

# TOWARDS ADAPTATION

## Leading scientific knowledge to better prepare for climate change

**Global warming, which has been measurable for several decades, is an irrefutable fact and Quebec is also being affected. Climate change is having and will continue to have a profound impact on society and the natural environment in the coming century. What are these impacts in Québec and how should they be managed? That is the question that will be addressed in the document Towards Adaptation. Here are the highlights:**

- ▶ Since 1950, average annual temperatures in Quebec have increased between 1° C to 3° C, depending on the region. Based on a plausible greenhouse gas emissions scenario, increases are expected to range from an additional 2° C to 4° C by 2050 and from 4° C to 7° C by the end of the century in southern Quebec, with increases of up to 5° C to 10° C in northern Quebec. It is anticipated that these increases will be accompanied by shorter snow seasons, longer heat waves and increased precipitation. It is therefore imperative to conjointly reduce greenhouse gas emissions and to adapt to changes that are already underway.



- ▶ Extreme meteorological phenomena will have impacts on all economic sectors. Some of these phenomena will become more frequent and/or more pronounced as the climate continues to warm. Therefore, we must take all necessary measures to limit these impacts with a view to reducing the cost and magnitude of catastrophes, in particular by adapting buildings and infrastructure.

- ▶ Sea level is expected to rise by 30 cm to 75 cm in the Gulf of St. Lawrence, which is threatened by erosion and submergence. Various essential coastal developments and ecosystems are at risk; this trend is expected to continue. Measures aimed at improving land-use planning and protecting ecosystems will be required to control this phenomenon.



- ▶ Most economic activities are expected to be directly or indirectly affected by climate change. Some aspects of these changes could generate opportunities, while others could lead to significant productivity risks in the farming, forestry, fishing and aquaculture sectors, along with the energy and tourism sectors. To manage these effects, it is essential to integrate climate change in the areas of land-use planning, natural resource use and infrastructure re-engineering.



- ▶ Quebecers' health will also be affected by climate change. Higher mortality and morbidity rates are expected, due in particular to urban heat islands. In addition, a longer pollen season and more intense atmospheric pollution caused by forest fires could aggravate respiratory and cardiovascular problems. To counter these phenomena, emphasis must be placed on urban «greening», more effective promotion of active transport, and the implementation of early warning systems.

- ▶ Buildings and infrastructure associated with land, air and maritime transport, together with industrial and public infrastructure, often show significant vulnerabilities to the consequences of climate change, including coastal erosion, flooding, road surface deterioration and permafrost melting in the north. Consequently, we must rethink how buildings and infrastructure are designed and managed, in addition to innovating by capitalizing on natural ecosystems.

- ▶ Ecosystems and biodiversity could be profoundly disturbed, e.g. by the arrival and expansion of invasive and harmful species. The effects of a warmer climate are already being observed on the life cycle and the distribution of trees, plants, migratory birds, salmonids and migratory caribou in certain regions. It is imperative that conservation strategies be implemented with a view to maintaining essential ecological services, many of which help to reduce our vulnerability to climate change.

- ▶ Water management will be another major climate change-related challenge. Impacts are expected on water resources, not only in terms of quality but also availability. These impacts could lead to resource use conflicts and could have a negative effect on fish habitats. To address these impacts, steps must be taken to protect water sources and wetlands and to implement water conservation measures.



**Quebec has a range of tools and expertise that could be employed to effectively reduce the vulnerability of Quebec society while capitalizing on opportunities that these changes may bring. Concrete examples of adaptation that have already been applied include the review of laws and regulations, the construction of infrastructure in accordance with revised design specifications and warning systems aimed at reducing impacts on human health. It is no longer a question of whether we should adapt but how we must do so.**