

Climate Change and Land Use Planning

*A Guide for NWT Community Governments
on the Community Plan Review Process*

August | 2025



Government of
Northwest Territories

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Foreword

This guide is one in a series of guides developed by the Department of Municipal and Community Affairs (MACA) to support the *NWT Community Planning Framework*. It is intended to provide guidance for community governments that are in the process of adopting, reviewing or implementing their community plans, and the professional community planners they retain to assist with this work.

Other guides in this series:

- Accessibility and Age-Friendly Design Considerations
- Archaeological Site Management and Protection
- Best Practices for Municipal Public Engagement
- Community Civic Addressing
- Understanding the GNWT's Duty to Consult
- Land Development and Capital Planning

Acknowledgements

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MACA thanks Dillon Consulting Ltd., Fotenn Planning and Design, and WSP Canada for their contributions to this guide.

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English

Si vous voulez ces informations dans une autre langue officielle, contactez-nous.

French

Kĩspin ki nitawih̄tĩn ē nĩhĩyawihk ōma ācimōwin, tipwāsinān.

Cree

Tłıchq yatı k'èè. Dı wegodı newq dè, gots'o gonede.

Tłıchq

ʔerih̄tł'ıs Dēne Sų́líné yatı t'a huts'elkēr xa beyáyatı theʔą ʔat'e, nuwe ts'ēn yóftı.

Chipewyan

Edı gondı dehgáh got'ıe zhatıé k'ée edatł'éh enahddhę nıde naxets'é edahfı.

South Slavey

K'áhshó got'ıne xədə k'é hederı ʔedıhtł'é yerıniwę nıde dúle.

North Slavey

Jii gwandak izhii ginjik vat'atr'ijahch'uu zhit yinoththan jı', diits'àt ginohkhıi.

Gwich'in

Uvanittuaq ilitchurisukupku Inuvialuktun, ququaqłuta.

Inuvialuktun

Ċ'đĊ ɳɳ'ḄΔᶜ ʌʀLJΔʀᶜ ΔḄ'ɳɳᶜ'ʔLɳɳḄ, ɳᶜᶜɳᶜḄᶜ ɳᶜḄᶜʀᶜḄ ᶜḄɳᶜ.

Inuktitut

Hapkua titiqqat pijumagupkit Inuinnaqtun, uvaptinnut hivajarlutit.

Inuinnaqtun

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Introduction

Communities throughout the Northwest Territories (NWT) face many climate change impacts and challenges that threaten property, prosperity, and life. Moreover, the threat of climate change is accelerating, and new information about climate change risks are continually being discovered. Each community in the NWT has its own unique circumstances when it comes to the impacts of climate change. Through community planning, communities can decide ways to incorporate policies to address climate change through adaptation, mitigation, and resilience measures. Communities that have their community plan bylaws or land use plans are better prepared for the effects of climate change. Some examples include:

- ✓ *Being able to build back better after a climate event due to good land use planning and development policies*
- ✓ *Communities understand what to do during an emergency and have adequate capacity to support community members*
- ✓ *Communities keep adaptation, mitigation and resilience top of mind when making decisions*

This guide supports planning practitioners, community leaders, and local administrative staff in integrating climate action into community land use planning processes in the NWT. It highlights opportunities to incorporate climate change considerations into the review, administration, and implementation of planning tools such as community plan bylaws, zoning bylaws, area development plans, subdivision plans, and development permits.

Given that community governments in the NWT are responsible for their own planning tools, regularly updating these documents ensures alignment with best practices, emerging data, and long-term sustainability goals. This guide presents practical strategies for incorporating climate resilience into planning documents, thereby reducing community vulnerabilities and supporting resilient development.



1.1 Climate Change Issues and Hazards in the NWT

Climate change refers to any significant alteration in temperature, precipitation, and wind patterns over an extended period. While it is a natural process, the current rate of change is unprecedented due to human activities, particularly the burning of fossil fuels and land use changes, releasing high levels of carbon dioxide and other greenhouse gases (GHGs) in the atmosphere.

The impacts of climate change have become a reality in past decades for the NWT: the North has been warming up about four times faster than the rest of the world. This creates rapid, significant and irreversible impacts on NWT ecosystems and landscapes.

Where applicable, this guide is structured around four key climate hazards that directly impact NWT communities. These include:

- **Flooding:** The conditions for ice formation and spring melt have changed, resulting in increased ice jam flooding.
- **Erosion (Coastal and Riverbank):** Erosion refers to the disappearance of land along a shoreline or riverbank. An example of erosion impacting a community includes needing to move houses along a riverbank away from an eroding or unstable slope.
- **Wildland fires:** Due to longer, hotter summers, wildfires are getting more frequent and intense.
- **Permafrost Thaw:** Permafrost thaw is occurring all across the Northwest Territories at an unprecedented rate. Permafrost thaw undermines buildings, roads, and infrastructure.

Communities also face emerging issues such as extremes in precipitation, smoke-related health concerns, mental health related concerns, and food insecurity. These challenges are compounded by limited infrastructure, high transportation costs, and reliance on seasonal access routes such as ice roads.





1.2 The Importance of Planning and the Role of Community Governments and Planners

The urgency surrounding climate change calls for efforts that incorporate climate action into all stages of community planning, land development, and policy making. Given the complex and often imminent nature of climate hazards, comprehensive planning across various levels of government is occurring. Climate change impacts are being addressed at federal, territorial, and local levels, alongside an array of plans and strategies.

The community plan is often one of the few statutory tools available to a community government for strengthening climate resilience. As well, community plans can provide a platform for bigger climate change action. Since communities in the NWT are responsible for reviewing, administering, and implementing their planning and development tools, regularly updating these documents helps to maintain awareness, keep apprised of new developments and best practices, build capacity towards achieving goals and objectives, and inform land use and development decisions.

Under the *Community Planning and Development Act*, a community plan must be prepared in consultation with a professional community planner. MACA provides assistance for community governments in identifying and hiring a professional planner by maintaining a list of consultants and assisting communities in drafting Request for Proposals (RFPs). Planners bring essential technical knowledge, such as mapping, risk analysis, and policy development while community leaders bring deep understanding of local priorities, values, and lived experience.

The Canadian Institute of Planners (CIP) has published a Policy on Climate Change Planning, which states that planners have a professional obligation to incorporate measures to mitigate climate change and adapt to its impacts in all relevant planning decisions. This means that planners are “pre-positioned” to deal with climate change at the community level.



Legal and Planning Framework

As mentioned in the [NWT Community Planning Framework](#), community planning is governed by the *Community Planning and Development Act* (CPDA) and Regulations. The Act empowers community governments to prepare and adopt community plans and related bylaws and indirectly outlines specific requirements for managing climate-related hazards. The CPDA outlines two main ways communities can integrate climate action into community land use planning tools:

- **Section 4.1 c:** “A community plan must [...] contain statements of policy respecting the management of any **environmentally sensitive lands** or lands subject to **natural hazards** such as flood or slope instability.”
- **Section 12.1:** “The purpose of a zoning bylaw is to **regulate and control the use and development of land and buildings** in a municipality in a manner that conforms with a community plan, and if applicable, to **prohibit the use or development of land or buildings** in particular areas of a community.”

This legislative authority provides a clear mandate for integrating climate change considerations directly into land use plans, zoning bylaws, subdivision designs, and development approvals.

Table 1: Further Climate Considerations in the CPDA

<i>Community Planning and Development Act</i>	Climate Considerations
s. 3. (1) A plan must consider sustainability and the environment	Climate change is a factor which impacts a community's economic, social and cultural development, and its physical infrastructure. Climate action is key to sustainability.
s. 4. (1) Policy on environmentally sensitive or hazard-prone lands	Climate change affects the extent and type of natural hazards, and the function of environmentally sensitive lands, so community plans must consider current impacts and projected climate conditions.
s. 4. (2) Infrastructure planning	Climate change will negatively affect infrastructure, so at a community plans must address how climate risk will be reduced and/or the resilience of infrastructure systems increased.
s. 4. (2) Mapping	Land use schedules and maps are the primary way that community plans control land use and development. Different types of mapping techniques can be used to make decisions, as explored in Section 3.3.
s. 4 (3) (4) Plan preparation must be supported by studies	The Act gives municipalities discretion to incorporate a range of studies into their community plan. Communities are empowered to integrate climate-related plans and studies into the community planning process. This could include hazard mapping conducted by the GNWT Dept. of Environment and Climate Change, or a drainage study commissioned by the municipality as part of the community plan review.

Climate Change Actions and Planning Approaches

For communities in the NWT, where climate impacts such as permafrost thaw, flooding, and wildfires pose immediate risks, climate action is essential to ensuring long-term sustainability, safety, and economic stability. Mitigation, adaptation and resilience are key aspects of climate action. Climate action in the NWT must balance the urgent need to adapt to local climate impacts with broader goals of reducing greenhouse gas emissions and supporting long-term community resilience.

- **Adaptation:** actions that prepare for changes that are occurring, or are likely to occur, in the future due to climate change. In the NWT, this includes managing erosion, permafrost thaw, flood risk, and wildfire hazards.
- **Mitigation:** actions that involve preventing climate change, such as reducing greenhouse gas emissions or implementing energy conservation, efficiency and renewable energy projects.
- **Resilience:** ability of a system (ecological, social, economic) to anticipate, withstand, respond to, and recover from climate-related hazards and impacts, while maintaining its essential functions and identity.

3.1 Climate Adaptation Actions

Protect, Accommodate, Retreat, Avoid – The PARA Framework

The PARA Framework¹ is a useful tool for organizing climate adaptation actions, especially for the NWT where a flexible approach to climate adaptation is required. PARA is organized into four groups:

- **Protect:** To use engineered solutions to keep climate risks away from people and infrastructure. While protection strategies may seem like a straightforward solution, they are often prohibitively expensive in northern contexts and may only offer short- to medium-term relief. Without being paired with “Accommodate”, “Retreat”, or “Avoid” strategies, protection measures can lead to unsustainable outcomes. Communities are encouraged to use protective actions as part of an integrated approach.
- **Accommodate:** Strategies that allow for continued use of an area despite its climate change risk or impact.
- **Retreat** from high-risk areas due to climate change (more information in the Planned Retreat/Relocation section below.)
- **Avoid** hazard prone areas.

This section integrates the PARA framework with the four key climate hazards identified in Section 1.1: flooding, erosion, wildland fire, and permafrost thaw. Where applicable, each hazard is explored through the lens of “PARA” actions, with specific examples from NWT communities.

¹ "Protect, Accommodate, Retreat or Avoid (PARA): Canadian Community Options for Flood Disaster Risk Reduction and Flood Resilience." *Natural Hazards* 98, no. 1 (2019): 31–50. <https://doi.org/10.1007/s11069-018-3529-z>.

Flooding

Flooding in the NWT is predominantly caused by ice jams during spring breakup. Heavy rainfall, often combined with rapid snowmelt, can also drive flooding. Flood maps are essential tools for emergency and community land use planning.

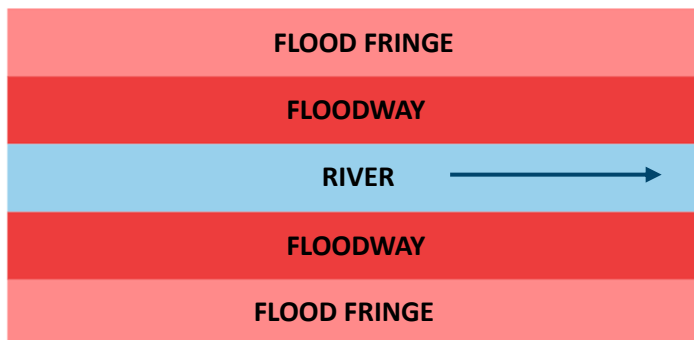
The GNWT, in collaboration with federal partners, is in the process of completing flood inundation and hazard maps for 10 NWT communities that are at risk of flooding. They are: Aklavik, Fort McPherson, Fort Good Hope, Tulita, Jean Marie River, Fort Simpson, Nahanni Butte, Fort Liard, Hay River, and Kát'odeeche First Nation (KFN).

Community maps are finalized for Aklavik, Fort Simpson, Hay River, KFN, and two are in progress for Nahanni Butte and Fort Good Hope. The remainder will be initiated in the next 1-2 years and completed by March 2028. Data availability and flood drivers differ across the communities, so flood map approaches vary. So far, developed flood hazard maps include:

- A 100-year ice jam flood hazard map (1% annual exceedance probability)
- A 200-year ice jam flood hazard map (0.5% annual exceedance probability)
- A 100-year open water flood hazard map- for Hay River and KFN
- Nahanni Butte- multiple open water, rainfall-driven flood scenarios including two climate change scenarios.

These maps distinguish between two zones in a Flood Hazard Area:

- **Floodway:** Areas where water is deep and fast, including the river channel and adjacent areas.
- **Flood fringe:** Shallow and less hazardous areas, located adjacent to the floodway.



Given the complexity of flooding in the NWT and the need for specialized guidance, the GNWT is currently developing a guide to be released in February of 2026. This guide will include important definitions of the different types of flood maps, best practices for regulating development in flood risk areas, and how to avoid flood risk areas through proactive community planning.



Drainage Plans are an effective tool to manage **pluvial flooding** (flooding occurring due to heavy rainfall or increased spring melt). Many communities have requested that consultants complete drainage plans as part of their overall review of the community planning bylaw, zoning bylaw, and land administration bylaw.

Hay River: Building Back Better after the 2022 Flood

Beginning on May 6th and concluding around May 15, 2022, the Town of Hay River experienced an unprecedented flooding event that impacted Vale Island, the West Channel, Paradise Gardens, and downtown neighbourhoods. Due to high water levels, ice-jams, and a significant amount of unseasonal rain, the flooding reached areas that had never flooded in the past.

The GNWT has flood maps for the Town that were adopted in the 1980s. To replace the 1980 map, the GNWT began developing a flood inundation map that uses elevation data from the high water marks from the 2022 flood.

As part of the recovery process, the Town of Hay River ensured that planning work incorporated this flood event into its inputs. The Town completed a Housing Plan and Action Plan in 2023 that identified the following Goals and Objectives:

“Goal 5: Hay River housing is resilient and sustainable

Objective 5 A: The Town of Hay River develops and implements a flood mitigation plan

Objective 5 B: Governments review and update policies and bylaws to make housing more resilient to floods”

The Town has been working on these objectives by reviewing and updating their zoning bylaw to introduce further flood-proofing regulations. The current zoning bylaw was passed in December of 2021—only 5 months before the flood event. It was determined after the 2022 flood that the zoning bylaw would have to be reviewed again. The new zoning bylaw will take into account the new flood inundation map developed by the GNWT.

Riverbank and Coastal Erosion

Riverbank and coastal erosion are serious climate hazards for many communities in the NWT. These hazards are often intensified by permafrost thaw, changing wave patterns, rising water levels, and ice-jam flooding. Erosion can undermine roads and buildings, and in some cases, may require relocation of entire neighbourhoods. Strategies can be organized using the PARA framework:

- **Protect:** Physical structures such as breakwaters, seawalls, and riprap can help reduce erosion by absorbing wave energy and stabilizing shorelines.
- **Accommodate:** Nature-based solutions can be used to rehabilitate coastlines and riverbanks. This includes revegetating slopes and restoring wetland areas.
- **Retreat:** In areas where erosion is severe and ongoing, communities may need to relocate infrastructure partially or retreat completely. The GNWT is developing a *“Planned Relocation Guide”* as part of a [Natural Resources Canada’s Climate Resilient Coastal Communities Program](#). Planned Relocation/Managed Retreat is explored more in section 3.3.
- **Avoid:** Community land use planning tools can be used to prevent development in erosion-prone areas. This includes applying “environmentally sensitive” designations and using land development suitability mapping as explored in section 3.3.

Wildland Fire

Longer fire seasons, hotter summers, and drier vegetation increase the frequency and severity of wildland fires. Communities located at the wildland–community interface are especially at risk. The GNWT department of Environment and Climate Change works with communities to develop Community Wildland Fire Protection Plans (CWPP). CWPPs assess the wildland/urban interface risk hazards and make recommendations to lessen the threat and impact from fire. CWPPs use the tenants of FireSmart to guide the document. All communities in the NWT with a threat of wildfire have a CWPP (general info found [here.](#))

- **Protect:** Communities can reduce wildfire risk through firebreaks, fuel management, and FireSmart construction standards. The Village of Fort Simpson demonstrates this strategy in the example below.
- **Accommodate:** Subdivision design plays a critical role in wildfire mitigation. Developments can include wider roads, multiple access points, and green spaces or low-fuel buffer zones to slow fire spread and improve emergency response. Dead-end streets increase evacuation risks and should be avoided in subdivision design in high risk areas.
- **Retreat:** In extreme cases, relocation may be necessary to move homes out of high-risk zones.
- **Avoid:** Land use planning can prevent development in wildfire prone areas by applying zoning regulations and hazard designations. Hazard mapping can guide these decisions as explored in Section 3.3.

Łíídlı́ Kúę (Village of Fort Simpson) Wildfire Protection

In 2018, a CWPP was developed for the Village of Fort Simpson to provide practical mitigation strategies for the community. This plan identified areas of risk where firebreaks should be placed. The study identified Wildrose Acres and Nogha Heights with the highest amount of hazard, with Bannock Land having the second highest amount of hazard. The village acquired these areas as a lease

Development Zone	Structure/Site Hazard (0 – 30m)
Airport	Low
4 Miles	Low
Wildrose Acres	High-Extreme
Nogha Heights	High-Extreme
Bannock Land	Mod-High
Fort of the Forks (Tank Farm)	Low
Industrial Area	Low-Moderate
Simpson Island	Low-Moderate

from the GNWT so that they could implement the firebreaks. The firebreaks were completed in the summer of 2023. While the firebreak work was being completed, the Village was also undergoing a comprehensive review of their 2008 general plan and zoning bylaw. The Village integrated their CWPP into their draft community plan with the following Policy Statement:

“Wildfire- Council shall consider fuel modification to mitigate fire risk around Nogha Heights and Wildrose Acres, as recommended in the Fort Simpson Community Wildfire Protection Plan.”

The Village also allowed for the construction of firebreaks to occur in the “Hinterland” designation. Most of the land within the hinterland area is subject to the ongoing Dehcho First Nations negotiation process and are identified as important lands that are used and cared for by the people of Łíídlı́ Kúę.

COMMUNITY WILDLAND/WILDFIRE PROTECTION PLANS, FIRESMART & COMMUNITY PLANNING

BASED ON A PRESENTATION BY WESTLY STEED



GRAPHIC RECORDING © AUSA M'CREESH 03/2024

Permafrost Thaw

To address permafrost thaw, communities should incorporate hazard maps into their community land use planning tools. These maps incorporate geotechnical surveys, community data, and remote sensing data (i.e. LiDAR data) to evaluate soil and ground conditions. In areas with significant permafrost thaw and slumping, an 'Environmentally Sensitive Designation or Zone' can be applied to limit or prohibit the use or development of land.

Permafrost exists in many NWT communities, with northern regions having an extensive continuous distribution, and southern areas having a sporadic, discontinuous distribution. Building on areas of permafrost often require specific development standards to be

incorporated into community land use planning tools. Communities can achieve this by directly referencing or requiring applicants to follow [the Northern Infrastructure Standardization Initiative \(NISI\)](#) standards for building on permafrost (as explored in Section 3.3), and by requiring geotechnical investigations as a condition of a development permit. The example highlights how the Community Government of Behchokò has incorporated NISI standards in their community land use plan.

Community Government of Behchokò: Building on Permafrost

Behchokò completed a comprehensive review of their existing land use plan in 2022. A goal of their new community land use plan was to allow for flexibility for new development, while also ensuring best practices for construction on permafrost were followed. As a result, the following clause was added:

***“Objective:** To ensure that development follows best practices for building on permafrost.*

***Policy:** New development should follow the National Building Code, best practices identified by the Government of the Northwest Territories and supporting agencies, and the Northern Infrastructure Standardization Initiative.”*

3.2 Climate Mitigation Actions

Community Energy Planning

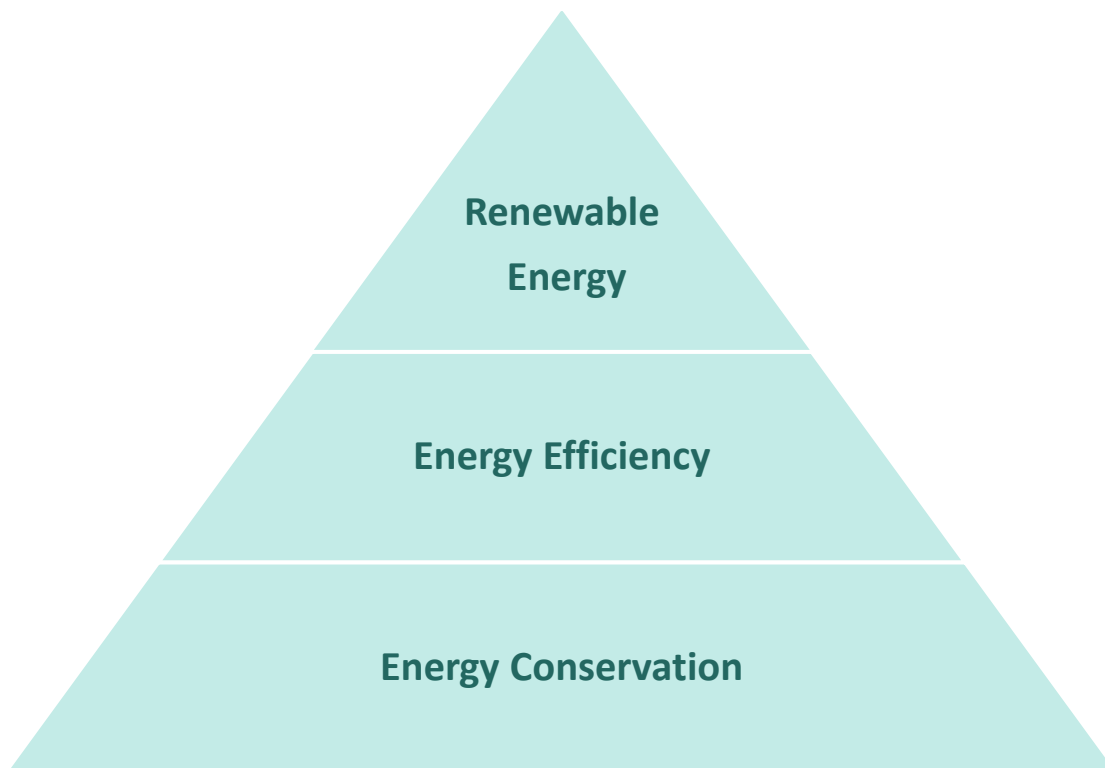
For communities that may already have a community plan, community energy planning may offer a strategic approach to manage energy use, reduce greenhouse gas emissions, and enhance fiscal sustainability. Community energy planning provides an overview of how energy is used in your community, allowing communities to evaluate and implement potential energy projects and partnerships into an action plan.

Community energy planning uses an energy pyramid to prioritize and plan projects. The layers include:

1. Energy Conservation (Base Layer)- This layer focuses on using less energy by changing behaviours and practices. Examples include smart thermostats, automatic plug switches, and using a clothesline.

2. Energy Efficiency (Middle Layer)- This layer aims to achieve more with less energy through improving technology and infrastructure to ensure that less energy is wasted. Examples include using energy efficient appliances and improving the energy efficiency of buildings through insulation and heating system upgrades.

3. Renewable Energy (Top Layer)- This layer involves using renewable energy sources, such as solar, wind, hydropower, and biomass to meet energy needs. Implementing renewable energy actions requires a solid base and middle layer to build upon.



Smart Growth Principles

Smart growth is a planning philosophy promoting compact, walkable communities with mixed land uses and access to amenities, while reducing environmental impacts. It supports resilience by:

- Maintaining compact development and preserving natural spaces around climate hazards where possible.
- Encouraging transit, cycling, and pedestrian access.
- Promoting infill development in low-risk areas.
- Limiting expansion into hazard-prone zones.

By incorporating these policies in community land use planning, communities can reduce their environmental impact. This is because vehicle emissions are significantly lowered in communities that employ smart growth. In addition, smart growth supports more efficient infrastructure investment, reduces the cost of service delivery, and helps protect culturally and ecologically important lands from unnecessary development pressure. It also encourages stronger social cohesion by bringing people, services, and amenities closer together.

3.3 Climate Resilience Actions

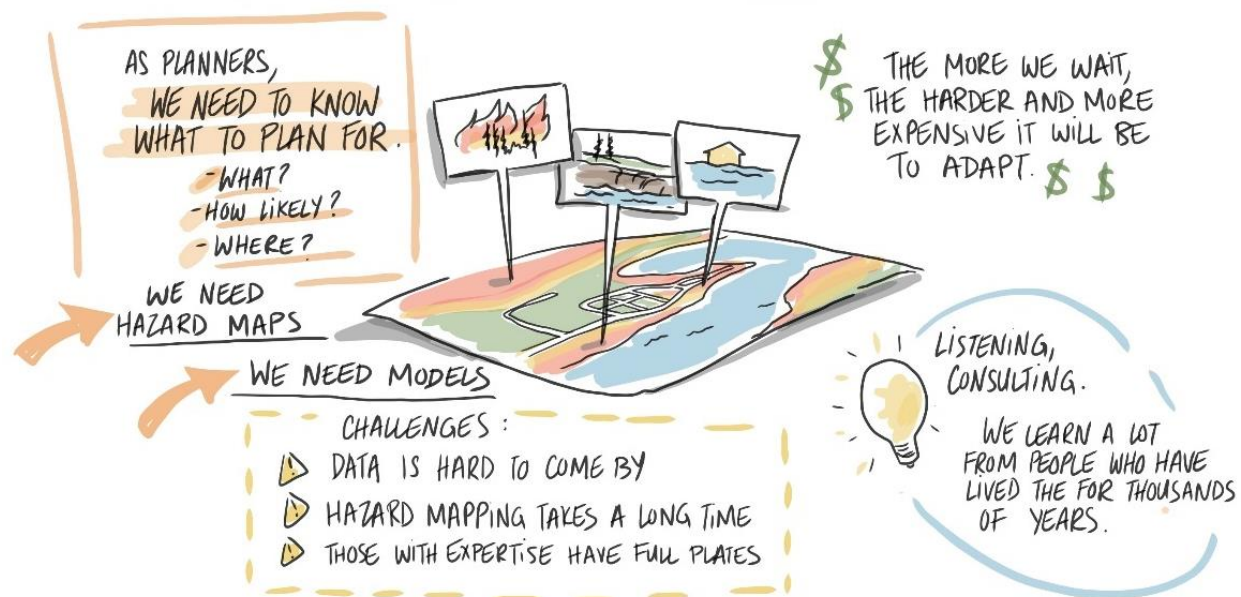
Northern Infrastructure Standardization Initiative (NISI)

The Northern Infrastructure Standardization Initiative (NISI), led by the Standards Council of Canada (SCC), is a set of standards specifically developed for the North, by the North, to assist communities in adapting to climate change. Each standard helps building owners and operators, as well as those responsible for public and community infrastructure, build and maintain infrastructure in a changing climate. The standards are available for free and include information on:

- Fire Resilient Planning
- Moderating Permafrost Damage on Existing Buildings
- Managing Changing Snow Loads
- Guidelines for Building in Permafrost
- Geotechnical Site Investigations
- Wastewater Treatment Planning, Design, Operation and Maintenance
- Solid Waste Site Planning, Design and Maintenance
- Techniques for dealing with High Winds
- Thermosyphon Foundations for Buildings
- Risk Based Approach to Community Planning
- Community Drainage System Planning, Design and Maintenance
- Erosion and Sedimentation Management

Land Development Suitability (LDS) Mapping and Hazard Mapping

Land Development Suitability (LDS) maps evaluate the appropriateness of land for various types of development. Hazard mapping provides a visual representation of areas at risk from natural hazards. Hazard maps feed into LDS maps. For example, a flood map is a type of hazard map, that may be used in the formation of an LDS map that also includes information about wildfire and permafrost thaw. These maps do not replace geotechnical site investigations, flood mapping or permafrost testing.



LDS maps classify areas with high susceptibility, moderate susceptibility, and low susceptibility to climate change hazards. The better the hazard data and engagement process used for the LDS map, the more finely tuned it will be. Some areas with high or moderate susceptibility to climate hazards may not be suitable for certain kinds of development or may require conditions on a development permit, such as setbacks from unstable slopes. Areas with low susceptibility will be suitable for most development.

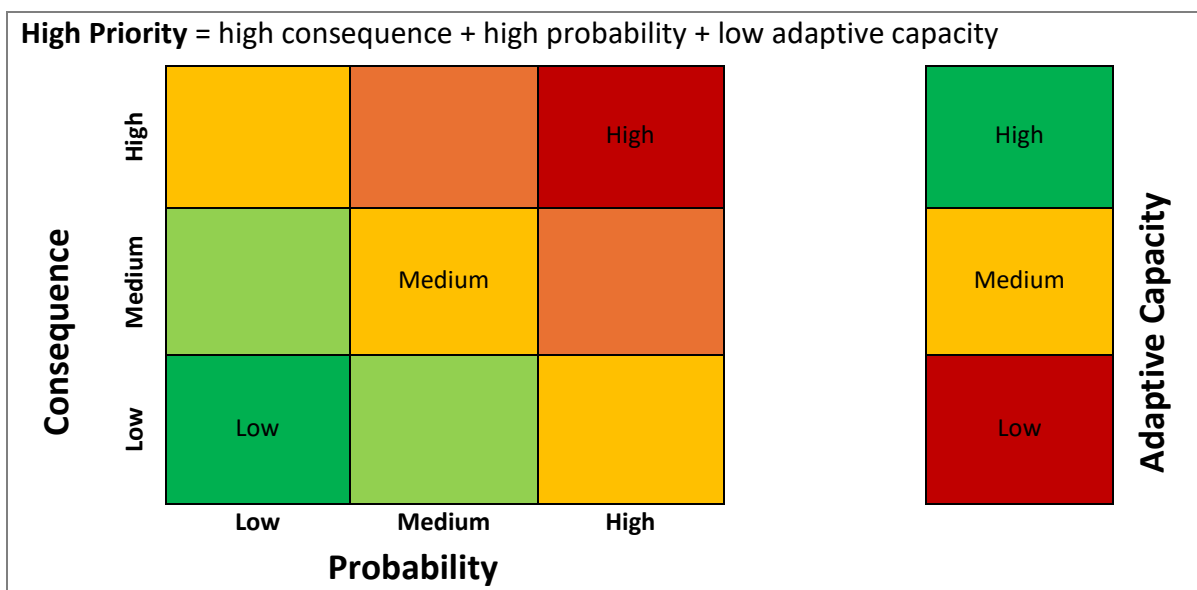
Risk-Based Approach for Community Planning

A risk-based approach for community planning, is a specific approach developed as part of NISI. It involves integrating risk assessment into the planning process to enhance community resilience and reduce vulnerability to hazards. This approach is crucial for disaster risk reduction.

Once sufficient data regarding a community's risks have been collected, they are rated based on three variables:

- Probability—how likely is this impact to happen and how often?
- Consequence—how seriously is the impact going to affect the community?
- Adaptive capacity—how resilient are we to the impact and consequences?

To illustrate: A high probability of flooding with severe consequences but strong adaptive capacity (good flood control measures) would be prioritized differently than an unexpected wildfire risk with limited resources to respond. A risk assessment matrix like the one illustrated below can be used to prioritize risks.

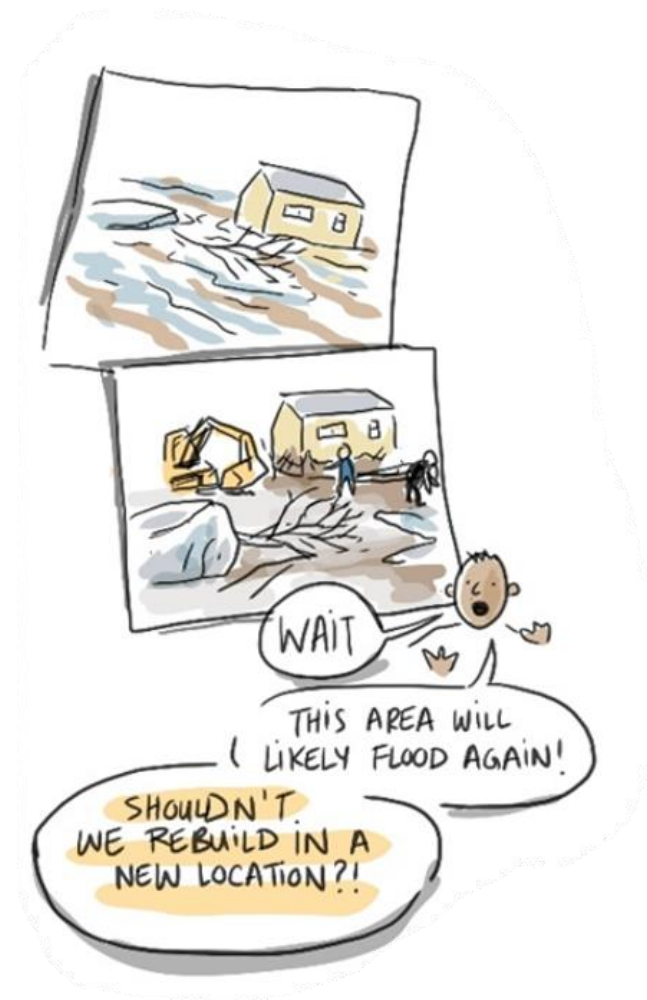


Planned Relocation/Managed Retreat

Planned relocation/managed retreat, sometimes referred to as “planned retreat”, is a proactive, community-led process that involves identifying areas at risk, engaging residents, and developing long-term strategies for relocation. It is most effective when supported by hazard mapping, land use planning tools, and clear governance and project management structures.

“Retreat” and “avoid” strategies are often used together over an extended time period when climate change becomes severe. For example, a community may relocate homes from a floodplain (retreat) and then re-zone the area to prevent future development (avoid). According to Natural Resources Canada’s guidance linked below, successful planned retreat efforts in Canada share the following characteristics:

- **Planned Retreat is community led and culturally grounded:** Retreat must be guided by local values, priorities, and governance structures. In Indigenous communities, this includes respecting relationships to land and supporting cultural continuity.
- **Planned Retreat is integrated with land use planning:** Retreat should be embedded into community land use planning tools so that it is coordinated with other goals.
- **Hazard Mapping is key to successful “Planned Retreat”:** Accurate and accessible data is essential for making decisions about planned retreat.
- **Planned Retreat must be flexible and phased:** Retreat is not a “one-time event”. It must include trigger points for voluntary relocation and milestones over a long period of time.



Planned Relocation in Tuktoyaktuk

Planned Relocation has been gaining attention in the NWT as there are cases where the impacts of climate change have become so intense that protect and accommodate strategies are no longer viable. As an example, over the decades in Tuktoyaktuk, various protection methods were employed, such as armouring the coastline, but with little success. Planned relocation is now understood to be necessary to adapt to the increase in erosion and sea level rise. As a result, the community embedded planned retreat options in their 2018 community plan. These options have begun the conversation within the community for retreat along the Inuvik to Tuktoyaktuk Highway. Next steps for the community include the creation of an adaptation plan and planned retreat roadmap, that identifies important milestones and trigger points for relocation. For more information on planned retreat, please consult NRCan’s guide: [“Planned Retreat Approaches to Support Resilience to Climate Change in Canada”](#).

Climate Change Resources and Data

Climate change impacts vary by location, affecting communities differently. To make informed decisions, it's crucial to understand a community's climate trends and likely future projections using the best available local data. As data becomes more complex, access to funding and expertise may be required to assist with navigating and interpreting information.

Table 2 lists some sources available for historical climate data, current data and climate models. Data gaps may exist, and predicting trends can become more challenging as new data emerges and climate change impacts increase. It is helpful to keep apprised of new data as it becomes available.

Table 2: Sources for Local Climate Change Data and Projections

Type of Data	Sources
GNWT Climate Change Library	Climate Change Library of the Environment and Climate Change Department, Government of the Northwest Territories.
Climate (including Temperature and Precipitation)	• NWTAC - Community Climate Change Profiles • Climate Data Canada • Canadian Climate Atlas - An interactive mapping tool that provides users with infographics on a variety of climate change projections. • NWT Climate Scenarios Explorer - Climate projections including very long-term extrapolations for 46 communities in the NWT. • NWT Bureau of Statistics
Wind	Government of Canada – Historical Climate Data
Water Flow / Rivers / Flooding	Environment and Climate Change – Water Management & Monitoring - Most communities have Flood Risk Mapping conducted under the Canada-Northwest Territories Flood Damage Reduction and Flood Risk Mapping Agreement (1979). Updated flood maps are available or underway for many at-risk communities.
Sea Level	Sea Level Projection Tool – NASA Sea Level Change Portal
Forest Fire	Canadian Wildland Fire Information System
Permafrost & Ground Movement	NWT State of the Environment Report – State Permafrost - LiDAR maps and/or surficial geology maps may also be available.
Various	Reports: Valuable data may be available in research reports or studies done over the years for local projects. For example, geotechnical reports on existing buildings, or background studies for infrastructure projects may contain information that is still useful for community planning today.

Traditional knowledge and community data are key components for understanding local climate change. Firsthand information can provide a rich and localized view on how climate change has affected the landscapes that may not yet show up in western science. **Table 3** outlines examples of traditional knowledge and community data that can be gathered locally by members of any community.

Table 3: Examples of Traditional Knowledge and Community Data

Type of Data	Examples
Traditional Knowledge (TK)	Review Traditional Knowledge: Examine traditional knowledge to understand local climate changes and discover traditional methods to address them. Work with elders to ground truth in any scientific information. Record Observations: Collect insights from community members who spend time on the land to understand their observations of climate change. Look for visible clues about local landscape conditions and hazards.
Community Data	Monitor permafrost: Observe and document permafrost slumps and cracks to track changes. Monitor ice thickness: Drill ice holes to measure depth. Record freeze-up and break-up dates to monitor ice conditions. Monitor riverbank and coastal erosion: Observe and document physical changes in riverbanks and shorelines. Monitor water levels: Use water gauges to record highwater marks from flood events. Monitor vegetation: Survey vegetation regularly to identify overgrowth, dead plants, and invasive species that could fuel wildfires.

Conclusion

Climate change is already impacting communities across the NWT, and these impacts are expected to intensify over time. Through thoughtful and proactive land use planning, communities can reduce their vulnerability to climate hazards and build long-term resilience. This guide has outlined practical strategies for integrating climate adaptation, mitigation, and resilience into community planning tools, including community plans, zoning bylaws, and development permits.

In summary, climate action in the NWT is built on three interconnected approaches:

- **Adaptation** refers to preparing for and responding to the impacts of climate change. In the NWT, this includes managing erosion, permafrost thaw, flood risk, and wildfire hazards through planning tools, hazard mapping, and community-led strategies.
- **Mitigation** involves reducing the causes of climate change, such as lowering greenhouse gas emissions and improving energy efficiency. Communities can achieve this through energy conservation, renewable energy projects, and smart growth principles.
- **Resilience** is the ability of a community to anticipate, withstand, and recover from climate-related hazards while maintaining its essential functions and identity. Resilience is built through strong planning, inclusive decision-making, and ongoing adaptation.

Community governments in the NWT are empowered to lead this work. With the right tools, data, and support, they can ensure that future development is safe, sustainable, and responsive to the realities of a changing climate.

Contacts

For additional information or help with questions on the *NWT Community Planning Framework* or its associated guides, please contact the Regional Superintendent with Department of Municipal and Community Affairs:

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