

EXECUTIVE SUMMARY

Climate change is identified as one of the key threats to prairie biodiversity (James et al. 2001). Gratto-Trevor (1997) reviewed climate change effects on natural prairie vegetation and wildlife (species responses to drought). Herrington et al (1997) focused on climate impacts and adaptations for economic use of selected resources. Reviews of possible climate change effects on national parks found that the effects on the Great Plains of North America will be greater than other regions (e.g., WWF n.d.).

There have been two recent studies in Saskatchewan that examined the possible effects of climate change on prairie biodiversity (James et al. 2001) and island forests of northern Great Plains (Henderson et al. 2002). These studies suggest reduced or complete loss of integrity of existing ecological communities and protected areas in selected areas of the Prairie Ecozone. At the national level, Scott et al. (2002) predicted through modeling that 50% of Canada's National Parks will undergo significant vegetation changes with climate change and identified major policy challenges for Parks Canada. At the continental scale, a recent publication on North American grasslands provides a context for conservation of grassland in relation to a wide array of issues including climate change (Gauthier et al. 2003). All these studies suggest the need for major changes in protected area selection and management policies to respond to anticipated climatic changes. For example, establishing a network of protected areas to represent natural regions that includes vegetation type may be problematic. A key objective of protected area management is biodiversity conservation, yet some species may be eliminated from a given protected area as the climate becomes warmer. Other species better adapted to warmer climates may be prevented from immigrating to the protected area because of the absence of migration corridors.

Saskatchewan, through its Representative Areas Network (RAN) program, has established an extensive system of parks and protected areas across the province and is now nearing designating 9% of its land base. While lands will continue to be designated in under- or un-represented ecoregions, there is increased awareness and efforts among management agencies to ensure that ecological integrity of protected areas is sustained (SERM 2001). To address many of the threats to biodiversity (e.g. habitat change and fragmentation, exotic invasive species, overuse), policies and strategies (e.g. species at risk) have been developed. However, managing for climate change offers a greater challenge as "rapid climate change fundamentally changes the context of protected areas planning and of nature conservation policy making" and "... this is little understood amongst policy-makers, managers, or the wider public" (Henderson et al. 2002, p. 2). Henderson et al. also noted "a failure to incorporate climate change impacts within strategic planning is typical of conservation management throughout the northern Plains region" including Manitoba's "Protected Areas Initiative" and Alberta's "Special Places Program".

The purpose of this study is to assess the capacity, both barriers and opportunities, of the current protected areas policies (including the protected areas network) to represent and sustain ecological health in the Prairie Ecozone in Saskatchewan (Acton et al. 1998) under future climate conditions. A policy framework for Saskatchewan will be proposed. The policies are

intended to support park and protected area planners and managers with responding to climate change now and in the near future.

Objectives

In consultation with protected area land managers and stakeholders:

- 1) Develop recommendations for policy and further research to support adaptation by protected areas to climate change.
- 2) Based on the case of the Prairie Ecozone, develop a protected area policy for Saskatchewan under climate change. This will specifically include adaptation strategies for the selection and management of parks and protected areas.
- 3) Develop a template to review protected area policy, under climate change, that could be used by other prairie provinces (Alberta and Manitoba).

Methodology

Assess Climate Change Impacts

- Building on the work of James et al (2001) and Henderson et al (2002), available climate change scenarios and associated vegetation models were reviewed and assessed for the prairies.
- Existing digital information about extant climate, landscapes and the protected areas network in the Prairie Ecozone in Saskatchewan were accessed to create digitized baseline maps for the prairie ecoregions. Significant land cover data and protected area databases already exist (Gauthier et al. 2002; Gauthier and Wiken 2003).
- Future climates and vegetation types were modeled at the ecoregional scale for the 2050s, expanding on the methodology used by Henderson et al (2002). Their work related the forest/grassland boundary to a climatic moisture index. A similar approach was used to define the climatic envelope of major vegetation types within the grassland region (e.g. dry mixed prairie, moist mixed prairie, fescue prairie, aspen parkland), which was then used to model the shifts in these types under future climates.

Identify Alternative Response Strategies

A variety of strategies to respond to climate change were developed and assessed in consultation with land managers and stakeholders. These included no response, maintenance of the status quo, and an adaptation response. Of primary interest are the adaptation responses. For future management of protected areas, adaptation responses can vary considerably in terms of level of intervention. Some of the adaptation responses that were considered include: expansion of the protected areas network with a focus to establishing connectivity among existing areas and selection of some protected areas based on current and future biological diversity. For protected area management, adaptation strategies may include: introduction of non-native species; revisions to wildfire management policy and adoption of a management planning process that incorporates climate change scenarios, potential adaptations and public consultation on the climate change issue.

Policy Review and Analysis

- A literature review was conducted on current knowledge of climate change impacts and policy adaptations on protected areas in the Great Plains of Canada, United States, and other international jurisdictions where similar climate changes are expected.
- A literature review was conducted on provincial protected area policies in Saskatchewan.
- Land managers and stakeholders were surveyed at the outset of the study to ascertain their perceptions of protected area policy issues under climate change.
- An evaluation method was developed to assess the capacity of protected areas policies (including the protected area network, management planning and habitat stewardship activities) to adapt to climate change. These criteria were used to identify barriers and opportunities to adaptive management. The approach addressed two key issues, the scope of policies to be reviewed and evaluation criteria. The scope of the review was intended to cover all policy, legislation and regulations that may impact on parks and protected areas and their ability to adapt to climate change. Specific criteria and supporting rationale were developed to allow for both objective and subjective evaluation of current policy.
- A policy review template, for use by other prairie jurisdictions, was developed in consultation with stakeholders.

Policy Development

A policy framework for Saskatchewan to adapt to climate change was developed to guide both expansion of the protected areas network and management of parks and protected areas. A workshop was held with land managers and stakeholders to share findings of the climate-vegetation modeling and the alternative response strategies. The workshop was used to formulate options and recommendations for a protected area policy for Saskatchewan.

Report Outline

The report outlines the background and rationale for the project, and summarizes the findings of the protected area policy review, involving a literature survey and manager workshop. The expected biophysical impacts of climate change on a sample of Saskatchewan protected areas are analyzed. Lastly, policy recommendations and recommendations for further research on protected areas and adaptation to climate change are presented along with a policy review template.