Government of Canada / Gouvernement du Canada

Climate Change IMPACTS and ADAPTATION Program

Forestry

The overarching goal of the Climate Change Impacts and Adaptation Program is to reduce Canada's vulnerability to climate change. Through a competitive proposal process, the research program supports cost shared research to address gaps in our knowledge of Canada's vulnerability to climate change and to provide information for adaptation decision-making. Emphasis is placed on research that examines processes, barriers, and drivers for adaptation.

The program also supports the Canadian Climate Impacts and Adaptation Research Network (C-CIARN). This network facilitates linkages between stakeholders and researchers, promotes new research techniques and methodologies, disseminates information, and provides a voice for an emerging impacts and adaptation research community.

Between 1998 and 2001, the Impacts and Adaptation component of the Government of Canada's Climate Change Action Fund (CCAF) supported over 75 projects to examine the impacts of climate change on Canadians and the processes by which we adapt. Six of these projects related to forestry and addressed future changes in forest growth, disturbances such as forest fires and insect outbreaks and potential adaptation options. In addition, the CCAF funded Prairie Adaptation Research Collaborative (PARC), supported four projects focussed on forestry topics of concern in the Prairie Provinces.

adaptation.nrcan.gc.ca

Canada

Here are some brief highlights of the projects funded.

1. Using Winter Climatic Data to Estimate Spring Crown Dieback in Yellow Birch: a Case Study to Project the Extent and Locations of Past and Future Birch Decline

Researchers used winter climatic data to investigate the impact of winter thaws and late spring frosts on yellow birch, a tree common to Ontario, Quebec and the Atlantic region. Researchers found a strong temporal and spatial relationship between extended winter thaws and spring crown diebacks and decline. These thaws have increased over the last 30 years. Future climate changes are expected to result in even more frequent and prolonged winter thaws, and therefore a potential worsening of birch dieback and decline.

Principal Investigator: Roger Cox
Canadian Forest Service - Natural Resources Canada

rcox@NRCan.gc.ca

2. Natural Disturbances in Boreal Forests and Climate Change

Wildfire and spruce budworm outbreaks are widespread disturbances in the boreal forest. Researchers examined the interactions between these disturbances and assessed how projected climate change would affect these interactions. They concluded that warmer and drier conditions induced by climate change would cause wildfires to increase in stands defoliated by spruce budworm, as well as increase the frequency and intensity of spruce budworm outbreaks.

Principal Investigator: Richard Fleming
Canadian Forest Service - Natural Resources Canada

rfleming@NRCan.gc.ca

3 Enhanced Indicators of Climate Change Impacts on Forest Hydrology

This study developed indicators to demonstrate the sensitivity of the forest water balance to climate variability. This will assist the forestry sector in evaluating land use adaptation strategies, especially in regions where persistent water deficits may develop in the next century.

Principal Investigator: Raoul Granger
National Water Research Institute - Environment Canada

raoul.granger@ec.gc.ca

4. Climate Change Impacts on Productivity and Health of Aspen Forests in the Western Canadian Interior

Trembling aspen is important for wildlife, recreation and the forest industry in western Canada. Researchers analysed tree rings from 72 aspen stands across the Prairie Provinces to determine how climate variation, insects and other factors have affected aspen growth and health. They found that insect defoliation and drought were the most important factors driving year to year variation in aspen productivity. This research will help in understanding the response of aspen forests to future climate change.

Principal Investigator: Ted Hogg
Canadian Forest Service - Natural Resources Canada

thogg@NRCan.gc.ca

5. Projecting Canadian Forest Fire Impacts in a Changing Climate: Laying the Foundation for the Development of Sound Adaptation Strategies

This project examined the relationship between fire activity and climate in Canada over the past 50 years, and evaluated how an increase in the number and severity of fires would affect forest communities, timber supply, and carbon budgets. Researchers used high-resolution regional climate models to generate scenarios of future forest fire danger. They found that the seasonal fire severity rating would increase in much of Canada under the projected climate changes.

Principal Investigator: Brian Stocks
Canadian Forest Service - Natural Resources Canada

bstocks@NRCan.gc.ca

6. An Assessment of the Vulnerability of the Boreal Forest

This study brought together the results of previous research on the impacts of climate change on the western Canadian boreal forest and forest industry. Researchers reviewed literature, assessed knowledge gaps, and provided an integrated picture of the overall sensitivity and vulnerability of selected eco-districts to varying precipitation levels.

Principal Investigator: Elaine Wheaton
Saskatchewan Research Council

wheaton@src.sk.ca

7. A Framework for Determining the Ability of the Forest Sector to Adapt to Climate Change

This project worked with representatives from the forest management sector to determine how adaptation options can be developed and implemented through existing approaches to sustainable forest management. Critical to success is an effective science and technology transfer mechanism, which would allow researchers and forest managers to work jointly towards solutions.

Principal Investigator: Mark Johnston
Saskatchewan Research Council

johnston@src.sk.ca

8. Simulating Climatic Impacts on, and Adaptive Management Options for Boreal Forest Ecosystems in Western Canada

Using data on plant physiology, climate and soil conditions, along with remote sensing technologies, researchers developed and tested new models to assess the response of forest growth to climate change at the landscape and stand levels. These models will also be applied to assess how forest management activities can reduce the negative impacts of climate change.

Principal Investigator: David Price
Canadian Forest Service - Natural Resources Canada

David.Price@NRCan.gc.ca

9. Forest Fire Management Adaptation to Climate Change in the Prairie Provinces

Using future climate projections to drive a fire effects model for the boreal forest, the study concluded that climate change would result in more severe and frequent fires. Late successional species are likely to disappear from some portions of the areas studied, while species adapted to rapid regeneration after fire, such as aspen, birch and jack pine would increase. Prescribed burning and fire suppression were assessed as potential adaptation options. Researchers concluded that fire suppression would be required to maintain white spruce dominated stands.

Principal Investigator: Bill deGroot
Canadian Forest Service - Natural Resources Canada

Bill.degroot@NRCan.gc.ca

10. Assessing the Impact of Climate Change on Landscape Flammability and the Effectiveness of a Forest Management Adaptation Strategy at Reducing Area Burned by Wildfires

This study found that fire intensity is likely to increase in the forests of central Saskatchewan by up to three times that under current conditions. They also conclude that fuel modification, such as incorporating less flammable species like aspen into stands of highly flammable fuel types like spruce, could reduce wildfire spread by up to 25%.

Principal Investigator: Victor Kafka
Canadian Forest Service - Natural Resources Canada

Vkafka@NRCan.gc.ca

Further information on the program and funding opportunities can be found on the web site:

adaptation.nrcan.gc.ca

or contact the
Climate Change Impacts and Adaptation Directorate
Natural Resources Canada
E-mail: adaptation@nrcan.gc.ca