



# Climate change adaptation for biodiversity management in Alberta

**By the end of the century, Alberta's climate is projected to become warmer**, by an average of 4°C, and drier, especially in the summer months.

In response to this change, **Alberta's ecosystems** will shift northward and upslope. Some of the most dramatic changes will occur in the boreal, where a reduction in old growth forest and a transition to a parkland ecosystem is projected, and in high-elevation ecosystems (e.g., mountain tops), which are likely to be replaced by ecosystems from below<sup>1</sup>. The vulnerability of different **wildlife and plant species** to these projected changes depends on their ability to disperse and the specificity of their habitat requirements<sup>2</sup>.

**Climate change adaptation** is the process of adjusting to the expected climate to moderate or avoid harm or to exploit opportunities<sup>3</sup>. The unprecedented rate of climate change, combined with habitat loss due to expanding human land-use may limit the capacity of our species and ecosystems to adapt on their own. This makes it necessary to consider how the management of biodiversity in Alberta could respond.

**Current provincial initiatives provide a solid foundation** for climate change adaptation. For example, the Biodiversity Management Framework<sup>4</sup> and cumulative effects management being developed through the regional planning process under the *Land-use Framework*<sup>5</sup> will support the resiliency of natural ecosystems and species populations to climate change by managing the extent and impacts of human activities. However, **there are many additional ways Alberta's current management policies and planning approaches could respond to climate change**<sup>6</sup>.

## CONSIDERING CLIMATE CHANGE IN THE ASSESSMENT AND RECOVERY OF SPECIES AT RISK

Climate change could be incorporated into the management of species at risk through assessments and recovery plans outlined by *Alberta's Strategy for the Management of Species at Risk*<sup>7</sup>. The general status of wild species assessment provides an opportunity to consider species-specific climate change risks. Recovery plans for species at risk can support climate change adaptation by considering both short-term (e.g., climate variability) and long-term impacts of climate change, and identifying “no-regrets” actions, such as increasing connectivity among populations, that could improve outcomes regardless of the future climate.

## THE ROLE OF BIODIVERSITY MONITORING

Carefully planned, long term monitoring will be required to understand how climate change is actually affecting our species and ecosystems. ABMI's monitoring program<sup>10</sup> is playing an essential role by providing reliable data that can be used to detect the effects of climate change on biodiversity in Alberta.



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## PLANNING CLIMATE-READY PARKS AND PROTECTED AREAS

Protected areas provide species and ecosystems with the opportunity to respond to climate change in areas with limited human disturbance. Selecting new parks to represent the full range of existing physical environments, as described under the *Scientific Framework of Alberta Parks*<sup>8</sup>, would enhance the parks network's robustness to climate change. New park selection could also consider climate refuges – areas with relatively little projected climate change in which species and ecosystems could persist.

## INCORPORATING CLIMATE CHANGE INTO REGIONAL PLANNING

Climate change adds a new source of uncertainty to land-use and conservation planning, but opportunities exist to include it in the models that support these efforts. As examples, climate change could be included through bioclimatic envelope projections that define vegetation succession after disturbance, or by altering parameters for disturbance rates (e.g., fire) that will be influenced by climate change<sup>9</sup>.

Climate-ready models could be used to help develop regional land use plans under the *Land-use Framework*, addressing questions like: How will climate change affect specific outcomes of interest? How robust is the plan to alternative climate futures? Fully integrating climate change into the land-use planning process will be challenging, and would require a combination of short-term deterministic and longer-term, adaptive planning. Alberta's regional planning process is well-positioned to facilitate coordination of adaptation efforts across sectors (e.g., forestry, parks).

<sup>1</sup>Schneider, 2013. Alberta's Natural Subregions under a Changing Climate: Past Present and Future. ABMI; <sup>2</sup>Shank and Nixon, 2014. Climate Change Vulnerability of Alberta's Terrestrial Biodiversity: A Preliminary Assessment. ABMI; <sup>3</sup>IPCC, 2014. Climate Change 2014: Impacts, Adaptation, and Vulnerability. Summary for Policy Makers. ; <sup>4</sup>Government of Alberta, 2012. The Lower Athabasca Regional Plan 2012-2022; <sup>5</sup>Government of Alberta, 2008. Land-Use Framework; <sup>6</sup>Schneider, 2014. Conserving Alberta's Biodiversity under a Changing Climate: A Review and Analysis of Adaptation Measures. ABMI. <sup>7</sup>Alberta Sustainable Resource Development, 2008. Alberta's Strategy for the Management of Species at Risk; <sup>8</sup>Alberta's Scientific Framework for Parks; <sup>9</sup>Schneider and Farr, 2008. A Modelling Framework for Assessing the Potential Impact of Climate Change in Northeastern Alberta; <sup>10</sup>[abmi.ca](http://abmi.ca)