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IN THE FACE OF CLIMATE CHANGE **PLANTS** AND **WILDLIFE**

- ▶ Future migration towards cooler regions over time (ie. Northward or upwards in altitude).
- ▶ Changes in distribution as species with broader tolerance ranges increase in abundance.
- ▶ Potential diet modification (modified food-web).
- ▶ Encroachment of southern diseases and vectors.

FOR THE **MANAGEMENT** AND **SELECTION OF PROTECTED AREAS** WE MUST CONSIDER,

- ▶ linking areas through “corridors”.
- ▶ traditional ecological knowledge.
- ▶ more in depth characterisation and long term monitoring.
- ▶ using climate change projections as a tool.
- ▶ expanding the northern border of existing reserves and establishing new areas with north-south orientation to continue providing for the same species over time.

THE ROLE OF CORRIDORS

Corridors are parts of the land or waterways that allow species to go from one place to another. Using corridors and protected areas together greatly increases their ability to protect the environment. They are bridges for biodiversity!



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CONCLUSION

Tools like traditional knowledge, scientific research and technology, and protected areas and policy need to be used wisely to manage the adaptation to climate change and its impact on Quebec’s ecosystems and it’s people.

IMPACTS OF **CLIMATE CHANGE** ON **PEOPLE** LIVING IN **NORTHERN QUEBEC**; Literature Review Summary Highlights



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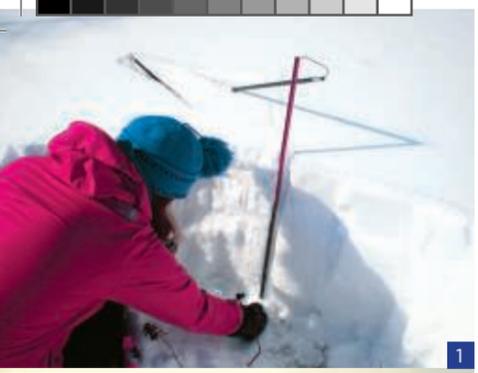
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ACKNOWLEDGEMENTS

This work would not have been possible without the cooperative management between the [Quebec Centre for Biodiversity Science](#), [Ouranos consortium](#) and the [Ministère du Développement durable, de l'Environnement et des Parcs](#). Their support has been complemented by financial resources from the [Fonds Vert](#) (through the Measure 26 of the Climate Change Action Plan 2006-2012 of the Government of Quebec) and the [Fonds de Recherche du Québec - Nature et technologies](#). Their shared vision has led to the completion of the “Impacts of Climate Change on the Biodiversity of Québec” literature review. This summary presents highlights from this literature review, including chapters on northern inhabitants, but also on ecosystems, protected areas and ecological corridors. Please find more in depth reports at <http://qcb.ca/research/research-contracts/adapting-to-cc/>.



Ecosystems in northern regions have been and will continue to be modified in response to climate change. Consequently inhabitants of northern communities will be strongly impacted as cultural identity and lifestyle continues to be strongly tied to the land. Scientific research and firsthand observations from inhabitants have already confirmed many changes in Quebec’s ecosystems.



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WHAT CLIMATE CHANGE MEANS FOR ECOSYSTEMS

A REDUCTION IN SNOW COVER

- ▶ Decrease in the amount of heat reflected in the form of sunlight
- ▶ Plants and ground less insulated by snow over the winter months
- ▶ Permafrost more likely to melt
- ▶ Changes in thermal and hydrological cycles

MELTING PERMAFROST

- ▶ Discharge of methane, a greenhouse gas
- ▶ Release of organic matter into aquatic environments
- ▶ Toxins captured in permafrost (also ice or snow) released into environment
- ▶ Soil degradation

MELTING ICE

- ▶ Early ice break-up on oceans and lakes
- ▶ Late freeze-up over oceans and lakes
- ▶ Sea level rise
- ▶ Decrease in ice thickness during coldest months

- ▶ EXTREME WEATHER EVENTS
- ▶ FOREST EXPANSION NORTHWARDS
- ▶ EARLY GROWING SEASON
- ▶ THREAT TO BIODIVERSITY

HOW IS THIS IMPACTING PEOPLE LIVING IN NORTHERN QUEBEC?

HUNTING, FISHING AND FOOD SECURITY

- ▶ Change in prey migration patterns
- ▶ Increase in sick animals and decrease in fur quality
- ▶ Changes in abundance of game (ie. increase in Muskox and decrease in geese and caribou)
- ▶ Longer period of open water fishing and hunting of aquatic mammals
- ▶ Shorter season for fishing and hunting on ice
- ▶ Regional changes in berry production (season, abundance and quality)
- ▶ Traditional ways of preparing and preserving food using permafrost or sun drying often not reliable

HEALTH

- ▶ Difficulty in carrying out subsistence practices
- ▶ Lower physical activity
- ▶ Shift towards store bought foods of lower nutritional quality
- ▶ Impact on cultural identity and welfare of northern peoples particularly aboriginals
- ▶ Increase in travel accidents over ice and on land (ie. permafrost melt, land slides, extreme weather)
- ▶ Increase in heat related and vector borne illness

ECONOMY AND INFRASTRUCTURE

- ▶ Many challenges surrounding new economic development in a warming north
- ▶ Damaged infrastructure due to permafrost melting and natural disasters
- ▶ Need for innovation to meet the needs of growing populations in permafrost rich areas

ADAPTING TO CLIMATE CHANGE AT THE COMMUNITY LEVEL

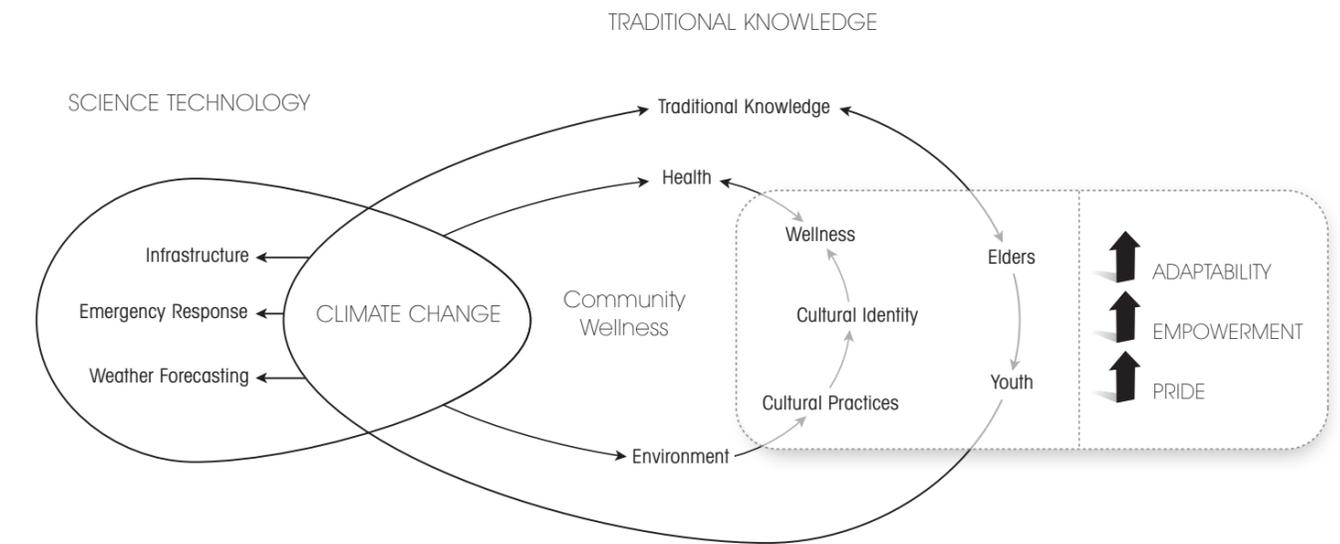


Figure 1 shows how traditional knowledge and science can mitigate the impact of climate change on community welfare. (Downing & Cuerrier, 2011)



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PROTECTED AREA: A TOOL FOR MITIGATING CLIMATE CHANGE IMPACTS

Quebec protected areas make up 8.14% of its surface area and are tools for buffering the impacts of climate change. To maximize their benefits protected areas need to expand and evolve. These areas will help to mitigate some of the challenges associated with climate change, like the local extinctions of species, invasive species, exotic species and therefore the maintenance of biodiversity. They also help to decrease human impact that exacerbates the impacts of climate change.