reliance on diesel fuel for all Indigenous communities by 2030.

By partnering with Nunavut Inuit, Canada can live up to the promises of the Nunavut Agreement, build social equity, expand economic opportunity, and show real leadership as an Arctic nation.

This study makes manifest the progress that needs to be made to fulfil such promises.

The 55 indicators across 18 priority areas provide a comprehensive picture of the scope and scale of the infrastructure gap between Nunavut and the rest of Canada.

Measurement of the gap is only a first step, however. It lays the foundation for a detailed infrastructure needs assessment and an infrastructure plan for the territory, developed by Nunavut Inuit in partnership with the Governments of Nunavut and Canada and grounded in an Inuit vision for Nunavut's future.

The legacies of colonial approaches and decades-long underinvestment affect Nunavut Inuit to this day. By partnering with Nunavut Inuit, Canada can live up to the promises of the *Nunavut Agreement*, build social equity, expand economic opportunity, and show real leadership as an Arctic nation.

APPENDIX: PROJECT METHODOLOGY

The NTI Infrastructure Gap project provides a first-of-its-kind comprehensive assessment of the infrastructure gap between Nunavut and the rest of Canada. The research framework guiding the NTI Infrastructure Gap Project is designed to provide a clear and reliable measurement of the infrastructure gap between Nunavut and the rest of Canada across 18 priority areas (such as housing, telecommunications, and roads and sidewalks).

The 18 priority areas are complemented by six cross-cutting sections that provide details on specific aspects of infrastructure (such as state of repair) and make more general comparisons to other parts of Canada. Combined, these 24 analyses close an important gap in data on the relative scale of Nunavut's infrastructure deficit, and highlight infrastructure priority areas where gaps are particularly large or worsening in comparison to other parts of Canada. The report was guided by NTI, with report research and drafting led by Drew Fagan, who is a professor at the Munk School of Global Affairs and Public Policy at the University of Toronto, and a team from Springboard Policy including Noah Zon, Michael Pelz, Jasmine Irwin, Jamie Van Ymeren, and Adrienne Lipsey.

There are no consistent standards on the appropriate quantity or type of infrastructure to serve a community. To measure the gap, this project relies on comparing Nunavut to other provinces and territories, or to a Canadian average through 55 distinct indicators. While provincial and territorial averages can obscure differences within Nunavut and other provinces and territories, the report includes detail on the different ways that the infrastructure gap is experienced by Nunavut Inuit in different communities across Nunavut.

The indicators selected for this study were chosen for the ability to make comparisons using similar data between Nunavut and other parts of Canada. However, national surveys and studies systematically under-represent the North, either excluding the North altogether or combining data for the territories. Many examples are found in this report, including Nunavut not being included in regularly reported data on solid waste, while banking information sometimes combines Nunavut with the Northwest Territories. In housing, the Canada Mortgage and Housing Corporation only reports new housing construction for local areas with a population of 10,000 or greater, which excludes all of Nunavut. In other cases, information about Nunavut reported in national data sets is inaccurate. Transport Canada reports that all of Nunavut's roads are unpaved, despite paved roads being present in both Iqaluit and Rankin Inlet. This challenge, combined with the frequency of data releases, mean that these data sets do not fully reflect current realities of Nunavut infrastructure. Where possible the report provides additional context on infrastructure in Nunavut and highlights the limitations of each indicator.

In some cases, benchmarks of infrastructure service are set out in policy or standards (e.g. 50 Mbps download/10 Mbps upload speeds for broadband internet). Where available, the report compares infrastructure to these benchmarks. In other cases, data are presented on a per-capita or per-community basis and compared with national averages.

The analysis in the report highlights instances where gap measurement is made challenging or even unhelpful due to factors such as the isolated nature of Nunavut's 25 communities, the territory's small population, the Arctic climate, or Inuit-specific context.

The goal of the indicators is to provide the best possible information to assess the infrastructure gap between Nunavut and the rest of the Canada, and to inform efforts to close the gap, while placing those indicators in proper context focused on how the gap impacts Nunavut Inuit.

Research approach

- **Scoping phase:**
  The development of gap analysis research began with an initial phase of research in July 2019. This phase of work examined approaches to measuring infrastructure between Nunavut and Canada, and included an assessment of the quantity and quality of available infrastructure data for comparison.
- **Research and analysis:**
  The second phase of work began in October 2019 and involved confirming infrastructure priority areas, as well as conducting comparative research on the gap analysis in each area. The development of gap analysis research and infrastructure priority areas was informed by several inputs, including a November 2019 workshop in Iqaluit that included representatives of NTI and each of the RIAs.
- **Identification of infrastructure gaps:**
  The project team conducted research from December 2019 to June 2020 on the relative scale of Nunavut's infrastructure gap in each of the 18 priority areas and cross-cutting factors. The team used publicly available data, such as Statistics Canada data sets, to quantify the infrastructure gap, as well as data shared with the project team by NTI and the Government of Nunavut and information gleaned from academic articles and grey literature (information produced by government agencies, academic institutions, and other organizations that is usually not widely available).

  Many of the priority areas include indicators that report on physical infrastructure (e.g. number of harbours in Nunavut), as well as indicators that report on the impact of infrastructure (e.g. fire damage). The combination of both types of indicators in the study serves to capture multiple dimensions of the infrastructure gap in Nunavut, and to help document the different ways Nunavut Inuit are impacted by shortfalls in infrastructure.
- **Expert interviews:**
  The project team conducted 21 interviews with policymakers and infrastructure stakeholders in Nunavut in April and May 2020 to support gap analysis research. The interviews were designed to ensure the project used the most appropriate and comprehensive data for national comparisons, build greater context for the infrastructure gap, and to help close data gaps identified by the research team and/or advisory panel.
- **Advisory panel:**
  The project was supported by an advisory panel to help guide and validate the report during the research and drafting phases from February to July 2020. The panel included a representative from each of the three RIAs in Nunavut, as well as three independent members with distinct knowledge and experience with Nunavut infrastructure needs, policy, and broader context. Independent members of the advisory panel received an honorarium for their time supporting the project.

Advisory panel members	
RIAs	**Independent Advisors**
Paul Emingak, Executive Director, Kitikmeot Inuit Association (KIA)	**Madeleine Redfern,** Executive Director of Northern Branch**,** Arctic360 /Ajungi Group (former Iqaluit Mayor, former NAM President, former FCM board/FCM Northern Caucus Member)
Stephen Williamson Bathory, Special Advisor, Qikiqtani Inuit Association (QIA)	**Lori Kimball**, Associate Vice President, Finance, University of Guelph
Qilak Kusugak, Executive Director, Kivalliq Inuit Association (KivIA)[853]	**Jessica M. Shadian**, PhD, President and CEO, Arctic360 and Distinguished Senior Fellow, Bill Graham Centre for Contemporary International History

Priority area indicators

The 55 indicators covered in the 18 priority areas in this report fall under one of three interconnected themes. **Energy and the environment** priority areas measure infrastructure that provide key services and necessary conditions for basic existence, such as access to drinking water and power. The theme of **people and communities** considers infrastructure that supports individual and community needs, such as healthcare facilities and recreational centres. Lastly, the **connections** gap analyses focus on infrastructure that helps drive economic development and impacts the extent Nunavut can access information as well as goods and services. This area also includes infrastructure supporting the transportation of people and goods.

Priority areas		
Energy and environment	**People and communities**	**Connections**
Power	Housing	Ports and harbours
Drinking water	Food sovereignty	Telecommunications
Wastewater	Health	Roads and sidewalks
Solid waste	Education	Air
Emergency response and protection	Community, culture, and recreation	Customs and tourism
	Community justice	Banking
		Rail

In most gap analyses, comparisons between Nunavut and other parts of Canada are based on two types of indicators, one centred on physical infrastructure and another on how infrastructure impacts the lives of Nunavut Inuit.

853 The research team also thanks Madeline Kaludjak for participating on the advisory panel as Acting Executive Director of Kivalliq Inuit Association.

- **Physical infrastructure indicators:**
  These indicators compare physical infrastructure in each of the priority areas, such as the number of bank branches available per capita, or length of roadway per 100,000 km^2. Analysing physical infrastructure that is generally consistent between jurisdictions is needed for methodologically sound comparisons. In some cases, nationally comparable data are not available, or different types of comparisons are more relevant. These cases are clearly identified within the report.
- **Impact indicators:**
  These indicators capture the impact of infrastructure shortages on the daily lives of Nunavut Inuit, and how these may differ from other parts of Canada. For example, the housing section includes an indicator that measures the number of households with a member on a waiting list for public housing. In this case, high waiting lists are an impact of a shortage of physical housing infrastructure.

Wherever possible, the research team used the latest data available for each of the indicators, with the majority of data used to inform comparisons between Nunavut and other parts of Canada dating from 2016 or later.

Energy and the environment

Power

The research team used four indicators to compare power infrastructure between Nunavut and other parts of Canada. These indicators were sourced from the national, provincial, and territorial energy profiles published by the Canada Energy Regulator. Data for the indicators are from 2018, with the exception of information on annual electricity consumption, which is based on 2017 figures.

Indicator	Details	Data sources
Total annual power generation	This indicator measures the total number of megawatt hours of power generated nationally in 2018, and in each province and territory. Data are presented on a per-capita basis to account for different population sizes in each province and territory.[854] Population data were sourced from Statistics Canada Population quarterly population estimates, using fourth-quarter data from 2018.[855]	Canada Energy Regulator, provincial & territorial energy profiles Statistics Canada, Population estimates, quarterly

854 Canada Energy Regulator, Provincial and Territorial Energy Profiles. https://www.cer-rec.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/index-eng.html
855 Statistics Canada, population estimates, quarterly: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1710000901

Maximum generating capacity	This indicator measures the maximum amount of electricity that can be generated at a given time in each province and territory in Megawatt hours in 2018.[856] Maximum capacity represents the total possible electricity produced if all production infrastructure is running at its full potential. To weight the impact of provincial and territorial populations, data are presented on a per-capita basis by 10,000 persons. Population data are sourced from Statistics Canada, quarterly population estimates from the fourth quarter of 2018.	Canada Energy Regulator, Provincial & territorial energy profiles Statistics Canada, Population estimates, quarterly
Share of electricity produced by renewable sources	This indicator reports on the share of power generated by renewable power sources in 2018.[857] National, provincial, and territorial shares of renewable sources are determined by adding together the percentages of power generated in the following categories: > Hydroelectric/tidal > Wind > Biomass/Geothermal > Solar	Canada Energy Regulator, Provincial & territorial energy profiles
Annual electricity consumption, megawatt hours	This indicator reports on the amount of power used on a per-capita basis nationally, and by province and territory in 2017.[858] Annual power consumption highlights the actual amount of power residents of different parts of the country use each year in their homes. As these data were already presented on a per-capita basis from the Canada Energy Regulator, no further calculations were required by the research team.	Canada Energy Regulator, Provincial & territorial energy profiles

Drinking water

The research team used four indicators to compare the state of drinking water infrastructure in Nunavut to other parts of Canada. Data are sourced from the Statistics Canada Core Public Infrastructure Survey, as well the Statistics Canada biennial survey on drinking water plants, and covers 2016 and 2017.

856 Canada Energy Regulator, Provincial and Territorial Energy Profiles. https://www.cer-rec.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/index-eng.html
857 Canada Energy Regulator, Provincial and Territorial Energy Profiles. https://www.cer-rec.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/index-eng.html
858 Canada Energy Regulator, Provincial and Territorial Energy Profiles. https://www.cer-rec.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/index-eng.html

Indicator	Details	Data sources
Length of drinking water pipes per capita	This indicator compares the length, in kilometres, of local water pipes and transmission-sized pipes for drinking water in Nunavut compared with other jurisdictions in Canada. It is self-reported by government bodies in the Core Public Infrastructure Survey and current to 2016.[859] Data are presented on a per-capita basis, using population estimates from Statistics Canada based on the 2016 Census.[860] This survey comes with limitations as it relies on self-reported data, and may not capture all drinking water pipes in Nunavut.	Statistics Canada, Table 34-10-0192-01 Inventory of publicly owned potable water assets, Infrastructure Canada Statistics Canada, Population size and growth in Canada (2016 Census)
Share of population served by drinking water plants	This indicator measures the share of the population that receives drinking water by drinking water treatment infrastructure in 2017 (i.e. public plants rather than private systems such as wells). Data are sourced from the Statistics Canada biennial survey on drinking water plants.[861]	Statistics Canada., Table 38-10-0093-01 Population served by drinking water plants
Physical condition rating of drinking water infrastructure	This indicator compares the self-reported condition of different types of public drinking water infrastructure, current to 2016 from the Core Public Infrastructure Survey.[862] Potable water assets include water treatment facilities, water reservoirs, storage tanks, water pump stations, as well as water pipes of different sizes. Self-reported condition types range from very poor to very good. Data are available nationally, and by province and territory.	Statistics Canada, Table 34-10-0196-01 Inventory distribution of publicly owned potable water assets by physical condition rating, Infrastructure Canada

859 Statistics Canada, Inventory of publicly owned potable water assets, Infrastructure Canada.
860 Statistics Canada, Population size and growth in Canada: Key results from the 2016 Census. https://www150.statcan.gc.ca/n1/daily-quotidien/170208/dq170208a-eng.htm
861 Statistics Canada, "Operation and Maintenance Costs of Drinking Water Plants," Biennial Drinking Water Plants Survey, accessed June 11, 2020, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3810010301
862 Statistics Canada, Inventory distribution of publicly owned potable water assets by physical rating condition, Infrastructure Canada. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410019601

Investment in drinking water infrastructure per capita (capital and operating)	This indicator reports on the operation and maintenance costs of drinking water plants in Canada, and by province and territory in 2017, sourced from the Statistics Canada Biennial Drinking Water Plants Survey.[863] Expenses are presented on a per-capita basis, based on data from Statistics Canada's 2016 Census.[864]	Statistics Canada, Table 38-10-0103-01 Operation and maintenance costs of drinking water plants Statistics Canada, Population size and growth in Canada (2016 Census)

OTHER INDICATORS CONSIDERED

- **Cost of drinking water for residential use:**
  Nunavut Inuit face much higher costs for drinking water than residents of the South. However, because approximately 40 percent of Canadian households do not have metered water (i.e. the amount they pay is not tied to their use), and because the costs of water are accounted for differently in different jurisdictions, it is not possible to compare this systematically.

- **Boil water advisories:**
  This would provide a tangible measure of the failure points of public water infrastructure. However, because data to the Canadian Network for Public Health Intelligence are self-reported by communities (with several gaps) and the Households and the Environment Survey (which captures boil water advisories reported by households) does not cover the territories, comparative analysis is not viable.

- **Potable drinking water use per capita:**
  These data, which are available from the Survey of Drinking Water Plants provide a breakdown of total potable water use per capita, with residential use divided from other (e.g. industrial) use. Nunavut has lower water use than any other province and territory, as noted earlier. However, it is unclear whether this indicator reflects different usage patterns (e.g. less wasteful practices in Nunavut homes) or the extent to which cost and infrastructure are barriers.

- **Number of drinking water facilities per capita:**
  As part of the Core Public Infrastructure Survey, government bodies report on the infrastructure that they have in their communities. For drinking water facilities, this includes water treatment facilities, water reservoirs, storage tanks not part of a water treatment facility, and water pump stations. These could be compared for each infrastructure type or in aggregate. However, a pure count of infrastructure units does not necessarily enrich analysis in comparison to other indicators. Nunavut has a high number of facilities per capita, but those are in many cases less sophisticated than those in peer jurisdictions, and the number reflects the small, dispersed nature of communities.

863 Statistics Canada, "Operation and Maintenance Costs of Drinking Water Plants," Biennial Drinking Water Plants Survey, accessed June 11, 2020, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3810010301
864 Statistics Canada, Population size and growth in Canada: Key results from the 2016 Census. https://www150.statcan.gc.ca/n1/daily-quotidien/170208/dq170208a-eng.htm

Wastewater

The research team used three indicators to draw comparisons in wastewater infrastructure between Nunavut and other parts of Canada. All of the indicators are based on the Statistics Canada inventory of wastewater assets, which forms part of the Core Infrastructure Survey, and are based on 2016 information.

Indicator	Details	Data sources
Kilometres of publicly owned sewer pipes less than 450 mm	This indicator measures the kilometres of publicly owned sewer pipes less than 450 mm in diameter in Nunavut compared with six provinces, and the Northwest Territories and Yukon from 2016 data. Analyzing Nunavut's small number of pipes helps document how Nunavut relies on trucked sewage. Data are sourced from the Statistics Canada 2016 inventory of wastewater assets.[865]	Statistics Canada Table 34-10-0222-01 Inventory of publicly owned wastewater assets, Infrastructure Canada
Sewer pipes state of repair	This indicator provides information about the physical condition of sewer pipes in Nunavut, compared with Canadian averages, based on 2016 data.[866] Sewers can be classified from being in very poor to very good condition.	Statistics Canada, Table 34-10-0226-01 Inventory distribution of publicly owned wastewater assets by physical condition rating, Infrastructure Canada
Sewage lagoons state of repair	This indicator shares information about the condition of sewage lagoons (e.g., poor, fair, good) in Nunavut in comparison with Canadian averages, based on 2016 data.[867] Unlike other parts of Canada, sewage lagoons represent a disproportionate amount of wastewater treatment systems in Nunavut. Sewage lagoons are classified as being in very poor to very good condition.	Statistics Canada, Table 34-10-0226-01 Inventory distribution of publicly owned wastewater assets by physical condition rating, Infrastructure Canada

OTHER INDICATORS CONSIDERED

- **Effluent measurements compared with WSER standards:**
  The Nunavut Water Board collects information around licensing, regulations, and reporting for each municipality in its public registry. Each community is supposed to submit an annual report with effluent monitoring reports attached, that could be referenced to compare effluent numbers to Canadian WSER standards. However, not every community has consistently submitted a report, and without more rigorous analysis of what each measurement means, conclusions may not be especially helpful in measuring the gap. In 2010, the Centre for Water Resource Studies at Dalhousie University entered into a five-year contract with Community and Government Services in the Government of

865 Statistics Canada, "Table: 34-10-0222-01: Inventory of Publicly Owned Wastewater Assets, Infrastructure Canada," 2016, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410022201.
866 Statistics Canada, "Table 34-10-0226-01 Inventory distribution of publicly owned wastewater assets by physical condition rating, Infrastructure Canada," https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410022601
867 Statistics Canada, "Table 34-10-0226-01 Inventory distribution of publicly owned wastewater assets by physical condition rating, Infrastructure Canada," https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410022601

Nunavut to investigate wastewater treatment processes in Nunavut. A major report published at the conclusion of Dalhousie's work indicated that in-depth research on four specific communities showed a consistent failure: "in comparison to the southern WSER standards, none of the WSPs could meet the 25 mg/L CBOD5 at any time."[868] Although they did sometimes meet WSER standards on other measurement scales, it seems reasonable to conclude that most water treatment systems in Nunavut would not meet WSER standards.

- **Lagoon issues flagged in inspection reports:**
  The Nunavut Water Board collects reports filed by inspectors on its public registry. The research team considered going through inspection reports for each community and looking for flagged issues in inspection reports. While the inspection reports were helpful for additional context, they were often written and filled out in different ways with varying amounts of detail (and not every community was up to date on posting reports), meaning that extracting comparative information would have been difficult to do with accuracy.

Solid waste

Limited data make consistent comparisons between solid waste infrastructure in Nunavut and the rest of Canada challenging. Much of the solid waste data collected in Canada are either not collected or reported for the North (i.e. Statistics Canada declines to publish data for smaller jurisdictions because of privacy reasons). Environment Canada's guidance for waste management in the North simply assumes that Northerners generate the Canadian average 965 kg per person on average in annual waste, and relies on a one-time waste audit of Whitehorse to make predictions about the composition of that waste.[869]

For a reliable national comparison, the research team used three indicators from the Core Public Infrastructure Survey.[870] Infrastructure Canada reports that the original round of the survey (which launched in 2017) received a 90 percent response rate.[871] However, the data have their limitations both for Nunavut (listing 16 active dumps or landfills for Nunavut when each community has a site) and with limitations for some other provinces and territories as well.

Indicator	Details	Data sources
Dumps as a share of waste disposal sites	This indicator measures the percentage of waste disposal facilities in Nunavut, compared with the Canadian average, and selected provinces and the Northwest Territories, based on 2016 data.[872] The research team excluded closed dump sites from this calculation as they do not reflect current abilities to deal with waste. Quebec, PEI and Yukon have also been excluded from this comparison due to unreliable data.	Statistics Canada, Table 34-10-0236-01 Inventory of publicly owned solid waste assets, Infrastructure Canada

872 Infrastructure Canada; Statistics Canada, "Inventory of Publicly Owned Solid Waste Assets."

Waste diversion facilities per capita	This indicator measures the number of waste diversion assets per 10,000 people in each province or territory, in 2016. Waste diversion assets include composting facilities, materials recovery facilities (that support recycling) and anaerobic digestion for organic waste.[873] Population data are sourced from Statistics Canada, based on the 2016 Census.[874]	Statistics Canada, Table 34-10-0236-01 Inventory of publicly owned solid waste assets, Infrastructure Canada Statistics Canada, Population size and growth in Canada (2016 Census)
State of repair of solid waste infrastructure	This indicator measures the reported condition of solid waste infrastructure by different types of infrastructure for Canada, and for Nunavut, based on data from the Core Infrastructure Survey.[875] Solid waste infrastructure includes transfer station assets, landfills, as well as dump sites. State of repair for these facilities is classified between very poor to very good.	Statistics Canada, Table 34-10-0240-01 Inventory distribution of publicly owned solid waste assets by physical condition rating, Infrastructure Canada

OTHER INDICATORS CONSIDERED

- **Waste disposal per capita:**
  While it would be possible to compare Nunavut with other Canadian jurisdictions on a per-capita basis for waste disposal facilities (similar to the indicator for waste diversion facilities) the research team assessed this indicator as misleading—the high coverage for Nunavut would primarily reflect the isolated nature of communities.
- **Recycling rates or organic composting rates:**
  While these indicators could reflect the impact of the state (or lack) of infrastructure, data are generally quite limited for the North and this is more directly reflected in the absence of waste diversion infrastructure in Nunavut.
- **Presence of consumer hazardous waste programs or Extended Producer Responsibility programs:**
  Some limited data are available about the extent to which households have access to household hazardous waste or other extended producer responsibility waste management programs. This includes some analysis of other Northern regions (e.g. Nunavik). However, this requires fairly granular analysis and focuses primarily on programming rather than infrastructure.

873 Infrastructure Canada; Statistics Canada.
874 Statistics Canada, Population size and growth in Canada: Key results from the 2016 Census. https://www150.statcan.gc.ca/n1/daily-quotidien/170208/dq170208a-eng.htm
875 Infrastructure Canada and Statistics Canada, "Inventory Distribution of Publicly Owned Solid Waste Assets by Physical Condition Rating," 2018, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410024001

Emergency response and protection

The research team used three indicators to inform a comparison on emergency response and protection infrastructure in Nunavut to other parts of Canada. The indicators share data about coast guard and rescue stations, firefighting infrastructure, and damages from fires. A variety of sources informed the indicators, including data from the Canadian Coast Guard, National Fire Protection Association, Nunavut Community Infrastructure Plans, as well as reports on fire damage in Nunavut and other provinces and territories.

Indicator	Details	Data sources
Coast guard search and rescue stations	This indicator reports on the number of Canadian Coast Guard bases and stations, as well as the number of inshore rescue boat stations in each province and territory. Inshore rescue boat stations differ from coast guard bases in that they are only operated seasonally. The number of coast guard and inshore stations was calculated manually by the research team, based on current data from the Canadian Coast Guard website.[876]	Canadian Coast Guard, Vessels Canadian Coast Guard, Inshore rescue boat station locations
Firefighting infrastructure	This indicator reports on the state of firefighting infrastructure from the most recent community infrastructure plans in Nunavut, from 2018-2020, against a nation-wide baseline established in a recent National Fire Protection Association study from 2018.[877] Nunavut firefighting infrastructure is compared specifically against small communities in Canada.	National Fire Protection Association, Canadian Fire Department Profile, 2014-2016 Nunavut Community Infrastructure Plans

876 Canadian Coast Guard, Vessels, https://inter-j01.dfo-mpo.gc.ca/fdat/vessels; Fisheries and Oceans Canada Government of Canada, "Station Locations," May 16, 2019, https://www.ccg-gcc.gc.ca/search-rescue-recherche-sauvetage/irb-esc/station-location-emplacement-eng.html.

877 Community Profiles – Government of Nunavut," accessed March 12, 2020, http://www.buildingnunavut.com/en/communityprofiles/communityprofiles.asp; Hylton Haynes and Gary Stein, "Canadian Fire Department Profile, 2014-2016," February 2018, National Fire Protection Association.

Fire Damage	This indicator compares the dollar value of fire losses on a per-capita basis for Nunavut against seven provinces and the Northwest Territories. Data for Nunavut are based on figures from the Nunavut Office of the Fire Marshall from 2013 to 2017.[878] The five-year average from 2013 to 2017 from Nunavut is compared against data reported by the Canadian Council of Fire Marshalls and Fire Chiefs for the period between 2003 and 2008 for seven provinces and the Northwest Territories. Data for provinces and the Northwest Territories are presented on a per-capita basis, and adjusted to 2017 CAD. Population data are from Statistics Canada, based on Q2 population estimates.[879]	Government of Nunavut, Department of Community and Government Services, Office of the Fire Marshal 2017 Annual Report Fire Losses in Canada - Year 2007 and Selected Years Statistics Canada, Canada's population estimates and demographic growth (2007)

People and communities

HOUSING

The research team used four indicators to compare the state of Nunavut housing to other parts of the country. Two of the indicators, housing suitability, and housing in need of major repair are components of Core Housing Need (CHN).[880] CHN is a measure used by the CMHC and is one of the Canadian poverty reduction strategy indicators used to track households in need of assistance.

Indicator	Details	Data sources
Housing suitability	This indicator measures whether a house has enough bedrooms for the size and composition of household residents in 2018, compared with other provinces and territories. Data from this indicator help show the extent to which Nunavut has more overcrowded homes than other parts of the country. The research team calculated data by examining the percentage of households categorized as "not suitable" nationally, and for each province and territory.[881]	Statistics Canada, Table 46-10-0043-01, Housing suitability and dwelling condition, by tenure including social and affordable housing

878 Government of Nunavut, "Office of the Fire Marshall 2017 Annual Report"; Mahendra Wijayasinghe "Fire Losses in Canada, 2007 and Selected Years," September 2011, Government of Alberta.
879 Statistics Canada, Canada's population estimates and demographic growth. https://www150.statcan.gc.ca/n1/daily-quotidien/070628/t070628c-eng.htm
881 Statistics Canada. Table 46-10-0043-01, Housing suitability and dwelling condition, by tenure including social and affordable housing

Housing in need of major repair	This indicator reports on the condition of individual homes, and whether major repairs are required, based on 2018 data nationally, and by province and territory. Major repairs include key updates to plumbing, electoral wiring and structural repairs, and does not include "desirable remodelling or additions."[882]	Statistics Canada, Table 46-10-0043-01, Housing suitability and dwelling condition, by tenure including social and affordable housing
Households with a member on a waiting list for public housing	This indicator measures the percentage of households that have a member on a waiting list for public housing in 2018, compared against national, provincial, and territorial data. Data were collected based on the percentage of households classified in each region as being on a waiting list.[883]	Statistics Canada, Table 46-10-0042-01, Waitlist status including length of time, by tenure including social and affordable housing
Capacity and adequacy of emergency shelters for victims of abuse	This indicator reports on occupancy rates of short-term facilities for victims of abuse for Nunavut in comparison to the rest of Canada, including data on the percentage of facilities that are full, as of 2017/2018. Data are sourced from a Statistics Canada report on Canadian residential facilities for victims of abuse.[884]	Statistics Canada, Canadian residential facilities for victims of abuse, 2017/2018

OTHER INDICATORS CONSIDERED

› **New home construction:**
The number of new homes constructed in Nunavut could provide information on whether current housing infrastructure deficits are being resolved, or not, through the creation of new homes. For example, the Nunavut Housing Corporation reports that it is building 185 public housing units by the end of 2019-20.[885] Comparing the number of new dwellings built in Nunavut with other provinces and territories could also highlight whether there are gaps between other regions and Nunavut in housing construction. However, this indicator was not selected because of difficulty accessing data and for methodological reasons. Although annual data are available on the number of public housing projects in Nunavut, CMHC does not currently report on new private housing construction in CMAs with population of less than 10,000, which excludes Nunavut. This is a barrier to sound comparison in housing stock between Nunavut and the rest of Canada.

882 Statistics Canada, Release Plan and Concepts Overview of the 2018 Canadian Housing Survey, https://www.statcan.gc.ca/eng/statistical-programs/document/5269_D1_V1#a3; Statistics Canada. Table 46-10-0043-01, Housing suitability and dwelling condition, by tenure including social and affordable housing
883 Statistics Canada. Table 46-10-0042-01 Waitlist status including length of time, by tenure including social and affordable housing
884 Statistics Canada, "Canadian Residential Facilities for Victims of Abuse, 2017/2018."

Food sovereignty

The research team used three indicators to compare infrastructure related to food sovereignty between Nunavut and other parts of Canada. The indicators cover stages of food travel and transfer, commercial food costs for consumers, and a comparison on Canadian Food Inspection Agency (CFIA) licensed food establishments. The indicators were sourced from Nutrition North Canada, the 2017 Nunavut Food Price Survey, and the CFIA database, respectively.

Indicator	Details	Data sources
Stages of food travel and transfer	This indicator compares the steps of travel needed to bring a commercial food staple to a retail store in Nunavut with Lac Brochet, Manitoba (a fly-in First Nations Community), as well as for retail stores in southern Canada.[886]	Enrg Research Group, "Northern Food Retail Data Collection & Analysis"
Commercial food costs for consumers	This indicator compares average food prices for several staples, such as flour, eggs, and milk compared with the Canadian average, based on 2017 data.[887]	2017 Nunavut Food Price Survey
Number of Canadian Food Inspection Agency (CFIA) licensed food establishments	This indicator shares information on the number of CFIA licensed facilities in Nunavut as of 2020. Facilities licensed though the CFIA may export food items to other countries or provinces/territories for specific items.[888] Data for Nunavut are compared with a sample of CFIA establishments in Yukon, the Northwest Territories, Newfoundland and Labrador, and PEI. These jurisdictions were selected as a comparison as they also have small populations, and P.E.I. and Newfoundland and Labrador rely on fisheries as a major local industry.	Canadian Food Inspection Agency, Safe Food for Canadians Licence Registry

886 Enrg Research Group, "Northern Food Retail Data Collection & Analysis."
887 2017 Nunavut Food Price Survey—Comparison of Nunavut & Canada CPI Food Price Basket Items available at Government of Nunavut, "Economic Data," accessed June 5, 2020, https://www.gov.nu.ca/executive-and-intergovernmental-affairs/information/economic-data.
888 List available at Canadian Food Inspection Agency, "Safe Food for Canadians Licence Registry," 2020, https://www.inspection.gc.ca/webapps/foodlicenceregistry/en/

Health

The research team used four indicators to compare differences in health infrastructure between Nunavut and other parts of the country. This includes indicators examining the number of hospital beds in each province and territory, as well as mental health and addictions beds. Data are also shared on government spending on out of jurisdiction health care, as well as a national comparison on access to a regular healthcare provider.[889]

Indicator	Details	Data sources
Number of hospital beds staffed and in operation, per capita	This indicator measures the number of hospital beds staffed and in operation nationally, and for each province and territory, based on data from 2018–19. Data are sourced from the "Hospital Beds Staffed and in Operation, 2018-2019" database from the Canadian Institute for Health Information (CIHI).[890] As data for Nunavut are not included in this database, the research team relied on information from the Government of Nunavut on the number of hospital beds available at Iqaluit's Qikiqtani General Hospital to support national comparisons. To weigh provincial and territorial populations, the research presented this data as a beds-per-capita total, based on Statistics Canada population estimates from the first quarter of 2019.[891]	Canadian Institute for Health Information, Hospital Beds Staffed and in Operation 2018-2019 Statistics Canada, Population estimates, quarterly
Mental health and addictions infrastructure	This indicator measures the number of staffed and in operation hospital beds dedicated to mental health and addictions by province and territory in 2018-2019, excluding Nunavut. Mental health and addictions beds are a sub-set of the hospital beds reported in the "Hospital Beds Staffed and in Operation, 2018-2019" database from CIHI.[892] Data are presented as a beds-per-capita total, based on Statistics Canada population estimates from the first quarter of 2019.[893] As Nunavut is not included in this survey, and the research team was unable to verify the specific number of mental health beds in the territory, the research team did not include a direct comparison between Nunavut and other regions (unlike total hospital beds, which is a more straightforward comparison).	Canadian Institute for Health Information, Hospital Beds Staffed and in Operation 2018-2019 Statistics Canada, Population estimates, quarterly

890 Canadian Institute for Health Information. Hospital Beds Staffed and In Operation, 2018–2019. Ottawa, ON: CIHI; 2020.
891 Statistics Canada, Health characteristics, two-year period estimates, census metropolitan areas and population centres. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310080501
892 Canadian Institute for Health Information. Hospital Beds Staffed and In Operation, 2018–2019. Ottawa, ON: CIHI; 2020.
893 Statistics Canada, Health characteristics, two-year period estimates, census metropolitan areas and population centres. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310080501

Government spending on out-of-jurisdiction health care	This indicator captures the annual spend by provincial and territorial governments on out-of-jurisdiction hospital care, as reported by Health Canada in 2018–19.[894] It does not include medical travel costs (which are sizeable in Nunavut). Data are presented on a per-capita basis, based on Statistics Canada population estimates from the fourth quarter of 2018.[895]	Health Canada Act, Annual Report 2018-2019 Statistics Canada, Population estimates, quarterly
Percentage of residents with a regular health care provider	This indicator measures the percentage of people who report having a regular healthcare provider in Nunavut, compared with other provinces and territories in Canada in 2017–18. Data are sourced from Canada Community Health Survey—Annual Component, as reported by Statistics Canada.[896]	Statistics Canada, Table 13-10-0805-01, Health characteristics, two-year period estimates

OTHER INDICATORS CONSIDERED

› **Advanced diagnostic equipment:**
The project team explored reporting on the amount of advanced diagnostic medical equipment in Nunavut, compared with the rest of Canada. This includes reporting on the number of CT scanners and MRIs in the territory, using data compiled by the Canadian Agency for Drugs and Technology in Health (CADTH).[897] Nunavut currently only has one CT Scanner (in Iqaluit), and no MRIs. Findings from this analysis highlight another infrastructure health gap, and document a reason why patients must travel for care. However, this indicator was not selected as the out-of-territory spending on health care measure covers the same issue (of limited infrastructure) at a broader level and supports clearer jurisdictional comparisons.

894 Health Canada, Annual Report on the Canada Health Act 2018-2019.
895 Statistics Canada, Health characteristics, two-year period estimates, census metropolitan areas and population centres. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310080501
896 Statistics Canada. Table 13-10-0805-01 Health characteristics, two-year period estimates, census metropolitan areas and population centres

Education

The research team relied on four indicators to compare education infrastructure in Nunavut to other regions of Canada. Data include the number of school-aged people per public school, access to licensed childcare facilities, the number of universities and colleges, and post-secondary attainment rates.

Indicator	Details	Data sources
Number of school-aged residents per public school	This indicator reports data on the average number of students under 19 per public school for Nunavut compared with other provinces and territories, as well as the national average. Data on the number of schools in each province and territory are sourced from provincial and territorial departments of education. Population data are sourced from Statistics Canada, population estimates from 2019 for ages under 19.[898]	School directories: Newfoundland & Labrador Prince Edward Island Nova Scotia New Brunswick Quebec Ontario Manitoba Saskatchewan Alberta British Columbia Yukon Northwest Territories Nunavut Population: Statistics Canada, Population estimates on July 1st, by age and sex

898 Population data from Statistics Canada, "Canada's Population Estimates: Age and Sex, July 1, 2019"; "Distribution of Population Aged 25 to 64 (Total and with Aboriginal Identity), by Sex and Educational Attainment". Provincial education information from Newfoundland and Labrador English School District, "NLESD School Directory"; Government of Prince Edward Island, "Schools in PEI"; Statistics Canada, Government of Nova Scotia, "Nova Scotia Directory of Public Schools"; Government of New Brunswick, "Department of Education – Welcome to the School Directory"; Gouvernement du Québec, "GDUNO – Recherche d'un Organisme"; Government of Ontario, "Education Facts, 2018–2019 (Preliminary)"; Government of Manitoba, "Schools in Manitoba"; Government of Saskatchewan, "Active List of Saskatchewan Schools / Programs Provincial K-12 Headcount Enrolment (as of September 30, 2018)"; Government of Alberta, "Student Population Statistics"; Government of British Columbia, "Education by the Numbers"; Government of Yukon, "Find a School"; Government of Northwest Territories, "Directory of NWT Schools"; Government of Nunavut, "Department of Education Annual Report 2016–2017."

Licensed childcare facilities	This indicator captures the number of regulated childcare spaces available in each jurisdiction in comparison to the total population of children for that age group, in 2016.[899] Though this, the indicator provides data on the share of children for whom a regulated childcare space is available. Data from Nunavut are compared with a national average, and other provinces and territories.	Martha Friendly et al, Early Childhood Education and Care in Canada, 2016
Universities and colleges	This indicator captures the number of university institutions in a jurisdiction and the number of college learning locations. Data on universities are from 2019, sourced from Universities Canada. College information is current as of 2020, based on data from Colleges and Institutes Canada.[900] Data have been adjusted to reflect that Yukon University began operations in May 2020.	Universities Canada Colleges & Institutes Canada
High school graduation and post-secondary attainment rates.	This set of indicators reflects the educational attainment of the population by national average, and for all provinces and territories. Data are specifically reported for the share of the working age population (25-64) with less than a high school degree from 2016–17, as well as on-time graduation rates. This indicator also reports on the share of the population with a bachelor's degree (or equivalent) or higher in 2018. Data are sourced from *Education in Canada: An International Perspective*, a report published yearly by Statistics Canada and the Council of Ministers of Education.[901]	Statistics Canada, Education Indicators in Canada: An International Perspective, 2019

OTHER INDICATORS CONSIDERED

- **Training facilities:**
  While Nunavut has dedicated Community Learning Centres staffed by adult educators in each community, the type of adult learning and skills training facilities varies significantly across and within provinces and territories. In most cases, this does not take place in dedicated infrastructure but rather in local post-secondary institutions, public schools, or other community spaces.
- **State of repair of schools:**
  No consistent information is available for the state of repair of educational infrastructure.

899 Friendly et al., Early Childhood Education and Care in Canada 2016.
900 Enrolment by University – Universities Canada," accessed June 9, 2020, https://www.univcan.ca/universities/facts-and-stats/enrolment-by-university/ Colleges and Institutes Canada, "Colleges and Institutes Canada by Province."
901 Statistics Canada; Council of Ministers of Education, "Education Indicators in Canada : An International Perspective 2019."

Community, culture and recreation

The research team compiled three indicators to compare community, culture and recreational infrastructure in Nunavut with other parts of Canada. Indicators report on the number of publicly owned sports and recreation facilities, the state of repair of public recreation facilities, and the economic impact of recreational and cultural enterprises.

Indicator	Details	Data sources
Number of publicly owned sports and recreation facilities, per capita	This indicator reports on the number of ice arenas, pools, multipurpose facilities and art and cultural facilities per 10,000 people in Nunavut compared with the Canadian average, and by province and territory. Data are from 2016, sourced from the Core Public Infrastructure Survey.[902] Population data for provinces and territories are from the 2016 Census.[903]	Statistics Canada, Table 34-10-0188-01 Inventory of publicly owned culture, recreation and sports facilities, Infrastructure Canada Statistics Canada, Population and Dwelling Count Highlight Tables, 2016 Census
State of repair of public recreation and sports infrastructure	This indicator shares data on the state of repair of outdoor sports fields, skate parks, community centres, presentation and performance spaces, as well as museums and archives in Nunavut to Canadian averages. Data are sourced from the Core Public Infrastructure Survey from 2016.[904]	Statistics Canada, Table 34-10-0180-01 Inventory distribution of publicly owned culture, recreation and sport facilities by physical condition rating, Infrastructure Canada
Economic impact of recreational or cultural enterprises	This indicator reports on the economic impact (GDP-per-capita) in sport, and separately, cultural enterprises in Nunavut compared with the rest of Canada in 2016 as a percentage of the economy. Data are sourced from Innovation, Science and Economic Development Canada (ISED)/ Statistics Canada data on registered enterprises in each province and territory.[905]	Statistics Canada, Culture and sport gross domestic product per capita and as a share of the total economy, 2016

OTHER INDICATORS CONSIDERED

- **Number of community centres and state of repair:**
  There is no centralized account of what facilities exist in each Nunavut community that might fall under the category of "community centre" (or community hall or multi-purpose facility), or any comprehensive and centralized account of these facilities across the rest of Canada, making it difficult to present a strong gap analysis.

902 Infrastructure Canada; Statistics Canada, "Table: 34-10-0188-01: Inventory of Publicly Owned Culture, Recreation and Sport Facilities Grouped."
903 Statistics Canada, "Population and Dwelling Count Highlight Tables, 2016 Census—Canada, Provinces and Territories."
904 Infrastructure Canada; Statistics Canada, "Table: 34-10-0180-01: Inventory Distribution of Publicly Owned Culture, Recreation and Sport Facilities by Physical Condition Rating."
905 Statistics Canada, "Table 1: Culture and Sport Gross Domestic Product per Capita and as a Share of the Total Economy, 2016," 2016, https://www150.statcan.gc.ca/n1/daily-quotidien/180227/t001a-eng.htm

- **Number of Elder and youth facilities:**
  There has been no publicly available centralized accounting of Elder and youth facilities for Nunavut in the last five years. NTI did a survey of youth and Elder facilities in 2003, and the ICSP community profiles speak to the existence of such facilities (and their state of repair), but more up-to-date information is needed in order to present an ordered account of these facilities.[906]
- **Number of public parks/playground spaces:**
  There is information available on territorial parks, but not parks as municipal gathering/and recreation spaces. No information is available on the state of repair of playgrounds or other youth outdoor space.

Community justice

The research team used three indicators to compare different types of community justice infrastructure in Nunavut to other parts of Canada. This includes corrections infrastructure, as well as data on policing and court infrastructure.

Indicator	Details	Data sources
Corrections infrastructure	This indicator reports on two elements of corrections infrastructure. This includes the number of people in remand and in sentenced custody in Nunavut compared with other provinces and territories in 2017–18, as well data on federal and territorial corrections facilities operating in Nunavut.[907] Data on persons in remand are sourced from Statistics Canada, while information on federal corrections facilities operating in Nunavut is based on data from Corrections Canada.[908] Data on facilities operated by the Government of Nunavut are sourced from research interviews, grey literature, and reports from the Government of Nunavut cited in the community justice section.	Statistics Canada, Average daily counts of adults under correctional supervision, by type of supervision and jurisdiction, 2017/2018 Correctional Service Canada, Institutional Profiles
Policing infrastructure	This indicator shares data on the number of police officers per 100,000 people in Nunavut compared with the rest of Canada in 2018. Per-capita data are sourced from Statistics Canada information on police personnel and selected crime statistics.[909] This data set also includes information on Criminal Code incidents per police officer, which is reported separately in this indicator.	Statistics Canada, Table 35-10-0076-01, Police personnel and selected crime statistics -

907 Statistics Canada, "Average Daily Counts of Adults under Correctional Supervision, by Type of Supervision and Jurisdiction, 2017/2018."
908 Correctional Service Canada, "Institutional Profiles."
909 Statistics Canada. "Table: 35-10-0076-01: Police Personnel and Selected Crime Statistics

Courts and sentencing infrastructure	This indicator shares information about the extent of physical court infrastructure in Nunavut, with broader comparisons made to several Canadian provinces. Data on courts in Nunavut are sourced from research interviews, the Courts Nunavut website, and additional grey literature.[910]	Nunavut Court of Justice For additional sources, see community justice section.

OTHER INDICATORS CONSIDERED

- **State of repair of correctional facilities:**
  State of repair is a helpful indicator that the research team has used on many other kinds of public infrastructure to gauge how that infrastructure is serving the community. However, Statistics Canada does not measure the state of repair of correctional institutions, nor do provinces and territories. As a result, comparative analysis is not possible.
- **Correctional beds per capita:**
  There is no centralized accounting for the number of beds by jurisdiction or security level. Some information is available on websites for each jurisdiction, but it is not consolidated in a comparable way, or adjusted to reflect jurisdictional need (i.e. crime rate/sentenced offenders).
- **Number of detention cells at RCMP detachments:**
  This would provide a tangible measure of the adequacy of local infrastructure to safely and comfortably house those whom the RCMP feel they need to detain. Anecdotal accounts seem to indicate that RCMP are unable to respond to calls as quickly as they would like, and when they are out on calls do not always have a safe and appropriate place to keep people in isolation who need it. Unfortunately, no such information is available publicly, and there are no comparable data for the rest of Canada.
- **Number of courthouses by jurisdiction:**
  This would be a helpful indicator to demonstrate the comparative impact of having a single purpose-built courthouse in the whole of Nunavut. However, while some jurisdictions list their courthouse/circuit court locations publicly, they do not often say whether the space was designed to serve as a courthouse (unlike in Nunavut, where court is held in community halls, etc.). Additionally, it is almost impossible to compare and contrast courthouse appearances by community by virtue of how sitting calendars are arranged.

910 Nunavut Court of Justice, "Nunavut Courts – Court Schedule." See additional citations in Community Justice chapter.

Connections

Ports and harbours

The research team used two indicators to compare marine infrastructure in Nunavut to other parts of the country.

Indicator	Details	Data sources
Number of ports	This indicator measures the number of ports owned by Transport Canada, as well as the number of Canada Port Authorities by province and territory.[911] Data on ports were last updated in 2018, and in 2020 for Canada Port Authorities. The sub-indicator on deep-water ports was measured by including all of the Canada Port Authorities, which operate large deep-water facilities in Southern Canada, as well as the Port of Churchill, which is currently Canada's only deep-water Northern port.	Transport Canada, List of Ports owned by Transport Canada Transport Canada, List of Canada Port Authorities
Number of harbours	This indicator measures the number of harbours that are listed in the Fisheries and Oceans Canada Small Craft Harbour program.[912] Data for Nunavut are compared against the number of harbours listed in other provinces and territories. Data on harbours in the Small Craft Harbour program were last updated in 2019.	Fisheries and Oceans Canada, Harbours list

OTHER INDICATORS CONSIDERED

- **Number of vessels transiting the Northwest Passage:**
  The research team explored including an indicator on vessel traffic visiting or transiting Nunavut waters. This could include the number of cargo ships crossing the Northwest Passage, and cruise ships visiting the region. A comparison of traffic volumes between Nunavut and other areas (e.g. the Russian Arctic) could indicate that tourist and commercial vessels may be choosing different northern waterways because of more comprehensive marine infrastructure elsewhere. However, this indicator was not selected as the number of vessels transiting waters in Nunavut is not a measure or direct outcome of infrastructure. Why ships choose travel through the Northwest Passage is a result of many factors (weather, shipping distances), with the availability of marine infrastructure in Nunavut likely having only an indirect influence. Vessels transiting the Northwest Passage also cross multiple jurisdictions, making comparisons specific to Nunavut difficult.

911 Transport Canada, Ports Owned and Operated by Transport Canada, https://www.tc.gc.ca/en/services/marine/ports-harbours/list-ports-owned-transport-canada.html; see also Transport Canada, List of Canada Port Authorities. https://www.tc.gc.ca/en/services/marine/ports-harbours/list-canada-port-authorities.html
912 Fisheries and Oceans Canada, Harbours List: https://www.dfo-mpo.gc.ca/sch-ppb/list-liste/harbour-list-liste-port-eng.html

Telecommunications

The research team relied on three indicators to compare telecommunications infrastructure between Nunavut and other regions of Canada. Data include information on fibre optic technology, Internet speeds and capacity, as well as LTE coverage in Nunavut and other parts of Canada.

Indicator	Details	Data sources
Availability of fibre optic technology	This indicator shares data on the percentage of households that have access to satellite or terrestrial broadband in Nunavut compared with the Canadian average in 2018. Data are specifically reported on access to satellite and terrestrial broadband.[913]	CMR 2019 - Retail fixed internet sector and broadband availability
Internet speed and capacity	This indicator includes information on the percentage of households that can access broadband 25 Mbps or faster. The number of households with access to unlimited data transfer services is also included. Data for Nunavut are compared with other provinces and territories, from 2018.[914]	CMR 2019 - Retail fixed internet sector and broadband availability
LTE Coverage	This indicator reports on current LTE coverage for Nunavut, and for provinces and territories. Data from 2018 are disaggregated by urban and rural communities. Information on LTE coverage is sourced from the 2019 CRTC Communications Monitoring Report.[915]	CRTC, Communications Monitoring Report 2019

Roads and sidewalks

The research team used two indicators to capture differences in road infrastructure between Nunavut and other provinces and territories. Indicators reported information on the length of roadway in different parts of Canada, as well as the physical condition of roadway.

Indicator	Details	Data sources
Length of roadway and sidewalks (per 100,000 km^2)	This indicator measures the length of public roadway and sidewalks in kilometres in 2016, per 100,000 km^2. Data on the length of roadway and sidewalks by province and territory are found in the Transportation in Canada 2018 Statistical Addendum (available publicly upon request).[916] To calculate the length of sidewalks and roads per 100,000 km^2, the research team relied on data on the land area of each province and territory, also available from Statistics Canada.[917]	Transport Canada, Transportation in Canada 2018 Statistical addendum Statistics Canada, Table 15.7 Land and freshwater area, by province and territory

913 Government of Canada, Open Government Portal, "CMR 2019—Retail Fixed Internet Sector and Broadband Availability.
914 Open Government Portal, "CMR 2019—Retail Fixed Internet Sector and Broadband Availability."(Table 9.2)
915 CRTC, "Communications Monitoring Report 2019 – Retail Mobile Sector," 2019,
916 Statistical Addendum to Transport Canada, Transportation in Canada 2018. https://www.tc.gc.ca/eng/policy/transportation-canada-2018.html
917 Statistics Canada, Table 15.7 Land and Freshwater area, by province and territory https://www150.statcan.gc.ca/n1/pub/11-402-x/2010000/chap/geo/tbl/tbl07-eng.htm

Physical condition of roadway	This indicator reports on the percentage of roadway that is in poor or very poor condition in Nunavut in 2016, compared with other provinces and territories in Canada.[918] The research team compiled data by adding together poor and very poor percentage scores for each of the road types analyzed by Canada's Core Public Infrastructure survey. This includes highways, arterial roads, collector roads, local roads, and lanes and alleys.	Statistics Canada, Table 34-10-0070-01 Inventory distribution of publicly owned road assets by physical condition rating

Air

The project team focused on two indicators to measure differences in air infrastructure between Nunavut and other regions of Canada. Data for both indicators are sourced from NAV Canada airport charts (current to March 26, 2020).[919]

Indicator	Details	Data sources
Number of paved runways	This indicator reports on the number of paved and unpaved runways for Nunavut, compared with Yukon and the Northwest Territories, current to March 26, 2020. To assemble this data, the research team individually analyzed NAV Canada airport charts for each of the 67 airports in Nunavut, the Northwest Territories and Yukon and categorized airport runways as paved or gravel.[920] Owing to project scope restrictions, the research team did not analyze individual airport charts for each airport found in Canadian provinces (there are about 1,000 land runways in Canada).[921]	NAV Canada, Canadian Airport Charts

918 Statistics Canada. Table 34-10-0070-01 Inventory distribution of publicly owned road assets by physical condition rating, Infrastructure Canada https://doi.org/10.25318/3410007001-eng

920 NAV Canada, Canadian Airport Charts: https://www.navcanada.ca/en/products-and-services/pages/aeronautical-information-products-canadian-airports-charts.aspx

921 See Transport Canada, Transportation in Canada 2018 Statistical Addendum, Table A1.

Average runway length	This indicator reports on the average length of runways, in feet, for all airports in Nunavut, the Northwest Territories, and Yukon as of March 26, 2020.[922] Data for territorial airports are compared with runway length at airports that are part of the National Airport System (NAS). There are 26 NAS airports, including all provincial and territorial capitals. Runway length at each airport is determined by take-off run available (TORA), a measurement reported by NAV Canada. For airports with multiple runways, data on the longest runaway available are included. The research team also compiled data on the number of runways in the territories between 6,000 and 7,999 feet and more than 8,000 feet, the approximate distances required for narrow- and wide-body jets, respectively, to safely take off. The data are compared with the number of runways of these lengths for airports associated with the top ten population centres in Canadian provinces. Owing to project scope restrictions, the research team did not individually analyze data on runway lengths for all land runways in Canada.	NAV Canada, Canadian Airport Charts

OTHER INDICATORS CONSIDERED

- **Runway lighting and navigation aids:**
  The project team explored including an indicator on runway lighting and pilot navigations aids. A report on Nunavut airport infrastructure previously indicated that many facilities in the territory have limited lighting and pilot guidance systems or may require visual-only landings.[923] The prevalence of airport lighting systems in Nunavut compared with other parts of Canada could highlight an additional infrastructure gap. This indicator was not selected, however, as there appear to be a wide range of different types of navigation aids and lighting systems used throughout Canada, making comparison difficult.

Customs and tourism

922 NAV Canada, Canadian Airport Charts: https://www.navcanada.ca/en/products-and-services/pages/aeronautical-information-products-canadian-airports-charts.aspx

The research team used three indicators to compare customs and tourism infrastructure in Nunavut to other parts of Canada. Data in this section cover the number of employers running travel accommodation businesses, three categories of Customs and border services (CBSA) locations, as well as GDP generated by tourism. The last indicator on GDP generated by tourism is presented on a per-capita basis.

Indicator	Details	Data sources
Number of employers running a travel accommodation business	This indicator shares details on the number of employers running travel accommodation business in Nunavut compared with other provinces and territories in 2019. Data are sourced from Statistics Canada, based on information from Innovation, Science and Economic Development Canada.[924]	Statistics Canada, Businesses - Canadian Industry Statistics
Customs and border service (CBSA) locations	This indicator shares information on the number of CBSA locations in Nunavut compared with other provinces and territories, current as of 2020. Data are sourced from the CBSA website, which includes a list of all offices in different parts of the country.[925] In separate charts, this indicator also shares data on commercial vessel CBSA offices, which are dedicated to providing customs processing services for marine vessels, such as cargo ships. In addition, CBSA offices dedicated to processing cruise ships are also included. Both of these indicators compare Nunavut to other regions of Canada and are sourced from the CBSA website cited above.	CBSA, Directory of CBSA Offices and Services
GDP per capita generated by tourism	This indicator shares information on GDP generated by tourism industries in Nunavut, compared with the national average, and other provinces and territories. Data are sourced from Statistics Canada, based on 2014 figures, and presented on a per-capita basis.[926] Population data are based on 2014 quarterly population estimates, also from Statistics Canada.[927]	Statistics Canada, Provincial and territorial tourism satellite account, 2014 Statistics Canada, population estimates, quarterly

Banking

924 'Traveler Accommodation – 7211 – Businesses – Canadian Industry Statistics – Innovation, Science and Economic Development Canada', accessed 11 March 2020, https://www.ic.gc.ca/app/scr/app/cis/businesses-entreprises/7211.
925 For a list of CBSA offices, see: https://www.cbsa-asfc.gc.ca/do-rb/provinces/ab-eng.html
926 Statistics Canada, Provincial and territorial tourism satellite account, 2014. https://www150.statcan.gc.ca/n1/daily-quotidien/181010/dq181010b-eng.htm
927 Statistics Canada, Table 17-10-0009-01 Population estimates, quarterly, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1710000901

The research team relied on four indicators to capture differences in banking infrastructure between Nunavut and the rest of Canada. This includes banking branches per capita, bank-owned ATMs per capita, and average annual spending on financial services. In addition, data are included on take-up rates of RESP and RRSPs in different parts of Canada.

Indicator	Details	Data sources
Bank branches per capita	This indicator measures the number of branches per 10,000 people in each province or territory. The data reflect the total numbers of branches from nine national banks published by the Canadian Bankers Association, current as of 2017, plus the First Nations Bank of Canada branches as of 2020.[928] Data for this indicator have been amended to further include locations for credit unions or caisses populaires, which generally offer a similar range of services to banks, sourced from the Canadian Credit Union Association. Data for credits unions are from 2019. Population data are sourced from Statistics Canada, based on 2017 population estimates.[929]	Canadian Bankers Association, Statistics on bank branches in Canada by province First Nations Bank of Canada, Find Branch/ATM Payments Canada, Financial Institutions Branch Directory Canadian Credit Union Association, National System Results 2019 Q3 Statistics Canada, Population estimates (2017)
Bank-owned ATMs per capita	This indicator measures the number of bank-owned ATMs per 10,000 people in each province or territory. Data reflect the total numbers of ATMs from nine national banks published by the Canadian Bankers Association, current as of October 2017, plus First Nations Bank of Canada ATMs in 2020.[930] Population data are sourced from Statistics Canada, based on 2017 population estimates.[931]	Canadian Bankers Association, Number of ABMs in Canada by province and territory First Nations Bank of Canada, Find Branch/ATM Statistics Canada, Population estimates (2017)

928 Calculations based on data from Canadian Bankers Association Association, "Bank Branches in Canada by Province"; Canadian Credit Union Association "Canadian Credit Union National Sector Results Third Quarter 2019." Data from First Nations Bank of Canada; and Payments Canada Payments Canada, "Financial Institutions Branch Directory."
929 Statistics Canada, Population Estimates, https://www150.statcan.gc.ca/n1/pub/12-581-x/2018000/pop-eng.htm
930 Data from Canadian Bankers Association Canadian Bankers Association, "Number of ABMs in Canada by Province." With data from First Nations Bank of Canada added
931 Statistics Canada, Population Estimates, https://www150.statcan.gc.ca/n1/pub/12-581-x/2018000/pop-eng.htm

Average annual spending on financial services	This indicator measures the average amount that Canadians report spending on financial services in a given year. This includes banking fees as well as other costs at alternative institutions (e.g. cheque cashing, wire transfers). Data, sourced from Statistics Canada, are reported on the basis of household spending in 2017, and are reported in a comparison between Iqaluit households and the Canadian average. Separately, this indicator also compares the three territorial capitals (Iqaluit, Yellowknife, and Whitehorse) and provinces and territories, as well as the Canadian average.[932]	Statistics Canada, Table 11-10-0222-01 Housing spending, Canada regions and provinces Statistics Canada, Table 11-10-0233-01 Household spending, three territorial capitals
Take-up rate for tax-advantaged savings accounts: Registered Education Savings Plans (RESPs) and Registered Retirement Plans (RRSPs)	This indicator measures the share of eligible children receiving the Canada Learning Bond and Canada Education Savings Grants in Registered Education Savings Plans in 2018. These are Government of Canada contributions to education savings that depend on having an eligible account in place at a participating financial institution. Data are sourced from the Canada Education Savings Program 2018 Annual Statistical Review.[933] Take up rates in Nunavut are compared with averages in other parts of the country. This indicator also reports on RRSP contributors as a percentage of tax filers in 2016 in Nunavut compared with other regions of the country. Data are sourced from Statistics Canada.[934]	Employment and Social Development Canada, Canada Education Savings Program: 2018 Annual Statistical Review Statistics Canada, Registered retirement savings plan contributors - Canada, provinces and territories

OTHER INDICATORS CONSIDERED

- **Access to banking infrastructure by share of population:**
  This would involve measuring access to banking infrastructure by share of population with a bank in their community or within a short driving distance of their community. However, with considerably more than 8,000 bank or credit union branches across Canada, it would require a significant exercise in GIS analysis to build this picture, and is beyond the scope of this report. While the World Bank does have data for Canada about the share of "unbanked" or "underbanked" Canadians, they are published only at an aggregate, nation-wide level. The Financial Consumer Agency of Canada's Survey on Banking of Canadians does not have a meaningful sample of residents of Nunavut, with data aggregated along with other provinces and territories.

932 Household Spending, Canada, Regions and Provinces," Statistics Canada, accessed June 6, 2020, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1110022201; Household Spending, Three Territorial Capitals," Statistics Canada, accessed June 6, 2020, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1110023301.
933 Canada Education Savings Program: 2018 Annual Statistical Review – Canada.Ca," accessed June 6, 2020, https://www.canada.ca/en/employment-social-development/services/student-financial-aid/education-savings/reports/statistical-review.html#h2.4.3.
934 Statistics Canada, Registered retirement savings plan contributors—Canada, provinces and territories, https://www150.statcan.gc.ca/n1/daily-quotidien/180216/t001d-eng.htm

Rail

The research team used one indicator, length of tracks per 100,000 km^2 to analyze the state of rail infrastructure in Nunavut compared with other regions of Canada.

Indicator	Details	Data sources
Kilometres of track per 100,000 km^2	This indicator measures the total length, in kilometres, of rail in Nunavut per 100,000 km^2 compared with other parts of Canada. Rail length for all of the provinces and territories is current to 2019, and sourced from the Railway Association of Canada.[935] Data on the length of rails in Yukon were calculated manually by the research team, and sourced from the White Pass and Yukon Railway Route website.[936]	Railway Association of Canada, Rail Trends 2019 White Pass and Yukon Route Railway, History

OTHER INDICATORS CONSIDERED

- **Rail connections:**
  The project team explored including connections between the rail network and other transportation modes as an indicator. The ease and practicality for rail infrastructure to move materials, and people, is significantly influenced by connections to other rail and transportation options. Rails connected to larger transportation networks are more likely to serve diverse needs, compared with isolated systems that may serve a single purpose. A network of passenger stations along the rails can also support connections between communities and reduce travel costs. This indicator was not selected as a result of project scope restrictions. As Nunavut does not have any rail, a comparison on rail infrastructure across jurisdictions would centre on comparing the Northwest Territories and Yukon rail systems with Southern Canada.

935 Railway Association of Canada (2019), Rail Trends 2019
936 White Pass and Yukon Railway Route, see: https://wpyr.com/history/

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