ADAPTING WILDLIFE CONSERVATION AND MANAGEMENT TO CLIMATE CHANGE IN THE NORTHWEST TERRITORIES

Climate change is altering landscapes, habitats, and wildlife across the north, with downstream impacts on the people that rely on them. This discussion paper asks questions and seeks feedback on possible ideas, considerations, and general approaches for adapting wildlife conservation and management in the Northwest Territories to a changing environment.

Government of
Northwest Territories

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1 Background

Climate change is altering landscapes, habitats, and wildlife globally, with downstream impacts on the humans that rely on them. Nowhere are impacts more evident than in high latitude and polar regions, such as the Northwest Territories (NWT), where the climate is changing more quickly than in much of the rest of the world. A 2017 Auditor General's report on climate change preparedness in the NWT (Appendix 1), concluded that "... while the [Government of the Northwest Territories] Department of Environment and Natural Resources had set out protections for some vulnerable species, such as selected caribou species, it had no overall adaptation plan to better protect wildlife and help ensure that the areas of greatest risk were being addressed." Since this audit, GNWT developed and released the 2030 NWT Climate Change Strategic Framework and 2019-2023 Action Plan and has progressed towards achieving its goals and objectives, including the completion of a climate change vulnerability assessment for all 46 territorially- and federally-listed species at risk in the NWT (Singer & Lee 2021). For a complete report on progress towards implementing the 2030 Climate Change Strategic Framework to date, see the Responding to Climate Change in the NWT 2021-2022 annual report. However, given that climate change is ongoing and wildlife is central to ecosystem functioning and to the livelihoods and cultures of northern communities, continued efforts to mitigate and adapt to its impacts are needed to secure the health and well-being of northern lands and people now and in the future.

Box 1. IPCC (2007) defines climate change adaptation as "initiatives and measures to reduce the vulnerability of natural and human systems against actual or expected climate change effects".

2 Purpose of engaging on climate change adaptation for wildlife

This discussion paper asks questions and seeks feedback on ideas, considerations, and general approaches for adapting wildlife conservation and management in the NWT to a changing climate. Input received through engagement on this discussion paper will help to direct efforts of the GNWT's Department of Environment and Climate Change Wildlife Management Division to:

(i) Identify a vision, goals, and guiding principles for wildlife conservation and management in a changing climate;
(ii) Better understand climate change risks and impacts (positive and negative) on wildlife and their habitats; and

(iii) Identify and prioritize actions for mitigating and adapting to climate change impacts on wildlife, their habitats, and the people and communities that rely on them.

Feedback received on this discussion paper will set the stage for further conversations aimed at adapting wildlife conservation and management to climate change in the NWT. Input received through this process could be operationalized through species-specific wildlife management plans (e.g., range plans, management plans, and recovery plans for threatened and other priority species), regional land use plans, and conservation network planning. Feedback will also support other GNWT-led climate change adaptation planning initiatives, including informing territorial adaptation priorities and the next iteration of the NWT Climate Change Strategic Framework Action Plan (GNWT 2019).

Feedback: How can this engagement best support your community, region, or the NWT?

3 Fundamentals of climate change adaptation

This section provides an overview of general themes, characteristics, and frameworks underpinning climate change adaptation that could serve as guiding principles for adapting wildlife conservation and management to climate change, as well as criteria for developing goals and prioritizing adaptation actions. The themes and attributes, adapted and modified from Stein et al. (2013, 2014), include to:

- **Safeguard people and nature.** Adaptation goals and actions should reduce the vulnerability of people and communities to climate change impacts while also benefitting wildlife and the broader ecosystem and environment.

- **Manage for change, not just persistence.** Environmental change is continuous and ongoing. Thus, managing wildlife with the goal of sustaining or recovering current or past ecological conditions (e.g., a historical population size of a species) may not always be achievable. Accepting that some change is inevitable, and setting goals and actions that acknowledge this change, may be needed.

- **Embrace forward-looking goals and re-evaluate them when needed.** Given ongoing environmental change, goals should consider future climatic and ecological conditions, while recognising that actions taken to achieve long-term goals need to be balanced with actions taken to address near-term challenges. Adaptation planning for wildlife should include mechanisms for reviewing, and when needed, revising goals and actions based on new information.

- **Integrate adaptation into existing work.** Climate change is one of many pressures facing wildlife, their habitats, and the people that rely on them. Climate change impacts should therefore be considered in a cumulative effects context and adaptation should be woven into existing processes wherever possible (e.g., species range planning, regional land use planning, and conservation network planning). The framework in Fig. 1 shows one approach to integrating climate change adaptation into planning.

- **Consider the broader landscape context.** Goals and actions should be developed in the context of broad geographic scales to account for the wide distributions of northern wildlife, shifts in their distributions, and to sustain broad ecological processes. Further, actions should be coordinated across regions and jurisdictions to not exacerbate other vulnerabilities or undermine conservation goals and broader ecosystem sustainability.

- **Employ agile and informed management.** The dynamic nature of climate and environmental change means that conservation and management planning should prioritize actions that can be flexibly adjusted to take advantage of new information and respond to shifts in climatic, ecological, and socioeconomic conditions.

- **Adopt strategies robust to uncertainty.** Future projections of climate and responses of wildlife, their habitats, and ecosystems to climate change are inherently uncertain. Therefore, actions should aim to account for and be robust to uncertainties in future climatic and ecological conditions.

- **Minimize carbon footprint.** Actions taken should aim to minimize carbon emissions and sustain ecological processes that contribute to nature-based climate change mitigation (e.g., promoting carbon storage by protecting forested and peatland habitats).

Building on these general themes and attributes, Stein & Shaw (2013) proposed a generalized framework for operationalizing climate change adaptation that extends the familiar adaptive management cycle (Fig. 1). Section 4 presents ideas and considerations for how the cycle might be applied in the context of wildlife conservation and management in the NWT.

Feedback: Do you strongly agree or disagree with any of these adaptation principles or themes? Are there other principles or themes that should underpin climate change adaptation for wildlife in the NWT?

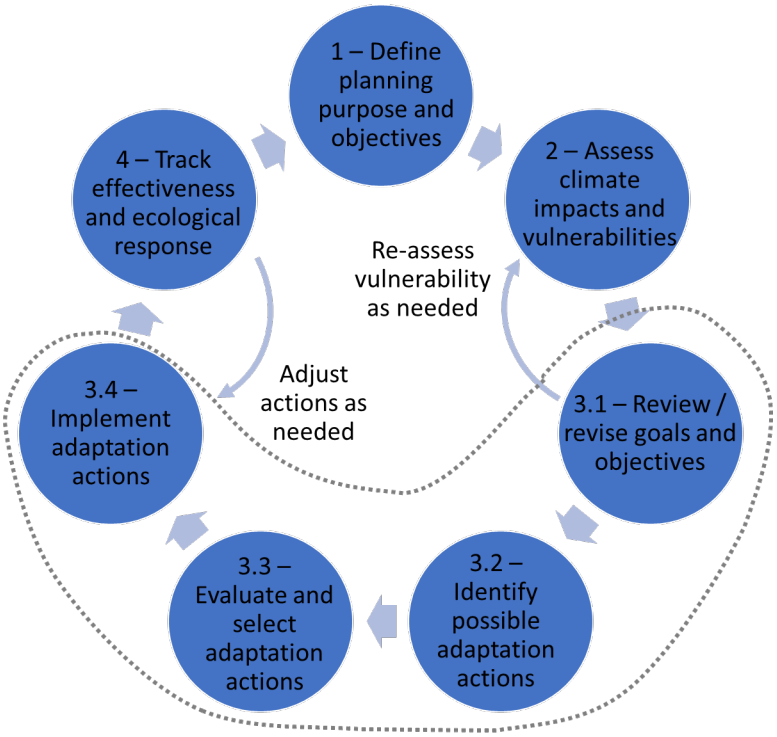


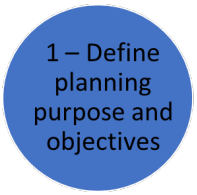
Figure 1. Generalized framework for climate change adaptation adapted from Stein & Shaw (2013). The dotted line shows the action planning stages described in sections 4.3.1-4.3.4.

4 A generalized approach to climate change adaptation

This section steps through the generalized climate change adaptation framework (hereafter, the "adaptation cycle") shown in Fig. 1 and presents general ideas and considerations for applying the adaptation cycle in the context of NWT wildlife conservation and management. Identifying, prioritizing, and implementing specific adaptation actions in particular communities, regions, or across the NWT could be the subject of future action-planning workshops.

Adhering to the theme of integrating climate change adaptation into existing work, it is recognized that various wildlife-related planning processes and activities are underway at different ecological and jurisdictional levels across the NWT. By extending the general and widely used adaptive management framework, the adaptation cycle enables existing and ongoing processes to enter the cycle at the most appropriate step. The cycle is also scalable and can be applied at different spatial (e.g., territorial, regional, local) and ecological scales (e.g., species, community, ecosystem).

4.1 Define planning purpose and objectives



An important first step in any planning process is to define the vision the process seeks to achieve and the goals that will support achieving that vision. Preliminary interviews undertaken in 2020 with wildlife co-management partners from across the NWT (Appendix 2) revealed goals broadly captured by the following:

- Ensuring healthy, diverse, and sustainable wildlife populations and ecosystems.
- Ensuring food security and ecosystem services for northern communities.
- Improving knowledge of and communication of climate change impacts, vulnerabilities, and adaptation actions.

These goals are also aligned with goals #2 and #3 of the 2030 NWT Climate Change Strategic Framework 2019-2023 Action Plan to *Improve Knowledge of Climate Change Impacts* and *Build Resilience and Adapt to a Changing Climate* (GNWT 2018, 2019).

Although, specific wildlife priorities, goals, and risks may differ among regions, a shared NWT-wide vision can help to ensure that region- and species-specific goals, and actions born from them, fit within a broader landscape and management context, thereby helping to identify cooperation opportunities and avoid potential conflicting goals and actions.

Feedback: What do you think should be the vision and goals for wildlife conservation and management under climate change? Do you strongly agree or disagree with any of the visions or goals above?

4.2 Assess climate impacts and vulnerabilities to NWT wildlife and their habitats

Adaptation requires knowledge of known and predicted climate change impacts. Climate change interviews revealed that there are many gaps in the understanding of climate change impacts and risks to NWT wildlife, and nearly all interview participants suggested

work is needed to identify adaptation actions (Appendix 2). This second step of the adaptation cycle is critical to filling those gaps.

Conducting climate change impact and vulnerability assessments across a broad and representative sample of NWT wildlife will be an ongoing and iterative process. Trait-based climate change vulnerability assessments for NWT species at risk have been completed (Singer & Lee 2021) and assessments for other ecologically and culturally important species are underway. These subsequent assessments will include spatial, model-based approaches to assess impacts of climate change, such as the approach adopted by the National Audubon Society to estimate predicted range gain, stability, and loss for North American birds under different climate scenarios. Information can be found at the following link, https://www.audubon.org/climate/survivalbydegrees.

Although many climate change impacts are expected to be negative, some species will thrive in future climatic conditions, so vulnerability assessments can also help to identify possible opportunities emerging from climate change that could facilitate adaptation. Indigenous Knowledge and community-based monitoring will play an important role in understanding past, current, and future climate change impacts on wildlife.

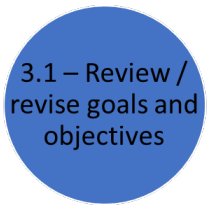
Feedback: What risks does climate change pose to wildlife and their habitats in your region? What changes have you seen? Which concern you the most? Have you seen or do you predict any positive changes or opportunities arising from climate change?

Feedback: What types of outputs are best for communicating climate change risks and impacts to wildlife (e.g., maps, reports, webpage, infographics, etc.)? Do you have any advice on how to integrate local, Indigenous or scientific knowledge into improving understanding of climate change impacts?

4.3 Action planning and implementation

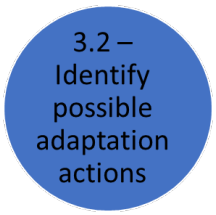
The action planning steps of the adaptation cycle take the vision and goals of the planning process and combine them with knowledge of key climate change impacts and vulnerabilities to identify, prioritize, and implement actions to mitigate risks and take advantage of possible opportunities. This section describes ideas and options that could be considered for action planning, acknowledging that specific actions and how they are prioritized and implemented will need to consider regional priorities and capacity.

4.3.1 Review and, where needed, revise goals and objectives



Before identifying and implementing adaptation actions, goals should be reviewed and, where needed, revised to ensure that they remain achievable in the light of climate change vulnerability findings. The Resist-Accept-Direct framework (RAD; Schuurman et al. 2020; Lynch et al. 2021) provides one lens through which goals can be assessed, both in the first instance of goal-setting and when reviewing and updating goals in light of new information. The RAD framework argues that balancing goals aimed at *resisting* change with goals aimed at *accepting* change, or even *directing* change to a new climate-adapted state, will improve the chances of successful adaptation.

4.3.2 Identify possible adaptation actions



While specific actions will be driven by goals, knowledge gained from climate change vulnerability assessments, and regional priorities and capacity, there are several broad action types that could support climate change adaptation planning for wildlife to reduce the vulnerability of natural and human systems to climate change (Stein et al. 2014; Singer & Lee 2021; Handler et al. 2022; McLaughlin et al. 2022). These include but are not limited to:

- *Maintaining and enhancing landscape connectivity*. One of the main adaptive traits for most wildlife is their ability to move to track changes in climate and habitat conditions over time and space. However, this adaptation is only possible if current and future habitats are connected or un-fragmented. Landscape planning that seeks to maintain current and future landscape connectivity is a foundational approach to climate change adaptation and one that aligns with GNWT's priorities for conservation network planning as outlined in Healthy Land, Healthy People 2023-2028.

- *Identifying and protecting refugia.* Climate change refugia are areas where the climate is changing more slowly or that are more resistant to climate change impacts (e.g., drought or wildfire). Refugia can be linked to landscape features such as north-facing slopes, wetlands, large water bodies, and topographically diverse areas (e.g., mountainous areas and river valleys), and can provide refuge for species to buy more time for natural adaptive responses (Morelli et al. 2016,

2020). Embedding climate change refugia within a climate-informed landscape planning framework could be another approach to adapting to climate change.

- *Detecting and (where needed) managing range-expanding and invasive species.* Changing climatic conditions are causing shifts in species distributions, including predators, competitors, pests, and pathogens. Monitoring for and managing novel species could help to limit or slow the spread of novel species, mitigate any negative impacts and, in turn, allow native species more time to adjust.

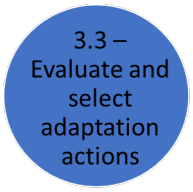
- *Minimizing non-climate threats.* Climate change is one of many potential threats facing northern wildlife and thus needs to be considered within a cumulative effects framework. Reducing non-climate threats, such as industrial and other human disturbances, can provide a greater buffer or flexibility for species to adapt to climate and other environmental change.

- *Communication, education, and outreach.* Communicating climate change and its impacts on wildlife and their habitats will help to "mainstream" climate change adaptation and provide the knowledge needed to better prepare for, manage, and adapt to climate change impacts.

A more comprehensive list of general climate change adaptation strategies and more specific approaches and tactics are provided in the wildlife adaptation menu developed by Handler et al. (2022).

Feedback: *What overall approaches or more specific actions, including but not limited to those listed above, could be taken to help mitigate or adapt to climate change impacts on wildlife and their habitats in the NWT?*

4.3.3 Evaluate and select adaptation actions.



Once all possible adaptation actions have been identified for a given species or region, decision support tools and processes can help to narrow down to a set of priority actions (Schwartz et al. 2018). Prioritization should take into consideration regional priorities; cost and feasibility of the actions; likelihood that the actions will be successful; and the

extent to which the proposed actions are aligned with the goals and guiding principles on which the adaptation planning process is founded (section 3).

Feedback: *What are important criteria or considerations when evaluating (or prioritizing) which adaptation actions to implement for wildlife management and conservation?*

4.3.4 Implement adaptation actions.

Adaptation actions can be implemented through new projects or activities or by adding to or revising existing territorial, regional, or species-specific programs. Since the viability of wildlife populations and communities depends on available, connected, and high-quality habitat, adaptation planning for wildlife will be most effective if done collaboratively with other landscape planning and management processes.

Feedback: *What initiatives or programs are already addressing climate change impacts on wildlife and their habitats? How could they be improved to support climate change adaptation? Are there new initiatives that could be started to support adaptation?*

4.4 Track effectiveness and responses to adaptation actions

Adaptation planning should include the development of indicators for tracking ecological responses to both ongoing environmental change and the actions taken to mitigate and adapt to those changes. Tracking ecological responses and effectiveness of adaptation actions at spatial and temporal scales matching those of climate change will require the

creative use of a mixture of approaches that combine local and Indigenous Knowledge, and scientific environmental monitoring methods and new and emerging technologies, such as remote-sensing and autonomous environmental sensors (e.g., wildlife cameras and acoustic recording devices). Data and information from such monitoring can feed back into step 2 of the adaptation cycle to improve knowledge of climate change impacts and the current state of the environment. Periodic review of existing wildlife management strategies and plans provides another avenue to assess success of adaptation actions.

Feedback: *What are ways of tracking responses of wildlife and their habitats to climate change? How can we measure effectiveness of actions taken to mitigate and adapt to impacts of climate change?*

5 Closing thoughts

Climate change is a defining issue of this and future generations. Ensuring the health and well-being of wildlife, their habitats, and communities will require creative and collaborative action across jurisdictions and wildlife co-management partners to understand climate change impacts and identify and implement actions to mitigate and adapt to those impacts. Feedback on the ideas, considerations, and questions presented in this discussion paper will help to set the stage for further conversations aimed at adapting wildlife conservation and management to climate change in the NWT.

6 Acknowledgements

Ideas, considerations, and approaches presented here were drawn from many sources (see references), but the following were especially influential. Many of the general themes and approaches introduced were synthesized from the climate change adaptation work of Stein et al. (2013, 2014), the Canadian Council of Forest Ministers *Climate Change Adaptation* report series (Williamson et al. 2012; Edwards et al. 2015), and the climate change adaptation menu developed by Handler et al. (2022). Goals, risks, and other content specific to NWT wildlife were informed by preliminary interviews conducted with wildlife co-management partners (Appendix 2) and a vulnerability assessment for species at risk (Singer & Lee 2021).

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Appendix 1 – Wildlife findings and recommendations from the October 2017 Report of the Auditor General of Canada to the Northwest Territories Legislative Assembly: Climate Change in the Northwest Territories.

Available from: https://www.oag-bvg.gc.ca/internet/English/nwt_201710_e_42609.html

Appendix 2 – Climate change adaptation for wildlife interview reports

https://www.gov.nt.ca/ecc/en/climate-change-and-wildlife-interview-results-report