SHARED VALUE SOLUTIONS

INDIGENOUS HOUSING AND CLIMATE RESILIENCE REPORT

Prepared for: Canadian Climate Institute

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1.0 INTRODUCTION

Many Indigenous Nations across Canada have rapidly growing populations and an immediate need for new and higher quality housing to serve their communities, but face policy, funding, and other barriers to planning and development. At the same time, many Indigenous Nations and the infrastructure they rely on are uniquely vulnerable to the impacts of events like wildfire and flooding, which continue to be exacerbated in the context of climate change. In combination, these issues highlight the need to identify barriers and opportunities to address climate risk in housing development with First Nations, Inuit, and Métis.

To better understand challenges related to climate-resilient housing and how to support Indigenous Nations in navigating and addressing them, the Canadian Climate Institute (CCI) has sought to address questions surrounding the unique challenges and barriers faced by Indigenous Nations in developing climate-resilient housing, as well as what policy-related changes and improvements are needed.

To address these questions, CCI has retained Shared Value Solutions to support in conducting research, including a literature review gap analysis, online survey, and key-informant interviews, the results of which are detailed in this report. The focus of this study is housing managed and/or provided by Indigenous Governments across Canada, with particular attention to flooding and wildfire as two prevalent climate-related hazards.

1.1 BACKGROUND

To build a fulsome understanding of the challenges and opportunities related to Indigenous housing and climate resilience across Canada, it is important to understand the unique context in which Indigenous Nations operate. This includes understanding the larger context surrounding issues including climate change and the housing crisis in Canada, as well as those unique to Indigenous Nations such as colonialism, governance, and Indigenous housing challenges specifically. This section draws on relevant background documents and literature to provide an overview of each of these topics.

1.1.1 CLIMATE CHANGE

Climate change is a global issue that affects all nations, with broad and severe impacts in Canada. The Earth's average surface temperature reached its highest level on record in 2023, with the planet being approximately 1.36 °C warmer than in the late 19th century (NASA, n.d.). Canada has experienced significant warming, with the rate of warming in Northern Canada being more than double the global average. This warming is largely driven by human activities, particularly the emission of carbon dioxide (Bush & Lemmen, 2019).

The effects of climate change in Canada vary by region but can include more extreme heat in summer months, fewer extreme cold days in winter, longer growing seasons, shorter snow- and ice-cover

seasons, earlier spring-peak streamflow, thinning glaciers, thawing permafrost, and rising sea levels. These trends are expected to continue, leading to more frequent and intense extreme-weather events, such as heatwaves, droughts, wildfire, and urban flooding (Bush & Lemmen, 2019).

Research shows that in general, disadvantaged groups are facing increased exposure to climate change impacts (Islam & Winkel, 2017). Indigenous Nations are particularly vulnerable to these impacts, as their way of life and well-being are closely tied to the land, and they are often located in remote and environmentally sensitive areas (Indigenous Climate Hub, 2024). Additionally, colonial policies and initiatives including the creation of the reserve system have contributed to the forcible relocation of many Indigenous Nations to lands that are disproportionately impacted by climate hazards including flooding and wildfire.

1.1.2 COLONIAL INFLUENCE

The housing crisis faced by Indigenous communities in Canada today is deeply rooted in colonial control. Colonial policies, including forced relocations, the establishment of reserves, and the continued enforcement of the Indian Act, have had long-lasting impacts on Indigenous settlement patterns, housing, and overall well-being.

Indigenous people have called Turtle Island home since time immemorial and are the original stewards of the lands and waters. Historically, Indigenous communities lived on the land, establishing settlement sites where it made sense, adapting to seasonal hunting, fishing, and harvesting practices and environmental factors, such as weather and access to fresh water. These seasonal migrations were normal parts of life and helped ensure safety, sustenance, and culture. Forced relocations disrupted these migration and settlement patterns, depriving Indigenous Peoples of their culture, food security, and economic viability by limiting their access to land, hunting, and fishing (Dicken, 2017; Yellow Old Woman-Munroe et al., 2021).

Today, First Nation reserve lands are disproportionately exposed to environmental hazards, such as flooding, compared to non-Indigenous communities. This disproportionate vulnerability is due to a range of factors, including historical and ongoing marginalization, lack of infrastructure, and socioeconomic factors. The forced relocations to substandard lands, coupled with inadequate floodprotection infrastructure, have left Indigenous communities highly vulnerable to environmental disasters, which are amplified by climate change (Yumagulova, 2018). There are dozens of examples of forced relocations of Indigenous people to lands not of their choosing and on short notice (Royal Commission of Aboriginal Peoples, 1996). The Royal Commission on Aboriginal Peoples explains, that “lack of planning, rushing to meet artificial deadlines, inadequate consultation and little understanding of potential negative effects (or ignoring warnings about them) often marked the relocations” (pg. 508). As corroborated by interview participants, little consideration seems to have been given to the quality of the lands where people were forcibly relocated.

These compounding effects led Howitt et al. (2012) to challenge the term “natural disaster” because it could be described as an “unnatural disaster.” Yellow Old Woman-Munroe et al. (2021) expanded on this idea for the Canada Climate Institute. These disasters are the cumulative result of human

decisions enforcing colonialism, land dispossession, and climate displacement, plus the fact that climate change is unequivocally anthropogenic or human-caused, highlighting the human influence in its origin and impact (Eyring et al., 2021).

1.1.3 HOUSING CRISIS IN CANADA

Simultaneously, Canada is facing a severe housing crisis, with a need for 5.8 million new homes by 2030 to restore housing affordability and availability nationally (Task Force for Housing & Climate, 2024). The Government of Canada released their *Solving the Housing Crisis: Canada's Housing Plan* in 2024. The federal government's plan is to enable the construction of 3.87 million new homes, in addition to the 1.9 million that would be built at the current pace of construction, by 2031 (Trudeau, 2024). The Insurance Bureau of Canada (2024) criticized the federal government for missing the opportunity to ensure new homes are built the right way and in the right locations and incorporate climate change-resilience measures, within both the Housing Plan and Canada's housing investments like the Federal Lands Initiative, Rapid Housing Initiative and the Affordable Housing Innovation Fund.

1.1.4 GOVERNANCE

The governance and jurisdictional systems for Indigenous housing in Canada are complex and varied. Each group—First Nations, Inuit, and Métis—has unique governance frameworks that vary regionally and by community, both on-reserve and off-reserve for First Nations, as well as for urban Indigenous people. Canada, through its National Housing Strategy, has accordingly committed to co-developing housing strategies for First Nations, Inuit, and Métis Nation partners (Government of Canada, 2017). These complexities necessitate a nuanced understanding of Indigenous housing governance, and this subsection can only offer a general snapshot.

Generally, the federal government provides housing programs and services to status First Nations people living on reserves and in Inuit communities. These programs are typically policy driven rather than legislatively mandated (Garneau, 2022). In essence, the federal government's approach to housing for First Nations on reserve and Inuit communities is focused on policy-driven commitments rather than on outcomes that ensure the delivery of appropriate services.

FIRST NATIONS

The governance framework for First Nations on-reserve housing is perhaps the most documented. Indigenous Peoples have been responsible for their own housing since time immemorial. However, following the creation of Canada, the federal government delegated legal authority over housing to First Nations under Section 73(1)(m) of the Indian Act, however the federal government had substantial control over reserve lands and decision-making (Hanna, 2022). In 1996, Indigenous and Northern Affairs Canada (INAC) developed the On-Reserve Housing Policy giving First Nations a key role in control over decision-making for how, where, and when housing funding is allocated (Indigenous and Northern Affairs Canada, 2017). Some First Nations have gone on to establish land

codes through agreements with Canada under the First Nations Land Management Act, further delineating and defining their authority over housing and land use (Hanna, 2022). As of August 2024, roughly 20% of First Nations in Canada are in various stages of land code development and implementation, with some having ratified a land code, some actively in the development process, and others yet having expressed formal interest in becoming involved in the process (First Nations Land Management Resource Centre, 2024).

A significant challenge to the supply, as well as building quality for on-reserve housing, is the lack of financing options. As neither Bands nor their individual members hold title to reserve land, First Nations individuals are unable to access conventional commercial mortgages due to issues with collateral (Hanna, 2022). This has been a primary constraint for housing supply on reserves.

In the 1990s, the federal government transferred responsibility for meeting building codes in on-reserve housing developments to First Nation Bands. However, this shift was not accompanied by adequate funding or training, resulting in limited capacity to ensure compliance with building standards (Hanna, 2022). The Auditor General of Canada reported in 2024 that the Indigenous Services Canada (ISC) and Canada Mortgage and Housing Corporation (CMHC) did not have assurance that all housing units built and repaired with their funding met applicable building code standards (Auditor General of Canada, 2024).

Off-reserve housing for First Nations peoples lacks a specific jurisdictional framework (Hanna, 2022). The governance complexity is heightened by the involvement of multiple jurisdictions: the federal government is responsible for Indigenous Peoples, provincial governments for Crown lands and tenancy matters, and municipalities for land use. This fragmented system leaves off-reserve First Nations people largely unsupported with respect to housing, as they fall outside the dominant state administrations. Federal funding for First Nation housing is focused on reserve lands. The Supreme Court of Canada has referred to this ambiguity between federal and provincial jurisdictions as a "jurisdictional wasteland," with both levels of government denying responsibility (Hanna, 2022).

INUIT

In Inuktitut, Inuit Nunangat means *the place where Inuit live* and is made up of four regions: Inuvialuit (the Northwest Territories), Nunavut, Nunavik (Northern Quebec) and Nunatsiavut (Labrador). Canada has played a role in Inuit housing since the 1950s, when the federal government began offering public welfare programs and encouraged Inuit to settle permanently in communities by offering housing. These houses were constructed through programs like the Eskimo Housing Loan Program. Starting in 1974, the federal government started divesting their responsibility for Inuit housing with the Northwest Territories assuming the management of these public housing programs from the federal government. This trend continued across other provincial/territorial jurisdictions across the 1970s (Dyck & Patterson, 2017). The federal Standing Senate Committee on Aboriginal Peoples reports that Canada has transferred responsibilities for Inuit housing to other levels of government and Canada's role has largely shifted to focus only on providing funding (Dyck & Patterson, 2017).

Housing authorities generally play a significant role in delivering housing programs throughout Inuit Nunangat. Housing authorities are involved in the delivery of housing programs, delivering programs such as social housing, and homeownership assistance programs. These organizations often exist at the provincial and territorial levels or at the community level, operating together or separately from provincial and territorial governments (Dyck & Patterson, 2017). The transfer of jurisdiction over housing to Inuit housing authorities is consistent with the Inuit Nunangat Declaration on Inuit-Crown Partnership (Federal Housing Advocate, 2022).

In 2019, the regional Inuit Associations of Nunavut, Government of Nunavut, and the federal government co-developed the Inuit Nunangat Housing Strategy (Inuit Tapiriit Kanatami and Government of Canada, 2019). The Inuit Nunangut Housing Strategy provides a roadmap for addressing housing shortages and ensuring housing outcomes in Inuit Nunangat are in line with the housing outcomes in the rest of Canada.

MÉTIS

In 2018, the Métis National Council and Canada entered into the Métis Nation Housing Sub-Accord, which outlines the design, delivery, and administration of housing services by members of the Métis Nation. The federal government continues to play a role by providing funding as part of the Sub-Accord, and the Métis Nation is responsible for financial reporting, performance measurement, and evaluation (Métis Nation & Government of Canada, 2018).

1.1.5 INDIGENOUS HOUSING CHALLENGES

The current housing crisis is exacerbated in Indigenous communities, where housing conditions are significantly worse than the national average. According to Statistics Canada, 24% of First Nations households require major repairs, compared to 6% of non-Indigenous households (First Nations Financial Management Board, 2022). Dwellings with major repairs needed are defined as those with defective plumbing or electrical wiring, and those requiring structural repairs to walls, floors, and ceilings (Statistics Canda, 2021). For First Nations living on reserves, the proportion needing major repairs is even higher, at 44.2%, further exacerbating the discrepancy between First Nation and non-First Nation housing quality (First Nations Financial Management Board, 2022).

The Auditor General of Canada has been raising concerns about First Nations housing since 2003, highlighting the chronic overcrowding and poor housing conditions faced by Indigenous Peoples. Despite recent investments, there has been no meaningful improvement in housing conditions. From 2015–16 to 2021–22 fiscal years, the percentage of homes in need of major repairs decreased only slightly, from 20.8% to 19.7%, while the percentage of homes needing replacement increased from 5.6% to 6.5% (Auditor General of Canada, 2024).

In 2021, The Assembly of First Nations (AFN) identified a housing funding gap of $44 billion to do the following:

- build 55,320 new housing units for those that require replacement or to accommodate overcrowded housing needs,
- build 78,000 new housing units to accommodate members returning to First Nations,
- repair 80,650 existing housing units, and
- service 112,000 new lots (Auditor General of Canada, 2024).

Since the release of that AFN report in 2021, the estimated cost to close the housing gap has tripled to $135 billion, considering additional factors such as costs related to climate change adaptation, energy efficiency and maintenance (Auditor General of Canada, 2024). Between the 2018-19 and 2022-23 fiscal years, only 21% of new housing units and 20% of the repairs to existing housing units had been completed to close the First Nations housing gap (Auditor General of Canada, 2024).

The federal government's Standing Committee on Indigenous and Northern Affairs presented a report to the House of Commons in 2022 entitled, *The Effects of the Housing Shortage on Indigenous Peoples in Canada* (Garneau, 2022). This report highlighted several factors contributing to the housing crisis affecting Indigenous Peoples, as shared by witnesses during the committee's hearings, and included the following:

- **systemic barriers:** Witnesses, including experts and community leaders, identified colonialism, residential schools, intergenerational trauma, and ongoing racism and discrimination as core factors contributing to the overrepresentation of Indigenous Peoples among those with dire housing needs. Such policies and initiatives have disrupted Indigenous Peoples' ways of life, knowledge, and governance systems while simultaneously dispossessing Indigenous Peoples of their lands, contributing to an array of social issues that can impact community wellbeing and housing security and stability. While these experiences are diverse and their impacts to housing can vary based on a community or individual's culture, history, and geography, Margaret Pfoh, CEO of the Aboriginal Housing Management Association, succinctly noted, "Dispossession is the heart of why we are all here today."
- **affordability, high costs, and remoteness:** Indigenous communities, particularly those in remote and northern regions, face high costs of building and maintaining housing. Harsh weather conditions, limited transportation infrastructure partly due to the unreliability of winter roads, and inflation exacerbate these costs. For instance, some Inuit communities rely entirely on a brief marine supply season to receive building materials, significantly raising expenses. The federal government's procurement processes for housing and infrastructure can also increase the complexity and costs of development.
- **Indian Act:** The Indian Act imposes unique barriers on First Nations, limiting their ability to create and finance housing. For example, the Act's restrictions prevent First Nations people from being eligible for mortgages because banks cannot secure tangible assets on reserve lands. Further, the Indian Act has historically forced First Nations onto "postage-stamp reserves" with minimal access to resources for housing development.

- **limited land base:** First Nation reserves are often small and lack sufficient space for safe and sustainable housing development. This challenge is echoed in Inuit communities where significant infrastructure limitations restrict the availability of developable land.
- **limited capacity:** Many Indigenous Nations rely largely on the federal government and associated funding programs to access capital and resources for hiring and training staff. Often these resources are not sufficient for building staff capacity or for retaining staff. As a result, many Indigenous communities often lack the capacity to plan, build and maintain housing units. There is an urgent need in many Indigenous nations to invest in recruitment, retention, and training to develop a qualified workforce equipped to address housing needs.
- **federal government funding:** Federal funding for Indigenous housing remains insufficient. First Nations, Métis and Inuit communities require stable, predictable, and flexible funding to meet the growing demand for housing. The existing funding levels fall short of what is needed to close the housing gap and ensure adequate living conditions (Garneau, 2022).

1.1.6 TOWARDS INDIGENOUS HOUSING AND CLIMATE RESILIENCE

The standing committee's report underscores the need for a comprehensive and culturally sensitive approach to address the housing crisis in Indigenous communities. This approach includes self-determination, recognizing and overcoming systemic barriers, ensuring adequate and sustained funding, and investing in local capacity building. Climate-resilient housing must be an integral part of this strategy, designed to withstand local and changing environmental conditions and aligned with Indigenous cultural and community needs.

The topic of climate-resilient housing for Indigenous Peoples sits at the intersection of three major interrelated problems facing society today: Indigenous reconciliation and restitution, climate change, and housing. Climate-resilient housing is not just an environmental imperative but also a critical aspect of human rights, social justice, and reconciliation. A holistic approach to addressing Indigenous housing needs, like an Indigenous Healthy Energy Homes approach (Wale et al., 2024) could simultaneously unlock health, climate resilience, energy independence and emissions reduction benefits. This background provides context for the research conducted under the project, aiming to learn more from Indigenous perspectives about climate-resilient housing and infrastructure.

1.2 PURPOSE AND SCOPE

This research paper characterizes the historical, environmental, and policy factors that increase the unique vulnerabilities that Indigenous Nations face related to climate-resilient housing. Our research seeks to address four main questions:

1. What are the unique challenges faced by Indigenous Nations relating to climate risk (specifically wildfire and flooding) as they plan and develop housing?

2. What are the policy-related and decision-making barriers that prevent Indigenous communities from addressing climate change and climate-related hazards as they plan and develop housing and infrastructure?

3. What are the activities, policies, and practices that are having success currently?

4. What changes or improvements in policy are needed and could be proposed to address the above-identified barriers and challenges?

This preliminary research intends to provide understanding on the issues faced by Nations across Canada and to bring in distinctions-based [1] and geographically distinct perspectives on both the barriers and recommendations for climate-resilient Indigenous housing.

An objective of the research is to enable and facilitate actions that can benefit Indigenous Nations and influence policy. Specifically, the research can be used as a tool for different Indigenous Nations and non-governmental organizations when advocating for policy changes. By providing research findings from a variety of primary and secondary sources, the research ultimately aims to support policy change to reduce the barriers to climate-resilient Indigenous housing.

2.0 RESEARCH METHODOLOGY

Our research methodology comprises three main components: a literature review, an online survey, and key-informant interviews. Each component was important in shaping the comprehensive insights presented in this report.

2.1 LITERATURE REVIEW

Researchers conducted a literature review of a variety of sources to provide a better understanding of our study and to identify existing gaps of research and knowledge that we could target through the online survey and key-informant interviews.

The Canadian Climate Institute provided Shared Value Solutions with a list of existing research related to Indigenous housing and climate resilience. Shared Value Solutions conducted a gap analysis through Google Scholar and other database searches to pinpoint gap areas of information and review relevant policies that impact the building of climate-resilient Indigenous housing.

[1] Distinctions-based: A distinctions-based approach means working independently with First Nations Peoples, Inuit, and Métis people in a manner that acknowledges their specific rights, interests, priorities, and concerns of each, while respecting and acknowledging these distinct Peoples with unique cultures, histories, rights, laws, governments (Government of British Columbia, 2024).

2.2 ONLINE SURVEY

An online survey was deployed for approximately three weeks from mid-April 2024 until early-May 2024. The online survey was sent to various contacts from Shared Value Solutions, key contacts from the Canadian Climate Institute, and direct outreach to policy leaders and other individuals who are knowledgeable about the topic. The survey was sent to approximately 65 individuals, including the following:

- lands and resources and housing officers within First Nation Bands,
- housing policy analysts within Inuit and Métis housing organizations,
- federal government policy-makers,
- researchers in climate change from various post-secondary institutions,
- housing resource programming officers from various non-governmental organizations, and
- tribal council representatives.

The intent was to receive input from a wide variety of individuals and organizations from diverse backgrounds across different geographies who are knowledgeable about policy barriers and opportunities related to climate-resilient housing. Engagement questions touched on the following: the participant's role, expertise, application, and understanding of the unique challenges that Indigenous communities face in building climate-resilient housing; the practices that they see are working to address these challenges within the Indigenous communities that they most familiar with; and the various barriers to building climate-resilient Indigenous housing that they have observed in their role. Questions also focused on identifying specific government policies that create barriers to building climate-resilient housing. Participants were also prompted to identify whether they would be interested in participating in a one-hour interview with the research team.

The survey received a total of 17 responses, resulting in a response rate of approximately 26%. Respondents were asked to identify the geographical regions where they support Indigenous Nations. Participants were allowed to select more than one jurisdiction, given that their work may be multi-jurisdictional. Participants' geographical distribution is summarized in the table below:

Table 1. Survey Participants' Geographical Distribution

Province/Territory	Number of Respondents Per jurisdiction
Newfoundland and Labrador	4
New Brunswick	2
Nova Scotia	2
Prince Edward Island	1
Quebec	1

Ontario	6
Manitoba	1
Saskatchewan	2
Alberta	1
British Columbia	7
Yukon	1
Northwest Territories	3
Nunavut	0

There was a strong distribution of respondents supporting Indigenous Nations over a wide geographical area, with a significant portion of survey respondents supporting Indigenous Nations in British Columbia and Ontario. The only region not represented in the survey responses was Nunavut.

2.3 KEY-INFORMANT INTERVIEWS

Further research was conducted through key-informant interviews, with a total of 18 individuals. Participants were found through a variety of sources, including previous survey participants, referrals from key contacts, and recommendations through word of mouth.

Participants were chosen based on interest and their ability to provide unique insights relevant to the research, while avoiding duplication of interview participants with similar backgrounds. Efforts were made to ensure the interviewees' backgrounds were diverse, representing many Indigenous Nations to provide a wide variety of perspectives. The interviewees included individuals from the following backgrounds:

- federal government policy analysts,
- First Nation housing officials, and
- non-governmental-organization housing grant officials.

Interviews were semi-structured, allowing for flexibility while maintaining a consistent framework across interviews. Interviews were approximately one hour in length. Questions were tailored to the interviewee's background and expertise. Interviews were recorded where consent was given. Information collected through the key-informant interviews is presented in Section 3.0 of this report.

Data from the interviews were analyzed to identify key themes. The variety of perspectives from interviewees provided significant insight to various facets of policy barriers and opportunities for Indigenous Nations in building climate-resilient housing. While the participants provided valuable insights, the findings are likely limited due to the small sample size. Further, the research team had

difficulty in recruiting interview participants representing Métis and Inuit perspectives, which further limits the results of this research.

2.4 LIMITATIONS TO RESEARCH

While this study aimed to provide distinctions-based insights into the policy barriers and opportunities for Indigenous Nations in building climate-resilient housing and infrastructure, there are several limitations to this research.

In general, uptake on the survey was not strong and the number of survey responses was fairly low. In particular, the research team encountered difficulties in securing participation in both the survey and key-informant interviews by individuals experienced in housing and climate change from Inuit and Métis perspectives. As a result, the study does not adequately provide insights to the unique policy barriers and opportunities that Inuit and Métis face in building climate-resilient housing. Due to these limitations, this report focuses on First Nations housing, with an emphasis on on-reserve housing. Further research is needed to appropriately speak to the policy barriers and opportunities facing First Nations off-reserve, Inuit and Métis peoples.

Furthermore, due to time and budget constraints, the research was limited to a maximum of 20 interview participants. Given the broad range of subject matter specialities and the nuances associated with the topic of climate-resilient Indigenous housing across so many geographies, these findings are not complete but limited to the experiences of the individuals available to participate in the survey and interviews. A larger sample size with greater geographical distribution and distinctions-based representation could provide a more effective and complete research understanding of this topic.

3.0 RESEARCH FINDINGS

This section details the findings of the research as outlined in Section 2.0 and explores the themes that emerged, including climate change and housing challenges, barriers preventing Indigenous communities from addressing climate-related hazards in housing and land use planning, and successful initiatives.

3.1 OBSTACLES IN DEVELOPING CLIMATE-RESILIENT INDIGENOUS HOUSING

In discussing building climate-resilient communities, study participants identified a variety of challenges faced by First Nations, including geographical constraints of First Nations reserve land, flooding events, wildfire events, extreme heat events, melting permafrost, and infrastructure problems. The discussion here is based on a combination of the literature review and key-informant interviews.

3.1.1 GEOGRAPHICAL CONSTRAINT OF RESERVE LANDS AND INDIGENOUS COMMUNITIES

Historically, Indigenous Peoples were effectively removed from the lands that they had lived on since time immemorial and disconnected from their territories more broadly (Hanna, 2022). The implementation of colonial policies, such as the Indian Act, aimed to assimilate Indigenous Peoples, and continues to impact their well-being today (NCCIH, 2019). Historical, government-led placement and locating of First Nations reserves created a situation where many First Nations are vulnerable to climate-related hazards. These hazards pose significant challenges for housing and community infrastructure.

Participants in both the interviews and survey discussed the impacts of colonial policies and processes on First Nations communities, with some individuals describing how the initial creation of reserve lands through the Indian Act often led to reserves being located in areas that could not support their needs or ways of life. One interview participant described the process of communities being relocated to "horrible areas" in Nova Scotia.

> *"Every community in Nova Scotia is situated in a horrible area. This came from the Nova Scotia centralization policy in the 1940s and '50s where [Indigenous] people were herded like cattle and forced to move to the places where they now live."*

Challenges associated with the quality and location of reserve lands are also well documented in the literature. Elder Rene Meshake describes how the Ojibway word for First Nations' reserve, *ishkoniganing*, translates to "the place of leftovers, scraps or garbage" (Taylor, 2021). Documents also show that some communities were even given a field of boulders on which to establish their community (Harris, 2002). As a result of this process and the lands selected, First Nations communities have compounded exposure and sensitivity to climate risks (CIER, 2009).

Another research participant described the issue of compounded challenges from the reserve land placement of his community:

> *"You've got reserve land which is usually put in remote, and I'll say subpar land—where only fir trees grow, not oaks and things like that. Once a fire catches, it [intensifies] quickly, and it's a huge risk. The capacity and ability to get to some of these First Nation communities, [because they're so remote] is not always easy."*

It is evident that First Nations are experiencing impacts related to climate change, and in some instances, the location and quality of reserve lands compound these challenges.

3.1.2 IMPACTS FROM FLOODING EVENTS

Literature has shown that First Nation reserve lands are disproportionately exposed to flooding, with almost 22% of residential properties at risk of a 100-year flood event (Thistlewaite et al., 2020). Following an analysis of flood modelling, Thistlewaite et al. (2020) identified that 91.4% of reserves in Canada have exposure to flooding over a 100-year return period, a higher rate of risk than other

communities in Canada. Overland and surface water flooding are expected to compound existing problems and expose First Nation housing and infrastructure to greater risk in the future (Assembly of First Nations, 2023).

The majority of survey participants (14 of 17, or 82%) identified flooding as the climate-related hazard that poses the greatest risk to the First Nations their work supports. Interviews provided further context to these survey results, with one participant noting that many First Nations reserves in their province are built in "flood-prone areas," while also experiencing other environmental challenges.

> *"It's going to be a continuous learning curve as we go forth dealing with the floods, tornadoes, extreme heat."*

Flood risk from climate change-induced events can be compounded by regional land-use and resource-management decision making and historical land-use change. For example, the regional removal of forests, riparian vegetation, and even wildlife species such as beavers can reduce water retention on the landscape, increasing flood vulnerability (Riis et al., 2020; Strong, 2017). Lake St. Martin First Nation in Manitoba provides one example of vulnerability resulting from such decision-making processes, with the community facing evacuations as the provincial government decided to direct floodwaters toward the reserve to protect urban and agricultural properties (Khalafzai et al., 2019).

One interview participant, reflecting on the flooding that their community faces, noted connections to land-use decision making related to forestry:

> *"Major flooding often occurs in wintertime where streams overflow from the mountains nearby, and we experience a lot of runoff. I say it's because of the clearcutting and the industry, with no trees to hold back [water]."*

Issues of flood vulnerability are also linked to housing and infrastructure maintenance issues. According to Statistics Canada (2021), 19% of Indigenous Peoples live in dwellings needing major repairs. The increased susceptibility of these homes to climate-related risks, including flooding, can exacerbate the impacts of these events and make it harder for Indigenous communities to build and renovate climate-resilient housing. Existing vulnerabilities and damage from hazards can create increased costs and challenges when faced with climate change hazards.

Understanding the potential impacts of flooding and making land-use decisions around flood management is a difficult task for many First Nations to undertake without adequate data and flood modelling. Several interview participants raised concerns that First Nation communities often may not have development plans, flood models, and other risk-reduction resources. Others described that even where First Nations have completed reports and received funding to do flood-modelling projects, the resources may be left unused or may not be intuitive for individuals to use due to lack of capacity and expertise in interpreting and applying the modelling information.

3.1.3 IMPACTS FROM WILDFIRE

First Nation communities are often more vulnerable to wildfire, with some estimates indicating that 18.9% of First Nation on-reserve communities are at a higher risk of fire compared to 2.9% of non-reserve population (Erni et al., 2024). Additionally, remote Nations have more challenges in wildfire monitoring and the ability to respond promptly when a fire ignites (Bénichou et al., 2021). All communities in these areas, First Nation communities included, face challenges in preparing themselves for the increased prevalence and intensity of forest fires that occur and will continue to occur from climate change. First Nation communities are also faced with more frequent community-wide evacuations (Public Health Agency of Canada, 2023). Communities' housing and infrastructure often remain unprepared due to a lack of education, training, and support in developing proactive wildfire management programs (Copes-Gerbitz et al., 2022). Such proactive wildfire management programs include those focused on both prevention (e.g., reducing human ignitions; banning fire-starting activities; treating fuel, including prescribed burning) and preparedness (e.g., providing training and equipment for fire response; coordinating pathways between emergency responders; developing community wildfire plans) (Copes-Gerbitz et al., 2022).

The majority of survey respondents (13 of 17, or 76%) identified that the increased intensity and prevalence of forest fires pose a significant risk to First Nation communities. Survey respondents further described how the location of certain First Nation communities, particularly those located remotely, are susceptible to forest fires. Respondents cited several factors contributing to this risk, including limited access to emergency services, challenges in preparing for and responding to large fire events, and proximity to forests that often experience fire. One interviewee described how First Nations are disproportionately evacuated from their homes as a result of intensive and more regular wildfire seasons.

> *"Yeah, I think fire is definitely increasing … If you're putting [fire] in the way we're thinking about housing and infrastructure and resilience, we see this year after year. Like, First Nations communities are disproportionally evacuated and impacted by these big fire seasons and they kind of go into the impacts of these northern communities, leaving [people] being put up in hotels and cities."*

3.1.4 IMPACTS FROM EXTREME HEAT EVENTS

First Nation communities are also uniquely vulnerable to the increased prevalence of extreme-heat events resulting from climate change. One participant, when asked whether Indigenous communities are more vulnerable to climate hazards and risks than other communities, revealed the following:

> *"I would say yes, both urban and on-reserve Indigenous people are [more vulnerable to extreme heat] because of the effects of the long-term effects of colonization, and are severely under-resourced, both in terms of people and money."*

Interview participants further described how housing in some geographical areas does not have appropriate ventilation systems or air conditioning to deal with extreme heat events. One participant explained how poor structural design has contributed, where housing that was originally designed with the intent of energy efficiency actually amplifies the heat during the warmer months of the year.

The participant also noted an overall lack of air conditioning units, which are necessary to mitigate heat events in both on-reserve and off-reserve housing.

3.1.5 IMPACTS FROM THAWING PERMAFROST

Indigenous Nations in areas of continuous permafrost also face barriers and unique challenges related to climate change. For example, melting permafrost impacts housing and infrastructure through damage to buildings, which in turn increases construction and maintenance costs (The Firelight Group, 2022). Existing structures and current building practices often fail to address the impacts of melting permafrost, such as shifting and settling foundations, slumping, and other associated damages (The Firelight Group, 2022). Estimates have shown that without adaptation measures, total costs of damage to buildings across Northern Canada could reach $30 to $38 million per year by mid-century because of climate change impacts to permafrost (Clark et al., 2022). Furthermore, there is uncertainty surrounding whether insurance policies would cover housing damages from permafrost thaw (Tsui, 2021).

One participant, who works with Indigenous communities in the North, communicated:

> *"A colleague of mine was from Paulatuk, Nunavut and he is a carpenter. The carpenter is going up there... The cost of housing [is more expensive because it] requires travelling, and with permafrost, the buildings are always shifting and houses require regular maintenance. But when you train people in remote communities to build houses, they can't stay in the remote areas because of a lack of employment."*

The participant further commented:

> *"People talk about climate change, and we see it and feel it. You're feeling the water level so low and that's the only way we are going to get our food supply. We have no road, and supplies are either by river or flying. We are in continuous permafrost, and the permafrost is dying rapidly. So, you get lots of slope landslides, roads are sinking, even at the runway, the roads are closing … Ice roads are closing earlier than normal, with a weight restriction, which means no goods and no trucks because it's too warm."*

Several interview and survey participants described the issues from melting permafrost and emphasized the need for adaptive changes to building practices in impacted areas. "Perma" implies permanent; building practices have been developed on the assumption of permanence. Skills, materials, and building approaches now need to rapidly adapt as climate change affects the once-reliable ground upon which housing and infrastructure were built.

3.1.6 INFRASTRUCTURE CHALLENGES

The current state of infrastructure in some First Nation communities affects their ability to build climate-resilient communities and housing. This includes the pre-existing state of housing/infrastructure, reliability of transportation systems in remote areas for accessing necessary

goods and services, and a lack of adequate water and wastewater services. Given that approximately 124,000 Indigenous people need housing (Office of the Parliamentary Budget, 2021), it can be difficult for many Indigenous communities to prioritize climate-resilient and energy-efficient options when overcrowding and growing populations create a tremendous need for more housing.

Several interview participants described the trade-offs that First Nation communities must make—choosing to build more housing rather than better housing. Housing managers in many communities have not focused on addressing or preventing impacts of climate change, due to the immediate and urgent focus on new housing needs as they address the backlog of housing deficits. One participant explained addressing the backlog is "the priority above all else, so building to address climate change is not forefront. Until the backlog is caught up, communities will build where and however they can". Another participant explained that there is an "unawareness of climate change and the impacts with respect to housing planning and repair and maintenance" in the communities he works with.

The cost of housing is even greater for communities in remote or northern locations in Canada, with some estimates that the cost is 30–50% higher than construction in southern communities (Assembly of First Nations, 2017). In Inuit Nunangat, housing construction costs average $250 to $530 per square foot compared to $120 to $195 per square foot elsewhere in Canada (Clark et. al, 2022). Many First Nations, especially those in remote locations, face challenges in accessing geographically appropriate, quality building supplies. Participants in this study identified various contributing factors, such as distance to building-supply centres, poor-grade building supplies, poor craftsmanship or design of buildings, and First Nations communities being taken advantage of by contractors.

Poor building quality often leads to shorter lifespan of houses than is found in non-Indigenous housing off-reserve (Pottris, 2020). One participant shared the following quote regarding the infrastructure capacity issues that a remote First Nation community faces:

> *"There's nowhere to store materials for First Nation communities. Companies will send products that show up already damaged, only warped wood and rejects get sent to these communities. I've seen houses built with drywall with black mold already because of the poor materials and lack of storage."*

Fly-in and other remote First Nation communities also face the impacts from changing and unreliable transportation systems connecting them to centres with supplies and goods. Increased temperatures from climate change reduce reliability of winter roads and shorten the season for their use. The shortened winter-road season results in limited transportation options in bringing materials and goods to remote Indigenous communities (Lyeo et al., 2024). One interview participant explained:

> *"We are in continuous permafrost and the ice roads are closing earlier than normal, and often have weight restrictions on them, which means that no real goods can be transported. The cost of the building supplies goes up because most of them would have to then go up along the barge, but the water level is so low, so the other way is to fly. You do it or you don't build it."*

The participant further mentioned:

> *"You're looking now at alternative routes. So from northern communities, alternative routes is to take materials down by the sea which is much more time and even costlier. … The other option is to just fly it in 'cause there's no local materials. I don't know what they are going to do in the future regarding building houses. For those communities that are even more north that can't go by sea, like Aklavik or something, I don't know [what will happen]."*

There has been a noticeable increase in insurance premiums for remote Indigenous communities, a trend that continues to escalate. CMHC's (2024) recent report on *Indigenous Insurance and Risk* highlights that the combination of historically low premiums and a rise in claims due to climate-related disasters have led to a loss in profits for insurance providers. In response, many insurers have increased premiums and reduced coverage on some things to remain profitable. This shift in the property insurance market has made insurance even less affordable for Indigenous Nations in rural and remote areas. These communities are often classified as high-risk due to their location on lands prone to events like fires and floods, leading some insurers to refuse coverage altogether. Additionally, older housing located on reserves was constructed to meet older federal building standards and codes, and are viewed by insurance providers as riskier to insure. One interview participant explained that while all CMHC-funded houses are required to be insured, once their mortgages have been paid out, the cost of insurance often leads to many houses being underinsured or uninsured. Many insurance companies won't insure older houses on reserve as they are often "worn out" by high number of people living in them combined with maintenance backlogs. This participant estimated that approximately 30% of houses on reserves are uninsured.

First Nation communities are further impacted by a lack of serviced lots, water and wastewater services that have reached their capacity, unreliable energy systems, and inadequate fuel supplies (Garneau, 2022). These compounding issues, along with poor housing conditions and unreliable transportation systems, create complex infrastructure constraints and infrastructure deficits that are difficult for First Nations to effectively manage without adequate funding and staffing.

3.2 BARRIERS TO PLANNING FOR CLIMATE-RESILIENT HOUSING

In the context of planning and developing climate-resilient housing, many Indigenous Nations face unique barriers, including those related to capacity, access to land, decision-making autonomy, information sharing, and funding. This section outlines these barriers as identified through reviewing relevant literature and the administered survey and interviews. In this context, planning for climate change includes determining where best to build (land use planning); how best to build and maintain resilient homes and infrastructure; and emergency response planning and preparedness.

3.2.1 BARRIERS TO CAPACITY

Various studies have shown that Indigenous populations could be disproportionately affected by climate change due partly to capacity challenges (Ford et al., 2018). Interview participants identified that capacity challenges include inadequate skills/experience, high staff-turnover rates resulting in

new staff with limited background and experience, inadequate resources to undertake the activities required, and overburdened staff who are addressing multiple urgent priorities at the same time or who may be holding multiple positions simultaneously. Participants explained that the lack of staff expertise, availability, and time were all barriers to planning for climate change in the First Nation communities in which they work.

One participant described how their Nation's responsibilities have increased due to the downloading of services from provincial and federal agencies. The resulting increase in workload has led to reduced time for staff to work on "extra" things such as building climate-resilient housing and communities. One participant described some of these difficulties:

> *"I'm finding that some First Nation communities get it and some don't and it's probably the same ratios as even non-Indigenous communities. It's denial or lack of funding, or they're feeling overwhelmed."*

Capacity constraints are further affected by the reactive nature of problem solving in many First Nations. Several participants described how staff and leadership often need to focus on "today's problems," such as rebuilding after a wildfire or flood, rather than proactively planning for the future. One participant said:

> *"Climate change is on the rise in the First Nation housing industry, communities are not in a position to be proactive in our industry, it is always reactive to what matters are front and centre; therefore, preparedness is never front and centre until something happens."*

Research participants described that First Nations often hire external contractors to fill the gaps in housing construction (e.g., hiring external contractors for plumbing). One participant expressed that hiring external contractors reduces a community's self-reliance and agency, as opposed to training and hiring internal community members. Several research participants identified this gap in knowledge and training related to climate-resilient housing construction and infrastructure construction, with one participant who revealed:

> *"There's a huge gap in providing hands-on training. Indigenous people want to learn how to build proper homes."*

Another participant discussed the challenges of starting culturally appropriate training programs for community contractors, but ultimately seeing success:

> *"We've had some when we first went down the pathway of community-based training, there was a lot of resistance from our primary apprenticeship training authority in British Columbia. They did not see the opportunity to move away from centralized urban institutions that would provide the training, whether public or private. We were able to demonstrate that you can bring in [training] even into a remote community, if necessary."*

Where some successful training programs do exist for Indigenous people interested in learning about climate-resilient housing, most conventional training programs were reported as being inflexible to

the unique needs and varying schedules of Indigenous participants. The inflexibility displays the importance of designing training programs that are adaptive to the dynamic lifestyles and values of Indigenous learners.

> *"And so there must be some flexibility from the funding envelope and also the timeline because we're not impacting the standard of the training, but we are—we need to have the flexibility around the training because from a cultural standpoint. If there's a significant loss of life within a community of an elder, the community honours that and attends the funeral services honouring that Elder Knowledge Keeper and community member. So those are things that all of a sudden you're in a class of however many apprentices you're training that they're they are attending the cultural event."*

Training and capacity-building are required throughout every step of the construction process for Indigenous communities seeking to build and develop these skills internally. Some organizations such as Ontario First Nations Technical Services Corporation or Vancouver Island University provide training materials and support for on-reserve building inspectors in their respective provincial jurisdiction. However, at the time of writing this report, we are not aware of any national organizations that support or provide training around climate-resilient housing construction methods for external contractors working in Indigenous communities.

3.2.2 BARRIERS RELATED TO DECISION-MAKING AUTONOMY AND ACCESS TO LAND

Decisions for on-reserve housing are a shared responsibility between First Nation governments and the Canadian government. The federal government provides funding and the First Nation governments manage the development, allocation, and maintenance of on-reserve housing (Lyeo et al., 2024). Infrastructure needs are typically funded through the Indigenous Services Canada (ISC) Capital Facilities and Maintenance Program. However, ISC does not cover the full cost of housing, so many First Nations supplement the funding allocated for housing through programs administered by the Canada Mortgage and Housing Corporation (CMHC). First Nations have the responsibility for carrying out programs and the development of housing, using a wide variety of formal and informal management strategies. Housing can be managed directly by Band leadership, a housing manager, or a separate housing authority. Essentially, First Nations determine what is needed and the federal government and Crown corporations determine what is funded. In this process, discussions and choices around climate change resilience can be overlooked as the quantity and quality of housing (and related infrastructure) are often prioritized (interview participant).

Decisions about where to build are largely driven by a combination of the availability of lands and the cost and the financial efficiencies of connecting new infrastructure to existing water, wastewater, transportation, and electricity services. The original selection of reserve lands was often undertaken by federal government administrators (Royal Commission, 1996) as part of a broad system of dispossession of Indigenous Peoples from their lands (Yellowhead Institute, 2019). Access to land for building is constrained by the location, condition, and size of the reserve lands.

Interviewees commented that First Nations reserve parcels are smaller than the extent of land required to meet the Nations' needs and support their ways of life. Often, the best and safest lands within the reserve boundaries were the first to have been developed, and as development continues to expand, First Nations are faced with building new homes using more marginal areas within their reserve lands.

At the same time, many First Nations are actively involved in seeking expansion of their reserve lands. While the additions-to-reserves process is slow, it is being modernized and streamlined. Given the intersections between the amount and quality of reserve lands and the ability for First Nations to meet their housing needs, this process needs to consider how First Nations can gain more rapid access to safe and buildable lands.

Reserve lands are "held in trust by the Crown for the use and benefit of specific First Nations communities" (National Indigenous Economic Development Board, 2019). Some research participants observed how the implications of people not owning lands on reserves or having access to mortgages pose barriers to making effective and appropriate decisions for on-reserve housing. This lack of ownership can also create difficulties with upkeep and building of homes (including climate-resilient homes), and reduce agency and care of housing:

> *"Ownership is also an issue, where people don't have the same value for house maintenance."*

Other participants disclosed that federal policies continue to lag in providing culturally appropriate, flexible funding mechanisms to meet the housing needs of Indigenous communities. There is no one-size-fits-all solution for housing for Indigenous communities, and housing management strategies must take a distinctions-based and geographically specific approach to meeting the needs of First Nation, Métis, and Inuit (Dyck & Patterson, 2015). One participant shared their experiences with housing management strategies from the federal government:

> *"[There is a] lack of self-determined building strategies that consider the unique needs of community and allow for new builds and retrofits to meet those needs and those of climate change impact."*

The expansion of land-use planning processes and funding also supports First Nations in having the resources to build climate-resilient communities. Land-use planning tools provide opportunities for First Nation communities to strengthen their decision-making processes and manage lands in a culturally and environmentally appropriate manner. Drawing on relevant data can inform decisions for long-term community planning in the context of climate change. One participant, while discussing land use plans, shared the need for support for self-determination of First Nations in housing and climate-resilient building:

> *"Firstly, not to make development decisions for First Nations, self-determination is meant to occur at the First Nation level. Capacity development, tools, templates, and funding are all just a start. First Nation communities don't have the luxury of relocating from the postage stamp coordinates they were placed on. Short of having the government relocate entire communities to a location that is more feasible for construction and infrastructure, we build what we can in the location that we are in."*

3.2.3 BARRIERS TO INFORMATION SHARING

Interview and survey participants noted that they are often not aware of relevant data or information that could support their community planning and the building of climate-resilient communities. This information includes innovative building practices, climate change-impact information, funding opportunities, and more. Housing managers and decision makers may therefore be making choices and decisions without access to relevant information and knowledge resources that could inform those decisions.

Government and academic interview participants shared examples of various innovative and valuable research and reports that had been completed. However, through interviews and conversations with people working in communities, it seems as though they were either not shared widely with many First Nations or were developed and written in inaccessible ways. One individual noted the following when asked about what resources could help their community construct climate-resilient housing developments:

> *"The science is there, the research is already done, the tools are there. Implementation and investment is needed."*

This issue is compounded in First Nations experiencing changes in leadership or the staff working on housing and infrastructure projects. When an internal "champion" or individual leaves a community, existing organizational knowledge may not be retained. One participant noted:

> *"I think the other challenge that many communities deal with is the rotation of leadership, so asset managers, they could be changed every two years. You don't have a transferring of knowledge or where to access knowledge. It's very limited because there is no money to facilitate a sharing of that knowledge so that you have an overlap of services."*

Research participants also revealed that community climate-adaptation approaches are often siloed. There are separate and distinct strategies being discussed in lands departments, infrastructure departments, health departments, and emergency management departments. The impacts of working in silos hinder information and knowledge sharing, and limit opportunities for community-wide and holistic responses to climate change. One interview participant reflected on their own First Nation government's policy work on climate change:

> *"For a long time, we've very much been working in silos, so there hasn't been a whole lot of collaboration between departments, only in the last couple of months has there been much collaboration, and we actually started working with the housing department on an initiative."*

Working in silos can exacerbate barriers to having appropriate data and information to draw on for decision making. For instance, participants shared that communities often lack crucial data on areas susceptible to flooding events, fire events, or melting permafrost. Understanding these factors is important for planning efforts related to mitigating climate change hazards, such as determining safe building locations. One participant reflected on the lack of data and information by sharing how Indigenous communities are often stuck in "the data-collection phase."

> *"I do work with the communities in terms of developing their adaptation strategy and such, but before they can develop adaptation strategies they first need to collect and analyze the data. We are just really at the collection-of-the-data stage. They're [Indigenous communities] looking at using the Traditional Knowledge to integrate with those models and see what's the best strategy going forward."*

Even communities that have land-use data and information in synthesized products, such as a flood plain mapping tool or risk assessment report, can face barriers to using this information. Several participants emphasized that these resources could fail to integrate Traditional Knowledge or are simply "collecting dust" without practical application for their community. One participant reflected on this challenge and discussed the state of flood plain mapping in communities:

> *"It's all data and no one understands it. That's the really big issue, because most of the people who make decisions are not technical. So what happens is an engineering report is given to them [Indigenous communities] and the engineers purposefully write them vague."*

Participants also identified that resources are often not effectively circulated to those working within First Nations' housing departments. For example, one policy expert highlighted a resource designed to help communities minimize the impact of fires by creating buffers and clearing areas around communities to protect them from fires. However, the participant noted that many First Nations are either unaware of these resources or do not utilize them. This gap in knowledge mobilization poses a barrier to adaptation, where good practices and innovative research do not make their way from the organizations that develop them to the people who could use them.

A few resources that were highlighted by participants throughout our research include the following:

> **Resource on fire buffer emergency planning for communities:** Bénichou, N., Adelzadeh, M., Singh, J., Gomaa, I., Elsagan, N., Kinateder, M., Ma, C., Guar, A., Bwalya, A., Sultan, M. A. (2021). *National guide for wildland-urban-interface fires: Guidance on hazard and exposure assessment, property protection, community resilience and emergency planning to minimize the impact of wildland-urban-interface fires*. National Research Council Canada. https://nrc-publications.canada.ca/eng/view/object/?id=3a0b337f-f980-418f-8ad8-6045d1abc3b3
>
> **CSA Group resources and training for resilient building in the North:** CSA Group. (2024). *Standards for more resilient infrastructure in Canada's North.* https://www.csagroup.org/standards/areas-of-focus/construction-infrastructure/standards-for-more-resilient-infrastructure-in-canadas-north/
>
> **Climate change adaptation land use resource guide:** Government of Manitoba. (2011). *Planning resource guide: Climate change adaptation through land use planning.* *https://www.gov.mb.ca/mr/land_use_dev/pubs/cca.pdf*

3.2.4 BARRIERS TO FUNDING

Funding approaches for Indigenous housing and infrastructure developments are often criticized for failing to consider the diversity of First Nation communities in northern and remote settings; this presents a shortfall in funding that does not always account for importing labour and materials (Lyeo et al., 2024). Research participants continuously identified these shortcomings of funding alongside the lack of both flexibility in eligibility and cultural appropriateness to meet the needs of their own community.

The lack of flexibility in eligibility is often prevalent in the scope of work that is required to be fulfilled. Funding for projects is often "strings attached" and requires the deliverables of a funding project to meet the priorities of the funder, rather than the priorities of the First Nation. These funding programs may therefore not fulfill the identified needs of the First Nation community. One interviewee shared that as a result, they often have to represent a different scope of work in funding applications than what is needed by their First Nation:

> *"Yeah, I just need like a Trojan horse project where you're working on one thing, but you're using that [project] to work on something else entirely."*

The inflexibility of funding is also connected to a lack of self-determination. Funding is often short term and insufficient, creating a strenuous process for First Nations to apply (Garneau, 2022). Direct funding for housing in First Nation communities and organizations provides critical supports; however, there is a gap in the availability of this type of funding currently (Garneau, 2022).

Participants also communicated that they cannot rely on funding, as there is often uncertainty regarding whether funding is simply a single amount reviewed annually or long-term program. Where funding is only provided on an annual basis, several participants noted the difficulty of using a short-term project to make effective long-term decisions including those related to land use planning, particularly as it applies to housing and, by extension, climate resilience. Some community-led projects and programs start and stop based on funding availability and related staffing decisions. Even where funding is available, such funding opportunities are rarely for climate-resilience building in housing and infrastructure projects, with one participant noting:

> *"There's no funding for mitigation funding, it's only for response [to a climate event], not for prevention."*

Research participants also revealed the inflexibility of how funding is timed, and that it is often released at inappropriate times. One common example is funding for housing being released in fall, forcing communities to buy and store materials in wetter seasons and to build housing during the winter. It was explained that funding delays and poor timing may mean that communities miss the short shipping and transportation seasons in the North, presenting further issues and costs in acquiring building supplies (Garneau, 2022). Several research participants also identified that the inflexibility of timing in Crown funding applications led to their Nation missing potential funding opportunities because of their strict deadlines. These barriers restrict First Nation involvement in

funding programs that could grow capacity and help facilitate climate-resilient building. One participation noted:

> *"The timing of funding is important. It would be nice to line up approvals for funding with the winter road season. If approvals come in late, they miss the winter road season. If housing is a very high priority, materials have to be flown up, it adds a tremendous cost. So, the timing of approvals needs to be coordinated and be done in a timely fashion. Longer-term funding cycles would also be beneficial instead of annual approvals so that nations can make longer-term decisions."*

The way the current funding system is set up creates barriers to participation in projects for some First Nations. One participant shared the following point regarding the need to shift funding mechanisms today to direct-transfer funding:

> *"We need to move away from programs [-based funding] to direct transfers to Indigenous governments to fund them appropriately. Everyone is so keen in advancing boutique programs."*

These funding challenges are also recognized by federal government departments. A political and policy conundrum exists where federal departments see the need to decentralize decision making and support autonomy, while also being accountable for the money and resources that flow through their departments (interview participant). The need for federal funding co-exists with the need (and rights) for autonomy and self-determination, adding complexity to the nature of the relationship between the federal government and First Nations in Canada.

3.3 POLICIES AND PRACTICES THAT ARE HAVING SUCCESS

Alongside the identified barriers and challenges experienced by First Nations related to housing and climate resilience, there are also existing programs and supports that have been successful in supporting these initiatives. These successful programs and initiatives seek to empower, promote, and enable local actions and decision making. The following section outlines such programs and initiatives.

3.3.1 TRAINING PROGRAMS

Several interview participants emphasized that training programs and capacity-building initiatives with a focus on culturally and environmentally appropriate building practices are essential. One interview participant described having a train-the-trainer program to share knowledge and encourage community members to teach within their own First Nations:

> *"One program we have started to push forward and have success [with], and I'm part of the training committee, is having a train-the-trainer program. We train the building practices, if not the tribal housing coordinator, their housing manager, or maintenance manager to teach qualifications to teach within their own First Nation."*

Train-the-trainer programs are designed to empower First Nation communities by accelerating training of those working in housing, whether they are inspectors or contractors, with the skills and knowledge needed to implement appropriate building practices. By training these individuals to become trainers themselves, the program fosters self-sufficiency and internal capacity by keeping knowledge circulation and training internal. Multiple participants explained that housing/infrastructure and emergency management practices are often siloed, and this type of program helps bridge the gap between these interrelated subject matters.

This type of training program also includes local fire department volunteers to learn and share about appropriate building practices. Local fire department volunteers who understand and are familiar with vulnerabilities and risks associated with emergency weather events can bring insights and information sharing to the training curriculum. This interaction helps bridge the gap between the often-missing connection of emergency management and house building.

Various resources are available to help First Nations with training and building capacity for climate-resilient building, such as those developed by Canadian Standards Association (CSA). These resources include free and low-cost opportunities for building strategies in Northern Canada. Courses range from training on building foundations in permafrost regions, to community drainage system planning in northern communities, to building standards for climate change in Canada's North. Organizations such as First Nations National Building Officers Association (FNNBOA) provide training opportunities through courses that are designed for any individual involved in on-reserve First Nation building construction. Training programs and resources like those developed by the CSA, FNNBOA, or the establishment of train-the-trainer-type programs, provide concrete examples of training to support climate-resilient housing and infrastructure.

3.3.2 CULTURAL BURNS

Prescribed fires and cultural burns can protect communities from wildfire events. Prescribed burns are a land-management tool that intentionally uses fire to reduce accumulated loads of wood and other combustible material in forests, designed to mitigate wildfire behaviour and reduce the risk of severe fire (Ryan et al., 2013).

Prescribed fire is a colonial adaptation of cultural burning that is practised by various Indigenous groups in Canada (Parks Canada, n.d.). Cultural burns are similar, as Indigenous people use cultural burning practices to manage their land and encourage a thriving ecosystem. Historically, forests managed by Indigenous Peoples using cultural burns have been less prone to wildfire than forests managed in a Western approach, (Hoffman et al., 2022). In many parts of the country, forest fires are actively extinguished for public safety reasons. Interview participants expressed that current forestry management practices typically exclude prescribed burns and First Nations-led cultural burns. There are many initiatives being developed in Canada to safely re-introduce fire to the landscape in order to reduce the frequency and severity of wildfire near communities and infrastructure.

There are some policy and legal barriers to proactive risk management actions, such as cultural burning. One participant explained:

> *"Province to province it's [cultural burns] a bit different, but it's illegal. It's been illegal for First Nations across Canada to use fire as a cultural tool. It varies by province. That's kind of set the baseline for the suppression of cultural fire for over 100 years across Canada … Each Nation's going to have a real different experience with this, but it's one of those things that, like a lot of knowledge in other cases, has been lost because of that. If a Nation is not able to go and practise cultural burns, that's very tactile and requires a lot of the community to come together to do this kind of burning, and be involved in ceremony and language exchange, that kind of stuff has been lost."*

Cultural burns present opportunities for First Nations that have historically, in pre-colonial times, been thinning and actively burning areas to maintain ecosystem balance. Empowering these communities to protect themselves through cultural practices builds resilience. According to one interview participant,

> *"Empowering those communities to protect themselves through cultural practices is the thing that builds resilience for those communities. It's not just about we're going to evacuate you and then we're going to send you back. It's like how do we support you in your own cultural practices to, you know, make your community more resilient to wildfire?"*

With cultural burns, First Nation communities actively manage their landscapes to reduce fuel loads and reduce the risk of catastrophic wildfire. Cultural burns help maintain biodiversity, enhance soil health, and promote the growth of fire-adapted plant species, contributing to a more resilient natural environment, and in turn protecting First Nation housing and infrastructure (Schelenz & Wheelock, 2022). One participant identified that not only do practices such as cultural burns help protect First Nations from catastrophic wildfire, but they also provide significant employment opportunities and economic benefits for Indigenous communities living in remote areas.

Westbank First Nation in British Columbia has recently started conducting cultural burns outside of Kelowna in an area in critical need of intervention. These cultural burns have been used to reduce natural grasslands that are overgrown with weeds and other plants that pose a significant fire risk. Westbank First Nation, in partnership with BC Wildfire Service, was able to conduct cultural burning over 18 hectares to protect and create healthy land management practices (King, 2023). Initiatives such as this show potential opportunities and relationships for the interaction between First Nations and the Crown to promote community protection and environmental health.

Work is being done to improve dialogue, shared responsibility, shared risk management and risk reduction, and collaborative forest management practices between provincial agencies and First Nations in several provinces. These changes could ultimately make both First Nation communities and neighbouring non-Indigenous communities more resilient to climate change.

3.3.3 MERGING WESTERN SCIENCE AND INDIGENOUS TRADITIONAL KNOWLEDGE

The importance of merging Western science and Indigenous Knowledge is particularly relevant in building climate-resilient housing. One participant, who works with various Indigenous Knowledge Holders, shared:

> *"The way Western people do stuff is different from how our Indigenous People do stuff … We need to integrate our tools, so it's not in a sense of capacity-building analogy, but 'bridging capacity,' which is maybe a more appropriate term for bringing the tools together to get things done. We recognize that while John does it this way, Harry does it that way—how do we bring the two together to get what we need done…. Right now, there's no funding to allow for cross-cultural capacity bridging/building. It's currently happening on a small scale, a lot of the research community and research agents are seeing that and changing models to meet the needs at the community level. It's happening at the research level, but at the government level, I'm not sure."*

One specific example of applying Indigenous Knowledge to building climate-resilient communities has been the reintroduction of beavers in some locations. For example, First Nations, such as the Doig River First Nation of British Columbia, held the beavers sacred as culturally significant species (Doig River First Nation, 2018). Beavers mitigate flooding and droughts by altering the landscape and retaining water in the environment. The decline of beaver populations had negative impacts on these natural water management systems. However, people have been observing environmental benefits and increasing wetlands in areas where beavers have been re-introduced and where populations have grown. Wildlife management practices can be shifted to allow species such as beavers to create landscapes that protect human settlements (Hood & Bayley, 2008).

FireSmart Canada merges Western approaches to fire resilience with Indigenous Knowledge, aiming to enhance neighbourhood resilience to wildfire and minimize its negative impacts throughout Canada. They acknowledge and promote wildfire prevention, including through techniques such as cultural burns in Canada. Their recent publication *Blazing the Trail: Celebrating Indigenous Fire Stewardship* is the culmination of FireSmart Canada partnership with Indigenous Peoples that provides context about fire stewardship and the techniques used for generations (FireSmart Canada, n.d.).

3.3.4 LAND USE PLANNING, AND FIRE AND FLOOD MODELLING

Some First Nations, utilizing federal and/or provincial/territorial funding or their own resources, have been developing land use plans. There is increasing interest in land use planning by many First Nations across Canada. Land use planning is often funded through the First Nations Land Management Resources Centre or through the National Aboriginal Lands Management Association. Undertaking a land-use planning process provides First Nations with an opportunity to determine what lands may be unsuitable for development, decide where they want to build in the future, and establish policies and guidelines for how they want their lands to be developed.

Flood or fire modelling data can be used to supplement Elder and land-user knowledge to inform land-use planning decisions. In places where flood modelling has been completed, that modelling has been used to better inform land-use decision making and to select safe areas for future housing and infrastructure. Fire modelling could be incorporated into land use planning in a similar way, although we are not aware of any examples where this integration has taken place.

One individual, who supports several First Nations in work relating to flood and wildfire mapping, highlighted that historically, fire and flood modelling have been difficult for First Nations without civil engineers or full-time firefighters on staff to understand. This individual emphasized the importance of creating intuitive mapping products that, for example, would allow any individual to more easily visualize potential flooding in a community during a storm event. This individual stated:

> *"If they're [Indigenous community] thinking about building additional housing, [we help them understand] to not put them on floodplains, 'cause it's been happening on reserves because there's not a lot of habitable land on some of these reserves. We aim to empower local leaders by making the information accessible and understandable. For example, if I were a Chief, I'd seek out experts to help interpret and act on technical data. Leaders need to feel confident in their decisions without fear of embarrassment or ridicule."*

The notion of resilience has often been applied to ecosystems, but should also be applied to community land-use planning, as suggested by the Province of British Columbia (2024). Progressive changes in the development of land use plans, such as the incorporation of resilience and adaptation measures, should be expanded in land-use planning practices.

Land use planning may be an ideal opportunity to integrate climate risk into community decision making, especially when it can be combined with predictions and modelling that show potential climate scenarios. However, there is a need to educate and prepare the people doing this planning work on best practices and access and availability of relevant climate information, so that they are better able to use land use planning as an initial line of defence against climate change risks. This education and training could be coordinated by organizations such as the First Nations Land Management Resources Centre, the National Aboriginal Lands Management Association, or professional planners through the Canadian Institute of Planners. Additionally, resources and research that outline and summarize the best practices for the inclusion of climate resiliency and adaption measures into First Nation land use plans would be valuable.

3.3.5 ADAPTING EXISTING BUILDING PRACTICES FOR CLIMATE ADAPTATION

Some First Nations have identified that climate change impacts have already led them to start building housing and related infrastructure in a more climate-resilient manner.

One individual explained how their community, which faces significant risks from coastal erosion and extreme weather events such as hurricanes, started to reduce the size of houses and modify building

practices—such as removing basements—with the goal of constructing safer housing. The participant noted:

> *"Some tribal councils are funding and training people in this area [adapting building practices]; they have no choice but to address climate change. [First Nations] can't avoid the weather… They're having to reduce the size of housing to build safer houses. Things like metal roofs, for example, are in buildings now. Houses that [used to be built] were bigger and now houses are 660 square feet. About 300 to 400 square feet have been lost in the [building practice] changes because they are now building on slabs on grade instead of putting in basements [because of climate-related weather impacts on basements], which also adds a cost. Now they build subdivisions and there are some aspects of land use planning to avoid low areas for building subdivisions."*

Another interview respondent identified that their community, which faces significant risk from inland flooding, started altering building practices by requiring new homes to be built on top of mounds, or other raised-grade structures.

Two common themes emerged from engagement with communities that have already started making changes to their housing and infrastructure development practices. First, they noted that every decision comes with a significant trade-off, whether in time, materials, land size, or resources needed to train professionals. They too are making the choice between building better homes or building more homes. Secondly, communities that have started making changes "on the ground" are the communities that have experienced intense weather events or other climate change-related issues and hazards. These are communities that have faced impacts already and have had a glimpse into a future with climate change. Alternatively, some interview participants noted that most communities that haven't adapted their housing and infrastructure development practices are often communities that haven't experienced extreme weather events to date.

4.0 ADDRESSING BARRIERS AND CHALLENGES

This section reflects on the research findings presented in Section 3.0 to provide a list of recommendations and associated actions to address the identified barriers and challenges associated with Indigenous climate-resilient housing.

4.1 RECOMMENDATION 1: ENABLE A WHOLE-OF-SOCIETY APPROACH

The results of this study highlighted that federal programs, initiatives, and funding opportunities related to First Nations housing and climate resilience need to enable collaborative multi-sectoral and multi-jurisdictional approaches. These approaches need to be grounded in strong relationships between federal, provincial, territorial, and Indigenous governments.

A whole-of-society approach is a concept in governance that involves civil society work, alongside public and private sectors, to collaboratively pursue solutions to complex problems while building

effective partnerships and cooperation. This approach emphasizes collaboration among formal and informal organizations and institutions in reaching the same goal (Kjellén et al., 2023). Building relationships across political, geographical, and policy jurisdictions is crucial to this approach. Establishing connections that create opportunities for cross-sectoral and cross-governmental collaboration enables comprehensive and effective solutions.

This research provided several examples of where holistic and collaborative approaches are working effectively to support First Nations, as well as non-Indigenous communities, when it comes to housing and climate resilience. One participant described the importance of building strong relationships and having accountability:

> *"[A big piece for our success is a] strong team that is motivated and passionate. I think our relationship, you know, with the federal government and provinces is strong, and there is accountability. … We build relationships extremely well."*

Others provided examples from their home provinces, with one participant from British Columbia describing how the province's active participation alongside the federal government in Indigenous climate and housing initiatives improves outcomes for First Nations. Similarly, another participant discussed programs in Manitoba, including the Manitoba Indigenous Housing Capacity Enhancement and Mobilization Initiative working group. This working group provides opportunities for all tribal councils and independent First Nations to come together, receive information and training, and keep up to date as things change and move forward regarding building safer housing. The program, established by Indigenous Services Canada to serve Manitoba, also enables communities to enhance their existing governance structures to address housing needs.

As part of the Canada Mortgage and Housing Corporation's National Housing Strategy work to address urgent housing needs, joint funding from the federal government and the Government of Alberta was established to support two Indigenous housing projects in northern Alberta in 2022 (CMHC, 2022). The support and joint discussions relieve housing constraints and aim to build affordable housing for Swan River First Nation, as well as a Métis organization. The funding, sourced from the National Housing Strategy, was developed through partnerships between the federal, provincial and territorial, municipal, and Indigenous governments (CMHC, 2022). This example of collaboration within the National Housing Strategy demonstrates how joint discussions from multiple layers of society can result in concrete improvements in housing for First Nation communities.

Alternatively, it was described to us that in areas where a province draws a hard line between provincial and federal responsibility for First Nation communities on issues relating to climate change and community safety, outcomes for those communities are not as good. One example an interview participant shared was in Nova Scotia, where the province has withdrawn access to some elements of emergency response training for First Nations. The interview participant explained that the reason provided by the province was because training for First Nations was a federal responsibility.

The effects of climate change reach across departments, geographical boundaries, policy jurisdictions, and disciplines. We need approaches to reduce climate risks that build on the skills, resources, connections, knowledge, and traditions of people and organizations that also cross these

jurisdictional boundaries. Whole-of-society approaches need to integrate First Nation communities into regional and provincial climate change planning and risk-reduction programs. A segmented or siloed approach that does not include First Nations is not only missing geographical gaps, but also local knowledge and resources. Canada's National Adaptation Strategy encourages a whole-of-society approach, setting goals and objectives for collective action from all aspects of society.

Similarly, landscapes that have been deforested for agricultural or urban development purposes typically increase the speed and volume of precipitation runoff. The rate and volume of this runoff can exacerbate flooding. Policy changes at the municipal, regional, or provincial level that promote the retention of water on the landscape, and promote the protection and enhancement of riparian buffers, can serve to protect downstream communities (Indigenous and non-Indigenous) and infrastructure from flooding events.

Additionally, wildlife management practices that promote the methodical reduction of species such as beavers from the landscape may be impacting the capacity of land to hold and retain water. Beavers are often seen as problematic species because their activity can flood infrastructure, farmland, and recreational lands. At a landscape level, the activity of beavers may actually reduce the peak flows and the volume of runoff following precipitation events.

To enable collaborative multi-jurisdictional and multi-sectoral approaches related to First Nation housing and climate resilience needs, the following actions are necessary:

- facilitating further research to better understand which provinces and territories are doing a better job at addressing climate change risks across jurisdictional boundaries. What are the factors that enable provincial, federal, and Indigenous governments to collaborate more effectively? Which provinces are doing this better and why? Which provinces are lagging and how can they improve?; and,
- enhanced protections by policymakers and government agencies, for landscape-level features that reduce risks associated with climate change-induced hazards. This should be done alongside a comprehensive inventory and analysis of existing land management, forestry, and wildlife management policies to measure their effectiveness in mitigating these hazards.

4.2 RECOMMENDATION 2: INCREASE SUPPORT FOR PREVENTION MEASURES

Adjusting federal funding programs to focus more on prevention initiatives for climate-induced emergencies will reduce disruptions to peoples' lives, keep people safer, and reduce costs associated with response and recovery.

The costs of response to and recovery from climate-induced emergencies are several times higher than those associated with prevention. Recent academic sources have described that proactive

adaptation measures can have a benefit-cost ratio of $11 saved for every $1 spent through building retrofitting and other infrastructure and building upgrades (Bhola et al., 2023). Additionally, prevention reduces risks to personal safety and the broad-scale disruption communities face during evacuations. The Auditor General's report (2022) found the following:

> The department's actions were more reactive than preventative, despite First Nations communities identifying many infrastructure projects to mitigate the impact of emergencies. The department had a backlog of 112 of these infrastructure projects that it had determined were eligible but that it had not funded. The department is also spending 3.5 times more money on responding to and recovering from emergencies than on supporting the communities to prevent or prepare for them (s.8.13).

Programs such as the federal First Nation Adapt Program are seeking to empower communities to gather flood mapping and other relevant data that can be used to inform community decision-making, for example. Indigenous Service Canada's Emergency Management Assistance Program also has a mitigation and preparedness funding stream. Additionally, Natural Resources Canada's Flood Hazard Identification and Mapping Program aims to create flood hazard maps of high-risk areas in Canada to inform decision making. While these programs provide valuable services, they highlight the need for a national strategy that prioritizes and integrates climate resilience into all aspects of federal investment in infrastructure planning and development for First Nations.

Innovative urban design and community planning processes have started to account for the effects of climate change from the start by constructing community spaces and buildings that can experience flooding and recover quickly. Some non-Indigenous communities are using new financial tools to make the investment case to elected leaders for building more expensive and climate-resilient infrastructure. Fires and floods are going to continue to happen. There appears to be more funding available in the coffers of response agencies than those addressing preventative actions; alternative accounting and financial projection approaches are needed to find an optimal balance. We recognize that communities are facing the effects of climate change to existing infrastructure now. Response and recovery spending is needed and will continue to be needed.

While numerous documents and resources point to the benefit of prevention versus response, there are some specific challenges around prevention to discuss. Our research pointed to an increase in preventative actions following the negative impacts of a climate-related event. It may be a common experience that communities and organizations need to be impacted before they are prepared to invest in prevention. Additionally, investments of money and resources used in prevention activities may not be seen as valuable when they are effective. In some cases, it may be more difficult to connect actions to outcomes that didn't happen (or were prevented).

There is a need to better understand what specific preventive actions can have the most impact, both socially and financially. More research, analysis, and knowledge sharing would help to clarify what specific actions create the most valuable and the most "savings."

We recommend that the federal government provide the following:

- an increase in funding available to Indigenous Nations for the prevention of climate-induced emergencies such as flooding and wildfire. Funding programs could support initiatives such as risk modelling to provide Indigenous Nations with data to inform prevention measures and land use planning, as well as to implement the prevention measures (e.g., capital for infrastructure);
- a national strategy for federal government spending that prioritizes and integrates climate resilience into all aspects of infrastructure planning and development for First Nations; and
- a national jurisdictional scan for best practices in climate change prevention and adaptation in First Nations that can be used to inform the above strategy and support the training and capacity development of land use planners.

4.3 RECOMMENDATION 3: FUND THE HOUSING GAP

The federal government must follow through on its commitment to close the Indigenous infrastructure gap by 2030 and urgently commit the necessary funding to build housing and related infrastructure. While addressing this gap, the federal government must also capture opportunities to build housing and related community infrastructure that reduces risk from climate-related events.

This research has shown that a lack of federal funding remains a primary factor contributing to the housing crisis affecting First Nations Peoples and intersecting challenges related to climate-resilient infrastructure. The Assembly of First Nations asserts that $349.2 billion is the minimum needed to close the First Nations infrastructure gap, $135.1 billion of which is needed to build the 157,453 new homes required (Assembly of First Nations, 2024). The infrastructure gap includes the limited access that people have to essential infrastructure, including housing, education, connectivity, water and wastewater services, and other services across Indigenous communities.

The new Canada Green Buildings Strategy does promote "climate resilience considerations—including locating, planning, designing, managing, adapting, operating and maintaining buildings infrastructure—and current and projected climate change impacts" (Government of Canada, 2024a). However, this strategy should ensure the recommendations and opportunities it provides are equally available to First Nations.

In 2022, the Auditor General's report stated, "Communities are likely to continue to experience emergencies that could be averted by investing in the right infrastructure" (s.8.13). Since 2015, the federal government's spending of $5.99 billion on First Nation, Métis, and Inuit housing has been inadequate, and Budget 2024 continues to underfund necessary infrastructure initiatives, with less than $1 billion committed to closing the gap over the next five years (Government of Canada, 2024b). The construction of climate-resilient homes requires, first and foremost, investment in closing infrastructure and housing gaps for First Nations.

We recommend that the federal government take the following actions to fulfill its commitment to close the Indigenous infrastructure gap by 2030:

- make the significant financial commitments required to close the First Nation infrastructure gap by 2030, including adequate funding for Indigenous housing;
- commit to a reliable long-term funding plan for on and off-reserve First Nation housing, housing managers, and housing inspectors, moving away from year-to-year funding approaches; and
- ensure that opportunities for climate-resilient construction incentives being promoted through the Canada Green Buildings Strategy are readily available and accessible to Indigenous Nations through conducting outreach programs and facilitating workshops.

4.4 RECOMMENDATION 4: REDESIGN FUNDING MODELS

Funding agencies must enhance funding models to better align with First Nations' climate and housing priorities. Such funding models should promote multi-jurisdictional, cross-sectoral collaboration, support the prevention of climate change-induced impacts, and promote long-term stability for housing projects.

Federal government funding support is essential for planning, staffing, and implementing projects. Some First Nations with sufficient own-source revenue or non-government funding support are able to supplement the funding received from the federal government. One research participant, when asked to identify any solutions that do not involve funding, commented:

> *" Everything involves funding and more funding. I don't see the solution without funding."*

Searching and applying for, and reporting on, various funding programs and initiatives require an extensive time commitment from those seeking to participate. Additionally, many departments within First Nations and organizations are faced with trying to creatively squeeze the projects they need to do into the narrow criteria of the funding available. Funding criteria often reflect the specific priorities of the agency from which they come, rather than the need and the priorities of those using the funding. These funding programs can further entrench siloed departmental activities. Both housing and climate change are cross-sectoral issues by nature. For example, housing supports health, education, and economic development initiatives, and is also a component of effective land management (Wale et al., 2024).

Reliance on funding programs also reduces the agency of those receiving the funds when their decisions and choices are dependent on the types and amounts of funding. Additionally, when federal political priorities shift (through elections or internal program review processes), people receiving the funding must adapt. This adaptation in turn creates instability in programming, implementation, and staffing. In order to maintain staffing and program continuity, First Nations' staff often need to become experts at "robbing Peter to pay Paul" (interviewee).

There is a considerable amount of research taking place internationally, as well as in Canada, on innovative "outcomes financing." These approaches often use private-sector project financing to achieve positive social outcomes that central governments may have challenges achieving. These

approaches can introduce new financial resources into the system and can also serve to reduce government expenses while improving the outcomes for people in communities. Government procurement policies can inhibit the opportunities to apply these new financial mechanisms to problem solving (Loney, 2016, 2018).

There are other examples of where the federal government's procurement policies may be driving up costs for housing and infrastructure in First Nations. One aspect of additional costs stems from the administrative burden federally financed projects may pose to communities and their contractors. There are opportunities to explore efficiencies in project financing that reduces administrative costs, while shifting more money into the desired activity.

It can be very difficult for people applying for funding to understand the range of programs and funding opportunities available to them. A one-window or integrated funding application process would create opportunities for proposal applications to be explored, shifted and improved, and funded where they may not otherwise be successful. Establishing a funding liaison officer position or something similar would support communities in finding the programs and processes they need to advance their projects.

The federal government (as well as provincial and territorial governments) has existing budgets and monies to support housing, infrastructure, and climate change adaptation (Government of Canada, 2024a). How can the use of those finances be optimized? What opportunities are there to improve their effectiveness (impact) and the efficiency (most benefit per dollar spent)? A positive deviance framework seeks out those organizations or individuals whose actions are allowing them to have greater success than others facing the same problem or challenge. Positive deviance approaches to problem solving can be used to quickly understand the best program and project approaches, and to learn from those leaders. In order to reduce redundancy, increase collaboration across departments or jurisdictions, and improve project outcomes, optimization of funding programs should be pursued to make the best use of the resources available. Seeking out "positive deviants" in this area—provincially, territorially, federally, or even internationally—could accelerate organizational learning about funding optimization.

We recognize that many of the recommendations in this report focus on the need for new and additional funding. This focus on funding is a reality in communities that face infrastructure and housing deficits. These calls for funding are not new. We expect that the availability and release of funding will continue to be slow and inadequate to address the wide range of priority needs. So additional questions must be asked. What can be done in the absence of more funding? When funding is going to be constrained for the foreseeable future, what are the actions, programs, efficiencies, collaborations, and innovations that can be pursued that will lead to safer and more resilient communities? Beyond funding, how can federal, provincial, and territorial governments most effectively support the broad-scale changes needed to build more resilient Indigenous communities and housing? What existing tools, skills, relationships, experiences, and funds can we leverage to accelerate adaptation?

In order for funding programs to be effective, local knowledge, goals, and priorities need to be woven in from the start. The criteria for successful funding applications need to reflect both the funders' priorities (and the accountability structures) and those of the funding recipient. A shift is needed to ensure that funding empowers and builds up communities.

Funding agencies should take the following actions to enhance funding models:

- introduce funding with adequate flexibility that enables Indigenous Nations to design projects appropriate for their needs, and to avoid creating "Trojan horse" workarounds by necessity (i.e., disguising the First Nation's actual needs and related priorities while developing programs and proposals in order to be eligible for program funding);
- implement a one-window or integrated funding application process to create a simplified, single-entry system for the proposal process;
- develop a funding liaison officer position to assist First Nations in navigating funding programs across departments, ensuring they can access and utilize available resources;
- conduct further research on best practices for outcomes financing and ensure that there are mechanisms to implement outcomes financing within federal departments;
- research the costs, benefits, and effectiveness of climate change-focused resilient actions;
- streamline procurement processes to reduce administrative burdens and costs on First Nations; and
- co-create funding programs and related application criteria with Indigenous Nations.

4.5 RECOMMENDATION 5: SITE FOR LIFE

The federal government should fund national-, provincial-, and/or territorial-scale projects that create tools that delineate high-risk flood and wildfire zones to support First Nation communities in their decision making for where to site a home.

Strategically locating new homes is a powerful opportunity to support the development of climate-resilient housing (Ness et al., 2024). At the same time, evidence from literature makes it apparent that limited land bases, particularly on First Nation reserves, restrict decision making surrounding where and how many homes can be built (MacTavish et al., 2012). This is compounded by scenarios where reserve lands are located in areas more susceptible to various climate hazards, such as flooding and wildfire.

Through the interviews, some First Nations shared their successes in integrating fire and flood modelling into their land use plans, building a more fulsome understanding of risks to draw on when making informed decisions. These projects often occur at the community scale, and require the involvement of qualified professionals, adequate funding, and time. Given that these resources are

not always available for communities to undertake their own planning and modelling, the development of larger-scale (e.g., regional or provincial) tools to identify and model threats, such as flooding and wildfire, could provide baseline information in the absence of more localized studies. In building these tools, the focus must be on making them interactive and easy to use.

To enable funding and create tools to support First Nation communities in their decision making for siting homes, the federal government should do the following:

- delineate high-risk flood management zones nationally and activate funding and regulatory levers to discourage residential construction in high-risk areas and to better understanding land-use trade-offs that are decided upon with limited land;[2]
- urgently map high-risk wildfire areas nationally and fund wildfire community action plans in these areas with Indigenous communities;[2]
- ensure tools that are created to identify high-risk areas are created in an accessible and user-friendly manner by incorporating input from Indigenous Nations;
- procure and fund innovative tools on a national scale for use by Indigenous Nations to support decision making in housing and planning and further enable self-determination;[3] and
- streamline the additions-to-reserve process in collaboration with the provinces to make it easier and quicker for First Nations to expand their communities into areas that are safe for building new homes and infrastructure.

4.6 RECOMMENDATION 6: MODERNIZE NATIONAL MODEL BUILDING CODES

The federal government should modernize the National Building Code of Canada to integrate physical climate-resilience measures and provide Indigenous communities with the support needed to implement and enforce building standards for human safety. Working with Indigenous Nations is critical to identifying deficiencies in current standards.

The Assembly of First Nations projects the need to construct 133,320 new homes and repair another 80,650 on First Nation reserves to close the housing gap (Assembly of First Nations, 2024). Survey and interview participants noted challenges in both implementing climate-resilience measures and enforcing building standards under the existing system that are not encouraged in current building codes.

[2] Adapted from Climate Proof Canada's National Climate Adaptation Summit Recommendation #2 and the Canadian Climate Institute's Close to Home report.

[3] The Canada Water project is an example of using technical expertise, computer modelling, and climate change projections to create a tool that puts water-resources modelling and decision-making tools in front of all Canadians at a national scale. This project is still underway and can be a model for the types of tools that will be useful in providing critical information to decision makers, so they can decide where to build homes in a climate-resilient manner.

One participant shared that the national model building code and some provincial and territorial building codes are moving toward a performance-based building code system, but often lack climate-resiliency measures or lump them under energy efficiency. Given this approach, there is a risk that climate resiliency will be overlooked in favour of meeting other requirements, or not included at all. There may be an overemphasis on building energy-efficient homes at the cost of ignoring climate resiliency. Ideally, housing is constructed in ways that address both of those goals.

Research participants also described challenges they have experienced with the inspection of new buildings and enforcement of building standards, particularly in First Nations. The Auditor General of Canada (2024) found that ISC and CMHC did not have assurance that all housing units built and repaired with their funding met applicable building code standards.

The demand for more housing in Indigenous communities presents an opportunity to ensure that those newly constructed are built with safety and climate resiliency at the forefront. As part of this recommendation, the federal government should do the following:

- overhaul the national model building code to simplify and harmonize requirements and integrate physical climate-resiliency measures to reflect changing regional climate risks and provide flexibility to meet the unique needs and constraints that Indigenous communities face;[4]
- provide First Nations with resources to apply and enforce building standards to ensure human safety and climate-resiliency measures. This recommendation needs to include local empowerment through training and skills development; and
- require and follow through to ensure all federally funded housing in First Nation communities meets the national model building code, or stricter code, and where deficiencies are identified, that they work with Indigenous communities to address them.[5]

4.7 RECOMMENDATION 7: ACCELERATE KNOWLEDGE SHARING

The most effective adaptation measures are going to take place at the local level. Enabling and expanding local knowledge through the acceleration of wider knowledge sharing will support people on the ground to take effective and appropriate actions. Specifically, the federal and provincial governments should co-develop a climate-resilient building toolkit with First Nations that provides real examples, guidelines, and best practices that can be easily implemented by Indigenous communities on the ground, and co-develop climate-resilient housing designs with First Nations to be included in the federal Housing Design Catalogue.

[4] Adapted from the Task Force for Housing & Climate's *Blueprint for More and Better Housing* report.
[5] Adapted from the Auditor General of Canada's *Housing in First Nations Communities* report Recommendation 2.51.

Addressing barriers to developing climate-resilient housing for Indigenous and non-Indigenous communities requires improvements to the ways resources and knowledge are shared. Indigenous Peoples have a long history and experience of adaptation and resilience that can support and inform the practices of governments and non-Indigenous communities. As the climate crisis expands, we need to harness available resources and sources of knowledge to adapt effectively. Blending the expertise of Indigenous Knowledge Holders and research and scientific organizations is one way to do so.

There is a significant amount of research and resources being directed to climate change-adaptation initiatives, including those focused on building, construction, and community design. However, the results of this study showed that people working on the ground in First Nations to address these issues often aren't aware of the innovations and advancements that are taking place in research related to climate resilience, mitigation, and adaptation.

Similarly, research organizations funding and carrying out research in this space face difficulty in making their results accessible and applicable for communities. For example, very few participants in this study were aware of the recommendations and best practices described in the National Research Council Canada's *National Guide for Wildland-Urban-Interface Fires*. Additionally, research that does make its way to the community level is often produced using inaccessible language that prevents local utility. Further resources like the *First Nations Infrastructure Resiliency Toolkit* developed by the Ontario First Nations Technical Services Corporation is another example of good practices that can adopted by communities. This toolkit supports First Nation communities in assessing the vulnerability of their infrastructure, buildings and facilities due to extreme weather.

Agricultural research organizations have been addressing the challenge of research communications and knowledge sharing. Many have developed effective "extension" services and approaches that streamline the links between research organizations and people in the field. Research organizations working on issues related to climate-resilient housing could adopt these processes and lessons learned to better accelerate knowledge sharing to the local level.

The federal and provincial governments should do the following:

- engage and lead outreach opportunities to co-develop a climate-resilient building and land use planning toolkit with First Nations;
- provide research and communication funding opportunities for First Nations so that their experiences, practices, knowledge and adaptation actions can be shared with and inform government and non-Indigenous communities;
- procure a research team to co-develop a business/financial case with Indigenous communities for the lifecycle cost of climate-resilient housing, including operating and maintenance costs, while also facilitating knowledge sharing to support implementation and management of such housing; and

- explore and apply extension services to increase the effectiveness and accessibility of research and innovation supporting community-led solutions to building climate-resilient housing.

4.8 RECOMMENDATION 8: ADDRESS LABOUR CONSTRAINTS

The federal government should ensure there is sufficient labour to close the Indigenous housing gap through funding Indigenous communities and organizations to recruit, retain, and train staff for all stages of the housing lifecycle.

The results of this study indicate that some First Nations may lack the internal capacity to build and maintain housing units, and to address these climate and housing challenges effectively. There is an urgent need to invest in infrastructure, recruitment, retention, and training to develop a qualified workforce in the community.

The ability of First Nations to build their own housing supports their self-determination and agency. While labour constraints exist at all stages of the housing process, a shift toward increasing local capacity would simultaneously address this issue while also reducing community reliance on external consultants and contractors. Interview participants also explained that costs can increase dramatically when in-community labour is used in home building, and that many First Nations have shifted to hiring external contractors as a way to better manage costs.

While those who receive training may also leave their communities for other employment opportunities, resilience on the local scale is built through this expansion of skills, knowledge, and experience.

The federal government should do the following to support this recommendation:

- allocate additional funding resources specifically for recruiting, training, and retaining Indigenous workers in the housing sector; and
- collaborate with various institutions and organizations to create specialized training programs that are flexible to the specific needs and priorities of each Indigenous community.

4.9 RECOMMENDATION 9: EMPOWER INDIGENOUS KNOWLEDGES AND COMMUNITIES

Provincial and federal governments should empower Indigenous Knowledges and cultural expressions that promote climate resilience.

First Nations Peoples have lived in relationship with the land since time immemorial, and the collective knowledge and understanding built through these deep connections has been passed on

through generations. Indigenous Knowledge is critical to building a holistic understanding of the land and environment, and as a result, plays a crucial role in informing climate change mitigation and adaptation measures.

The reintroduction of beavers by Doig River First Nation is one example of a First Nation leading climate resilience through cultural practices and adaptations. The application of cultural burns provides another example. As the impacts from climate change intensify and are anticipated to disproportionately impact First Nation Peoples, there is a need to respect the self-determination of First Nations and their jurisdiction to manage their lands in accordance with their culture, traditions, and practices.

Despite these proactive efforts, First Nations often encounter significant barriers due to jurisdictional constraints. In Canada, the Constitution Act, 1867, distributes legislative powers related to natural resources to the provinces. Outside of reserve lands, the practice of cultural burns falls under provincial natural-resources jurisdiction,[6] rather than federal responsibility. As part of these recommendations, provincial, territorial, and federal governments should do the following:

- develop mechanisms that respect and incorporate Indigenous Knowledge for climate resiliency when implementing Canada's United Nations Declaration on the Rights of Indigenous Peoples Act and Action Plan;
- leverage federal funding and other mechanisms to encourage provinces and territories to adjust legislative and policy barriers that prohibit or restrict First Nations Peoples from cultural practices that support climate resiliency; and
- empower local and provincial governments to transfer more decision-making power and resources directly to First Nation communities. The need for a whole-of-society approach must extend to all components of society, including First Nations, to ensure responsibility to lead their climate-resilient efforts.

5.0 CONCLUSION

First Nations Peoples and communities are particularly vulnerable to the impacts of climate change, requiring a paradigm shift across many facets of policy for First Nation housing and infrastructure to be built in a climate-resilient manner. Challenges of increased fire prevalence, flooding, melting permafrost, and other climate risks will increase as climate change progresses, and an intentional effort must be made by all of society to help mitigate and resolve these challenges.

To date, action related to Indigenous housing and climate resiliency has not been effectively prioritized for a number of reasons. As described throughout Section 3.0 of this report, Indigenous Nations have faced obstacles in developing climate-resilient housing, and barriers to climate-resilient housing and land use planning. More broadly, Indigenous Nations often face the necessity of

[6] Note, lines of authority and decision-making jurisdiction over natural resources are beginning to blur as Indigenous Nations continue to assert their own jurisdiction and Crown regulatory processes over natural resource development are modernized.

balancing numerous priorities in making housing decisions, including often urgent needs for more housing, the availability of land, proximity to other infrastructure and services, and what can feasibly be done within applicable funding and policy constraints.

Barriers related to capacity, lack of training, decision making, funding, and resource dissemination create direct barriers to the self-determination and agency of First Nations in building housing and climate-resilient infrastructure. Initiatives such as training programs, cultural burns, and other practices have supported some success, but there is a greater need for improved relationships with the Crown and Indigenous Nations, and other external counterparts. Our research points to the importance of enabling and supporting local actions to building climate change resiliency.

While our research drew on both primary and secondary sources, a large limitation to our research was that we were unable to incorporate Métis and Inuit perspectives directly in our survey and interview process. As such, the barriers and opportunities for success described in this report, along with the recommendations provided, are focused on the First Nation on-reserve context. Addressing this research gap and exploring the unique challenges and successes faced by Métis and Inuit Nations in establishing climate-resilient housing will help provide a more inclusive understanding of the barriers and opportunities at hand.

The acceleration of home building across Canada and specifically in Indigenous communities, offers us the opportunity to establish practices, programs and processes that can be applied to climate change adaptation nationally.

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