

Sustainable Forest Management in Canada in a Changing Climate

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February 9, 2016

Canadian Council
of Forest
Ministers



Conseil canadien
des ministres
des forêts



Sustainable Forest Management in Canada

- Canada's Forests
- Climate Change Adaptation and Mitigation

Stewardship of Canadian Forests

10 provinces and 3 territories



- Provincial jurisdiction:
 - Forest Management
- Federal jurisdiction:
 - Aboriginal affairs
 - International trade
- Canadian Council of Forest Ministers

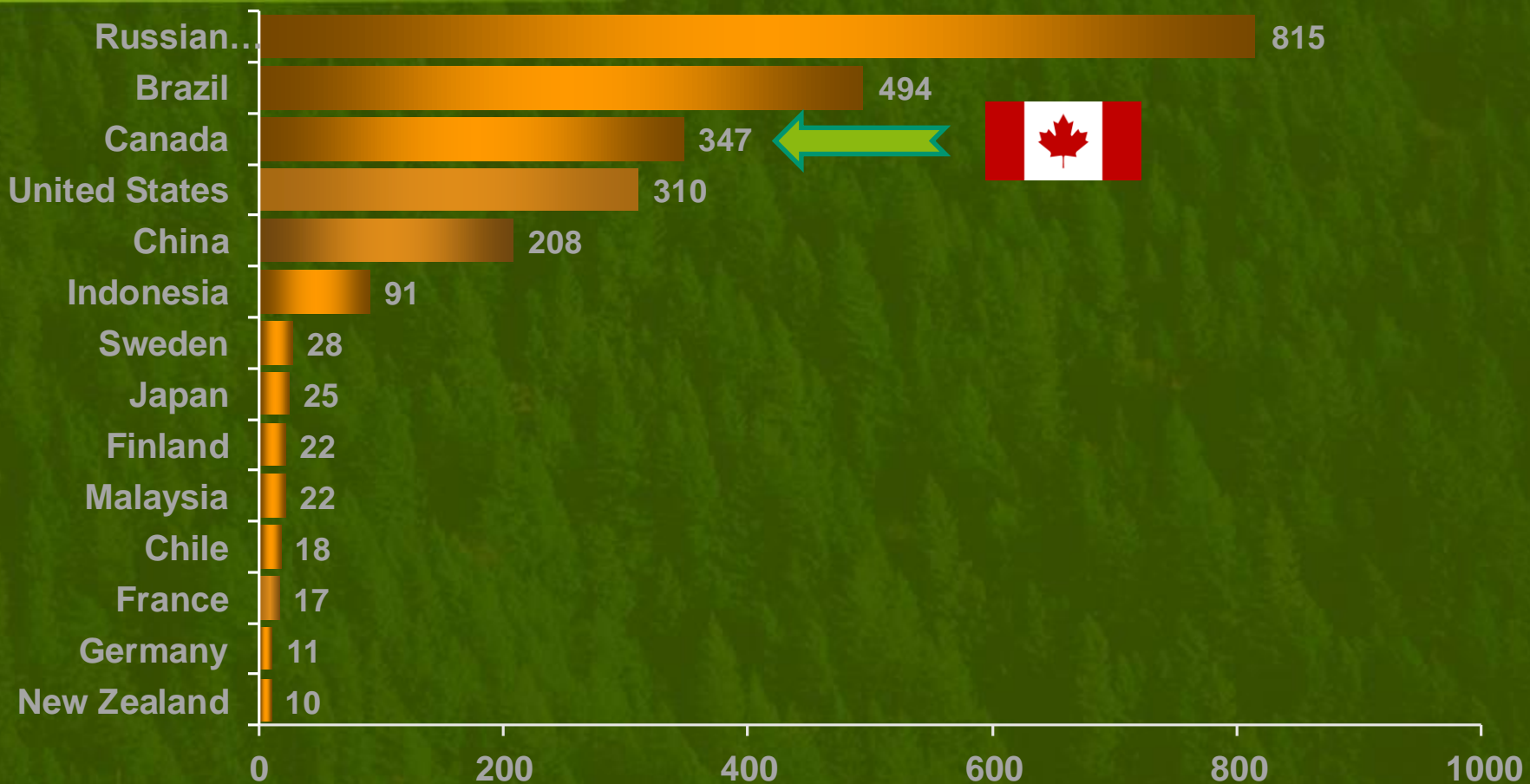
Canada is a forest nation

A vast resource,
a special
responsibility

10% of world's forest



Global Forest Area



Data source: FAO, Global Forest Resources Assessment 2015.

An aerial photograph of a lush green forest landscape. In the foreground, there's a rocky outcrop. A winding river or stream flows through the forest towards a large, calm lake in the middle ground. The sky is bright blue with scattered white clouds. A thick green wavy bar is at the top, and a semi-transparent green box is on the right side containing text.

Canadian Forestry

Public ownership of forest resources

Forests managed for
the common good

94% Public ownership

6% Private ownership



Canadian Forest Policy

Sustainability is in
the public interest



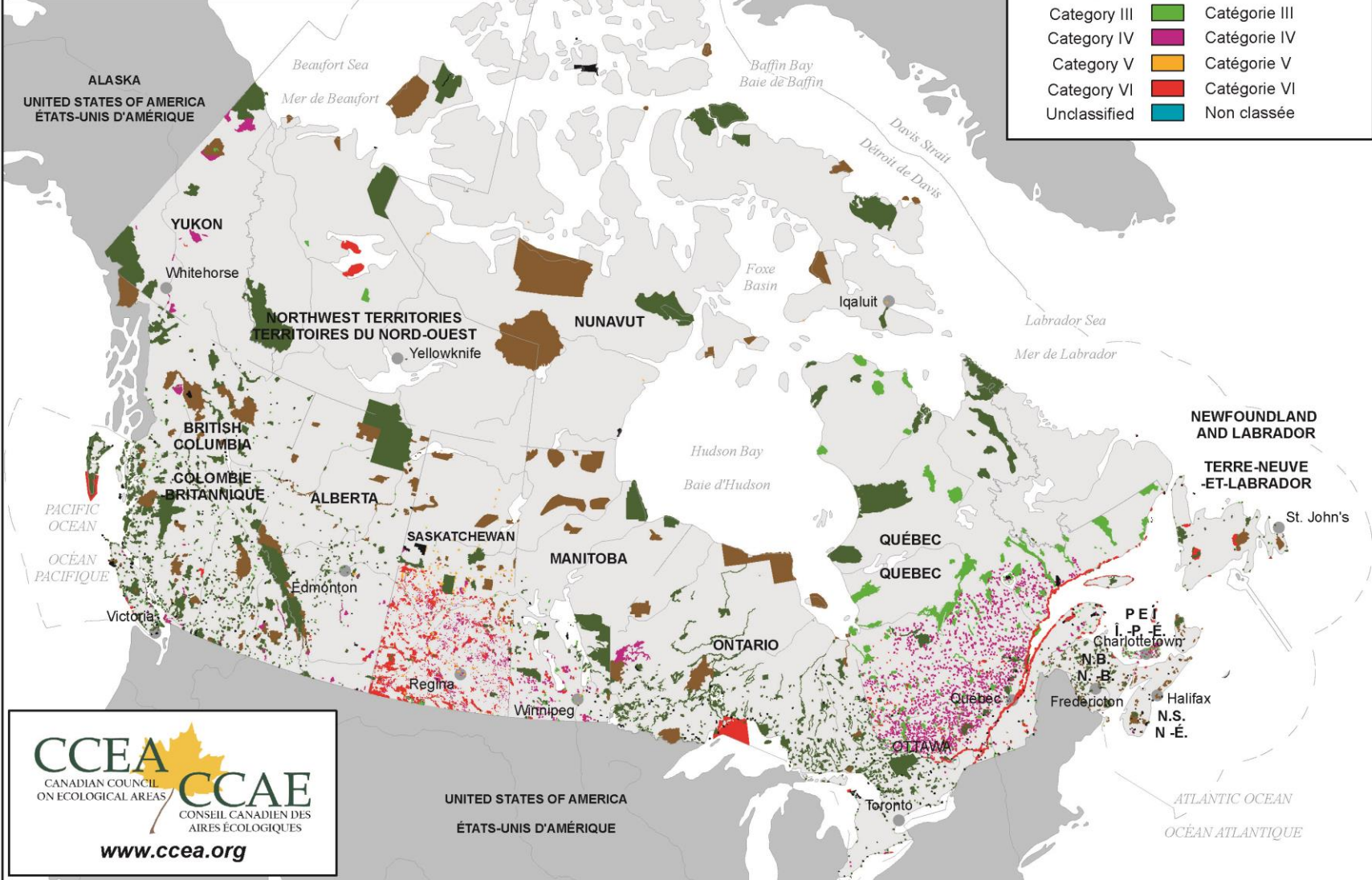
Sustainable forest management maintains and enhances the long-term health of forest ecosystems for the benefit of all living things while providing environmental, economic, social, and cultural opportunities for present and future generations

CANADA'S PROTECTED AREAS NETWORK RÉSEAU DES AIRES PROTÉGÉES AU CANADA

Source / Source :
Conservation Areas Reporting and Tracking System (CARTS) - 2014.12.31
Système de rapport et de suivi pour les aires de conservation (SRSAC) - 2014.12.31



LEGEND	LÉGENDE
IUCN Category	Catégorie de l'IUCN
Category Ia	Catégorie Ia
Category Ib	Catégorie Ib
Category II	Catégorie II
Category III	Catégorie III
Category IV	Catégorie IV
Category V	Catégorie V
Category VI	Catégorie VI
Unclassified	Non classée



CCEA
CANADIAN COUNCIL
ON ECOLOGICAL AREAS

CCAÉ
CONSEIL CANADIEN DES
AIRES ÉCOLOGIQUES

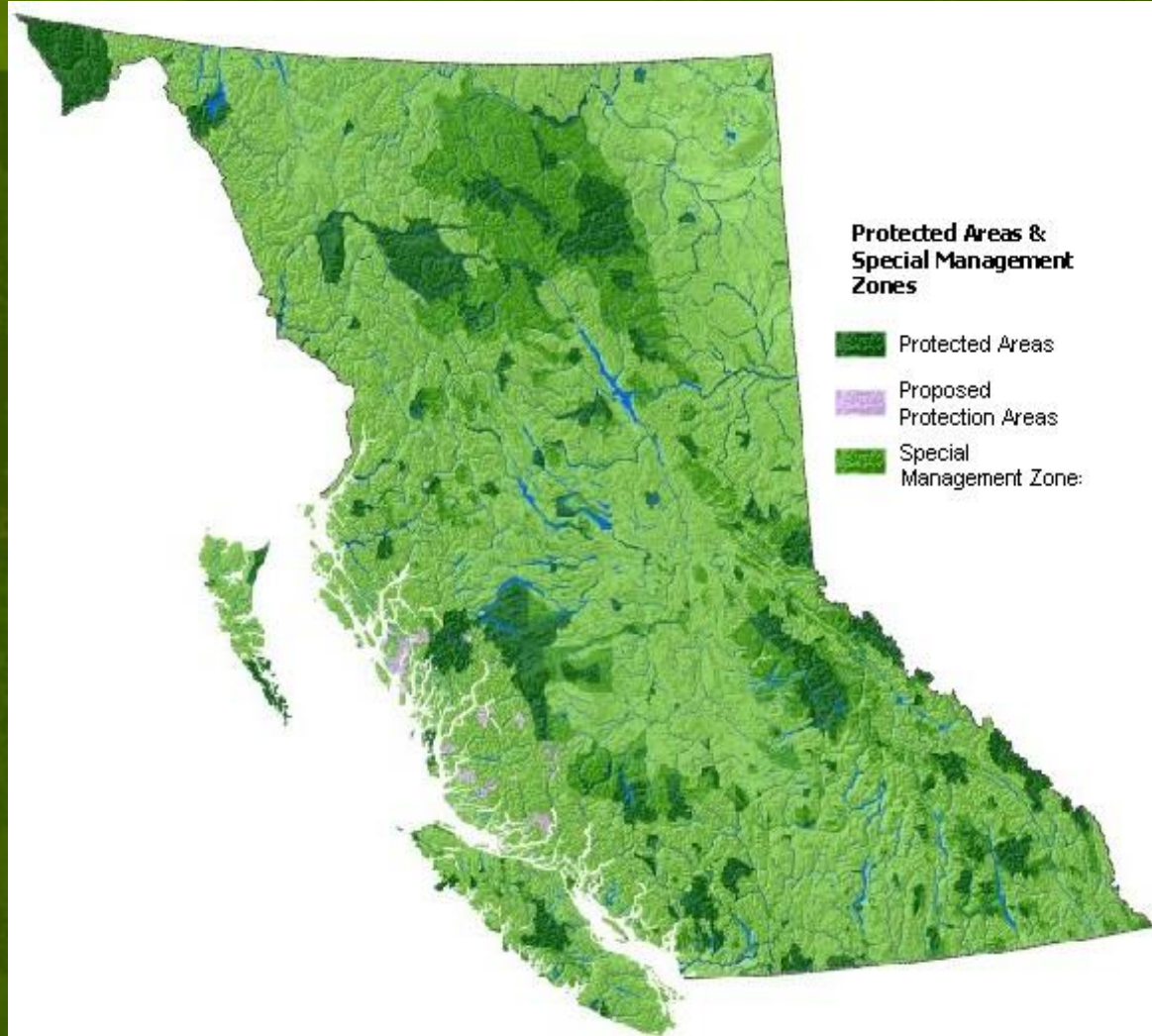
www.ccea.org


UNITED STATES OF AMERICA
ÉTATS-UNIS D'AMÉRIQUE

ATLANTIC OCEAN
Océan Atlantique

BC's Forests – Protected Areas

- 14.8% of BC is protected
14.1 million hectares
- Equally large area designated for special management
13.3 million hectares



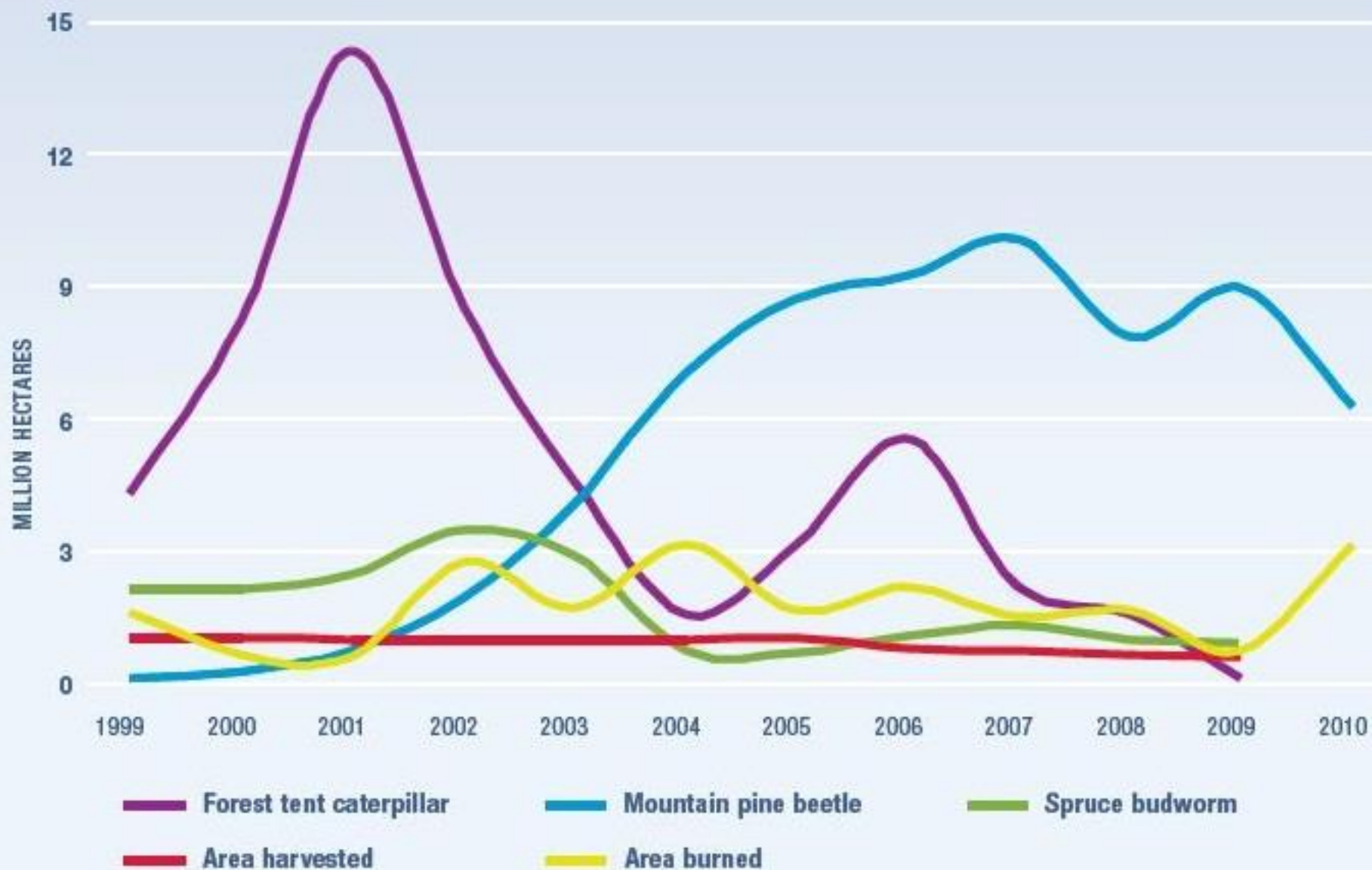


Sustainable Forestry

Rooted in science

Science
informs policy

AREA OF FOREST DISTURBED BY FIRE, INSECTS AND HARVESTING



Sources: Canadian Interagency Forest Fire Centre, National Forestry Database and British Columbia Ministry of Forests, Lands and Natural Resource Operations

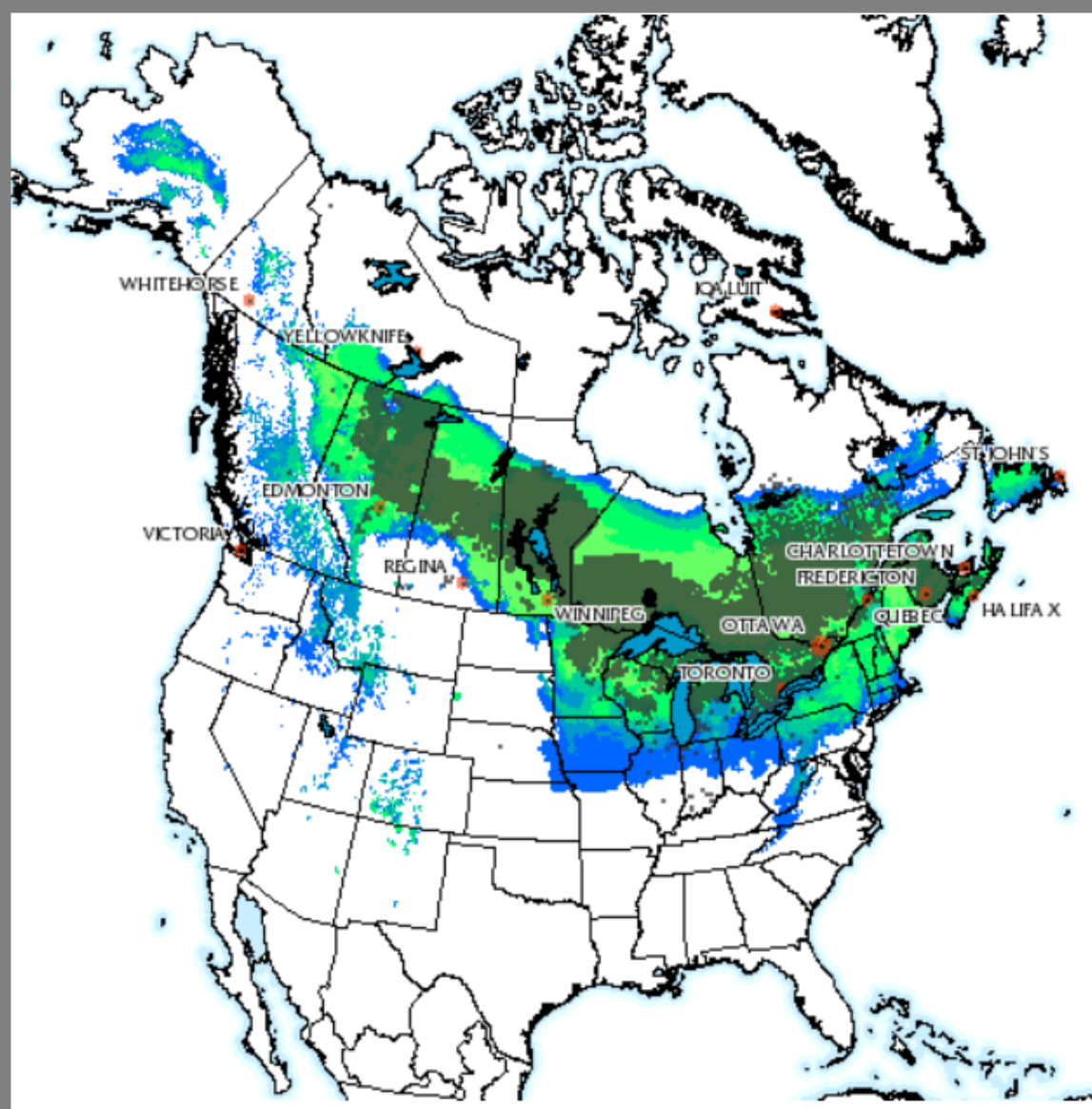
Climate Change Impacts

- Trees in new places
- Pests in new places
- More Fires
- Faster growing trees?

= Need to Adapt

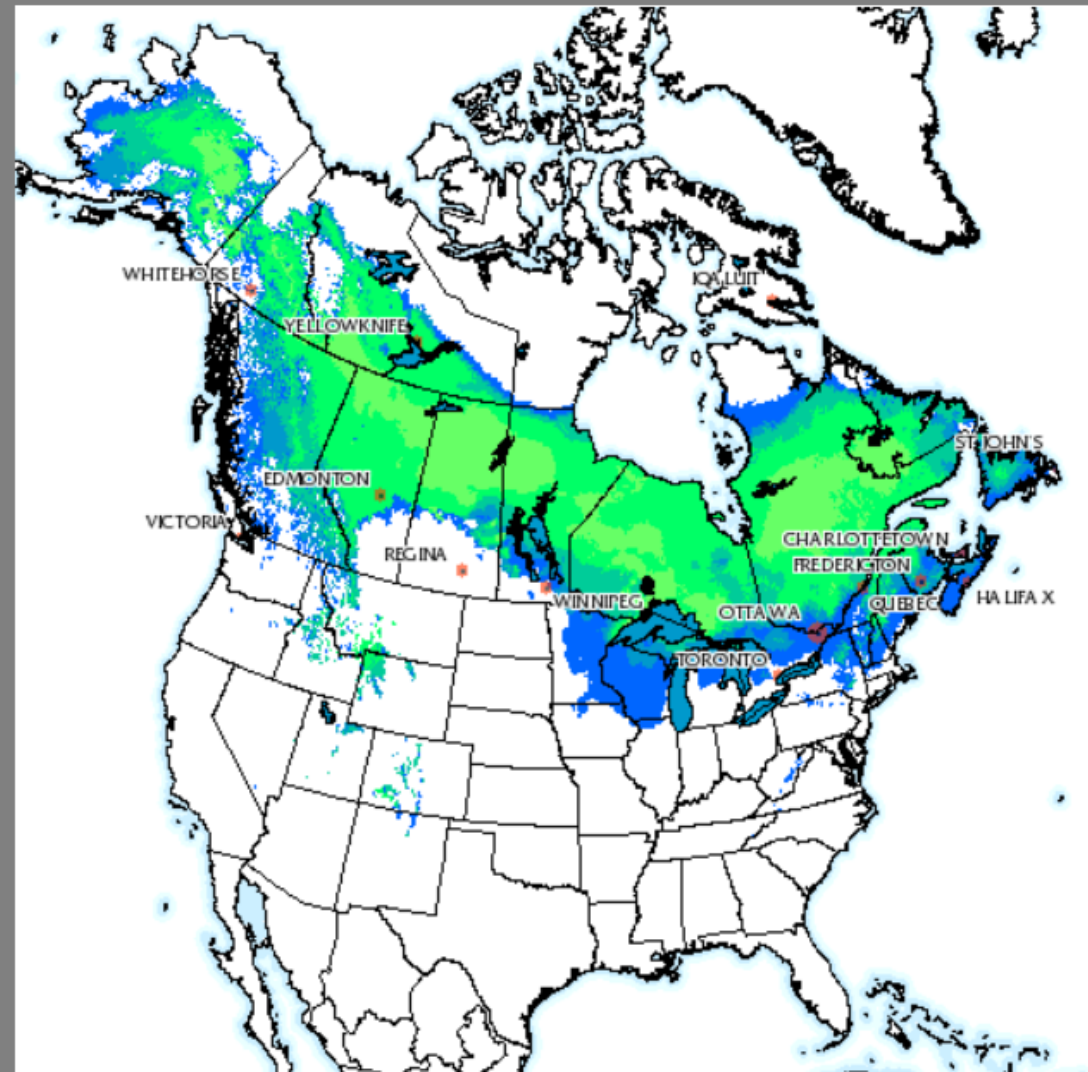
Trees in new places

Jack Pine – Current Range



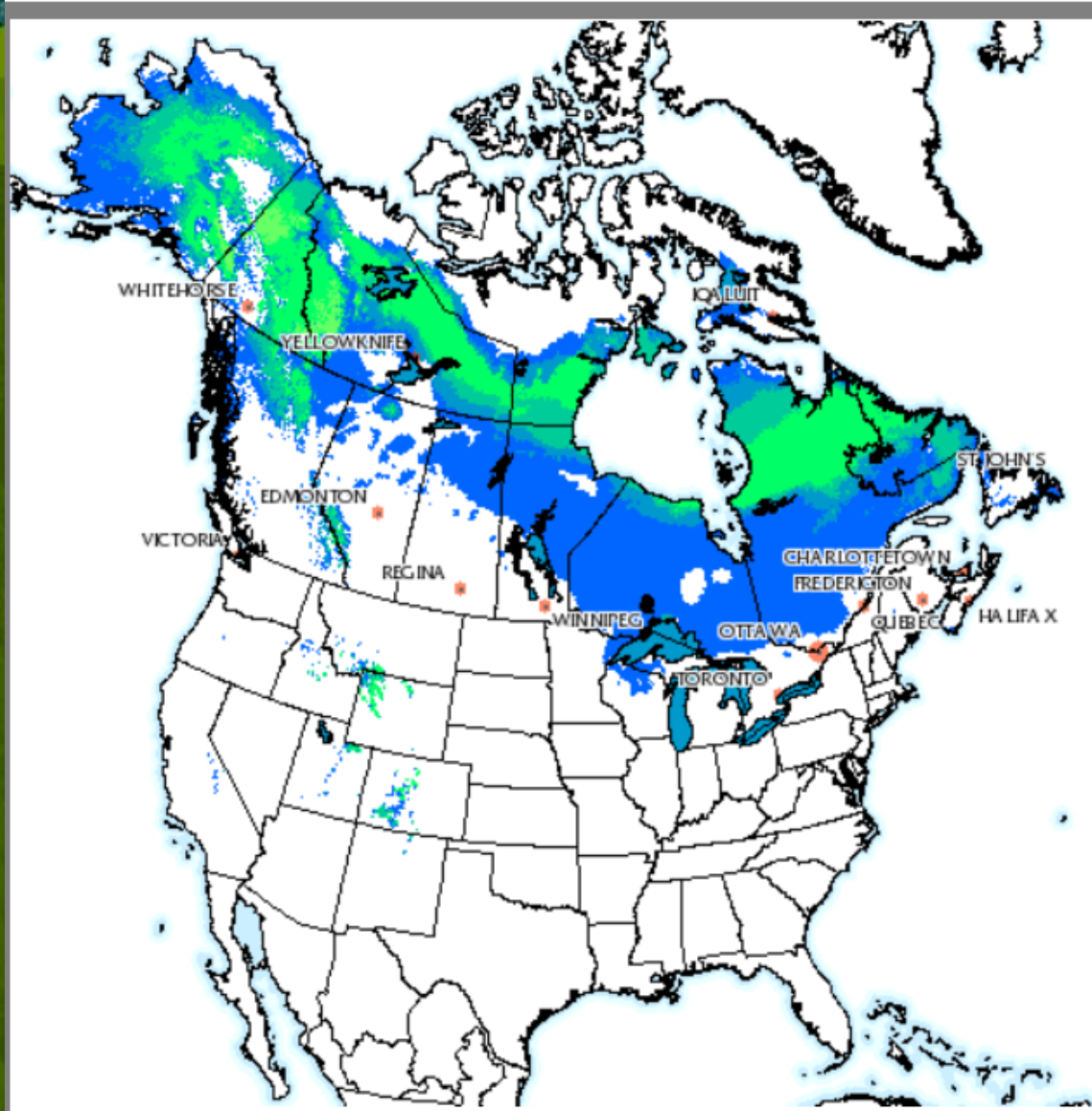
Trees in new places

Jack Pine – 2070-2100 RCP 2.6



Trees in new places

Jack Pine – 2070-2100 RCP 8.5





Pests

MPB in BC – 1999 to 2020

54% of
merchantable
pine has been
killed

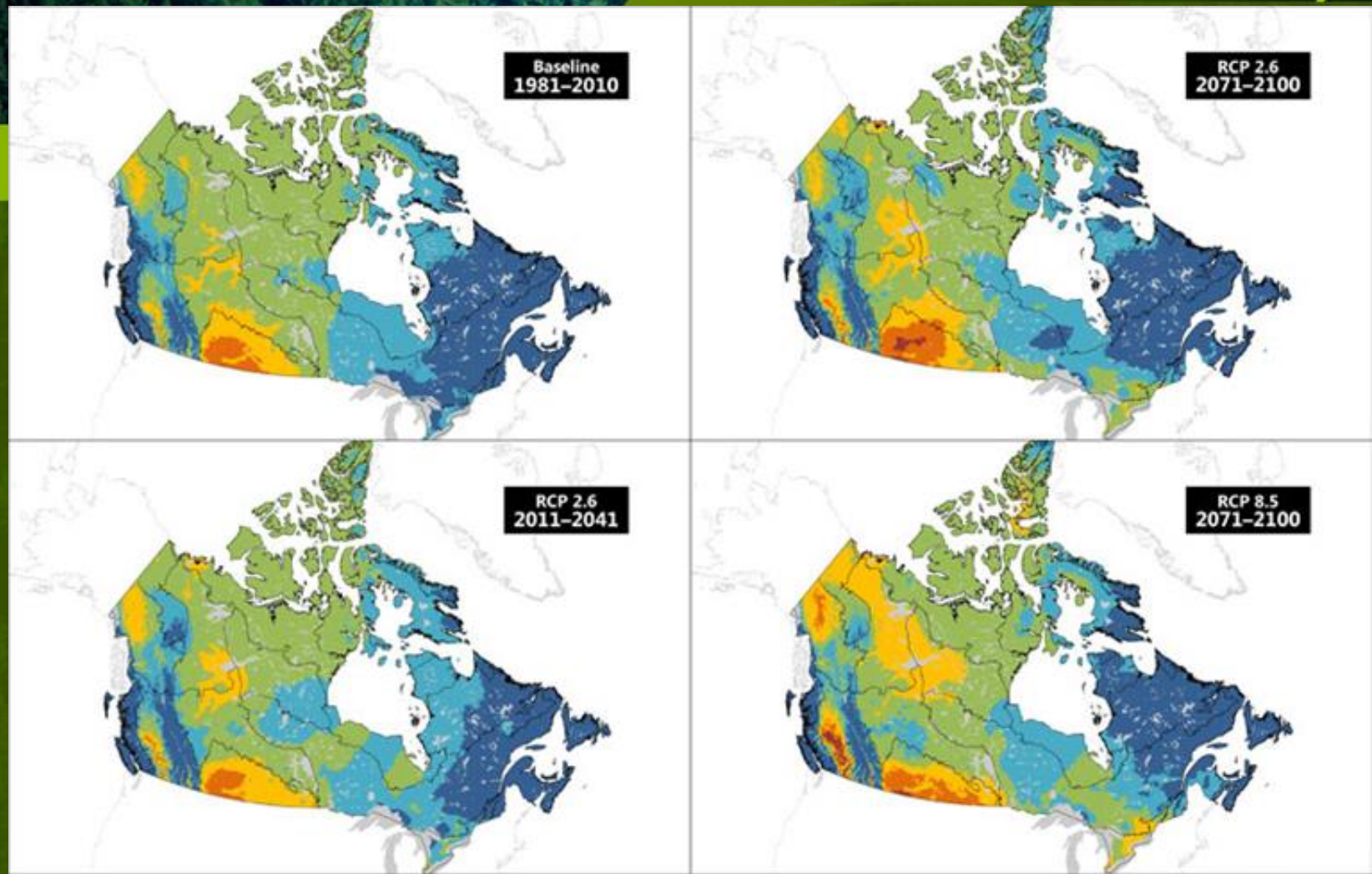
Provincial-Level Projection of the Current Mountain Pine Beetle Infestation

Cumulative percentage of pine killed:
observed 1999 to 2012
projected 2013 to 2020

Canada



Forest Impact Maps



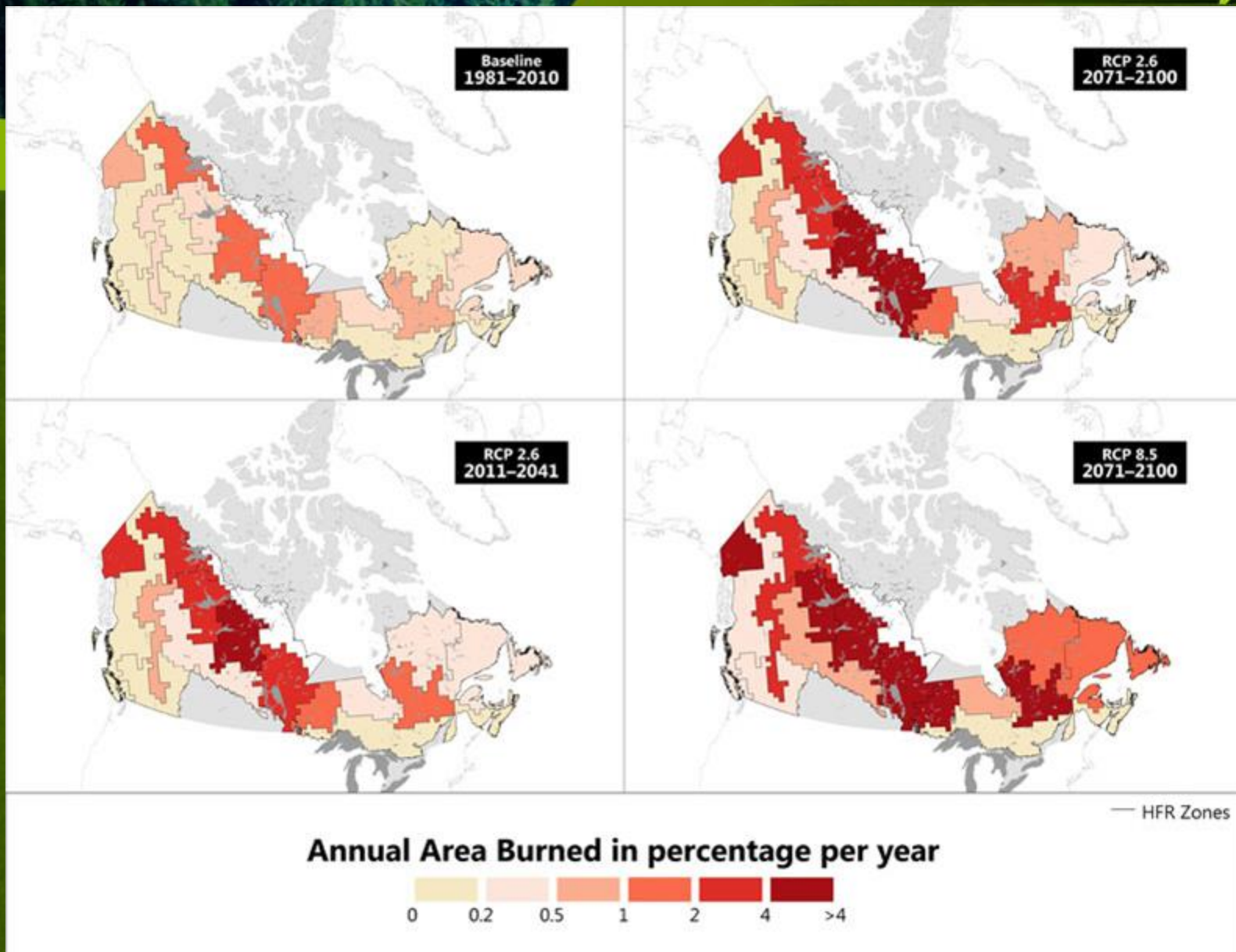
Climate Moisture Index (cm)



□ Ecozones



Forest Impact Maps



CCFM Wildland Fire Management Working group

Strategic Priorities:

1. Canadian Wildland Fire Response Plan.
2. Community protection and prevention programs.

CCFM Climate Change Task Force

Providing a foundation and guidance for adaptation

Innovative, nationally-applicable Vulnerability Assessment Framework

Adapting Sustainable Forest Management to Climate Change:
A Systematic Approach for Exploring Organizational Readiness

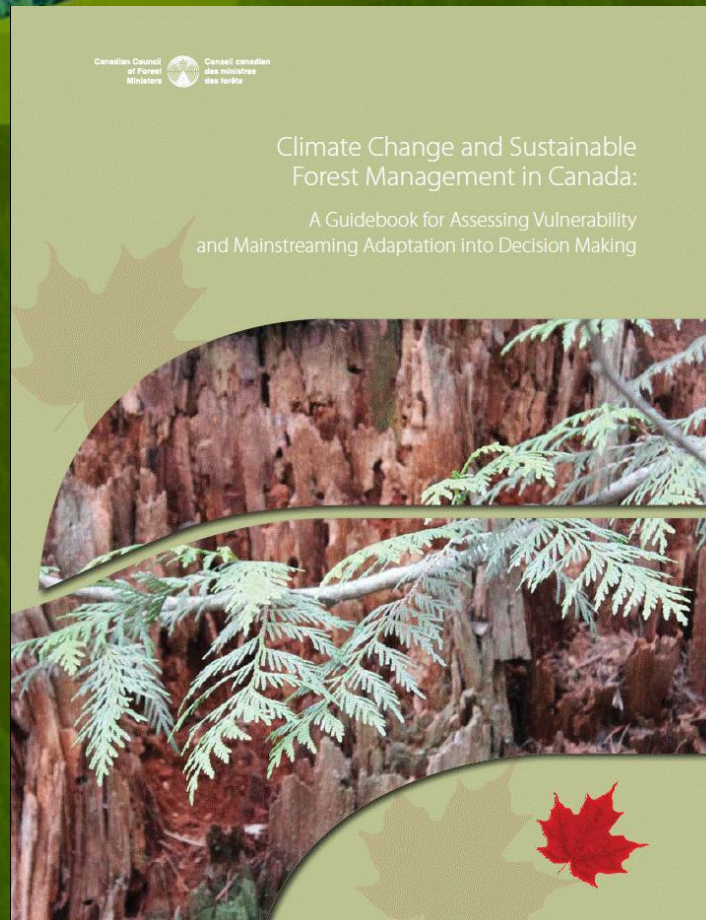
Adapting Sustainable Forest Management to Climate Change:
A Review of Assisted Tree Migration and its Potential Role in Adapting Sustainable Forest Management to Climate Change

Adapting Sustainable Forest Management to Climate Change:
Criteria and Indicators in a Changing Climate

Climate Change and Sustainable Forest Management in Canada:
A Guidebook for Assessing Vulnerability and Mainstreaming Adaptation into Decision Making



A Guidebook for Adapting SFM to Climate Change



Edwards, J.E.; Pearce, C.; Ogden, A.E.; Williamson, T.B. 2015. *Climate change and sustainable forest management in Canada: a guidebook for assessing vulnerability and mainstreaming adaptation into decision making*. Can. Council. For. Minist., Ottawa, ON.

Community of Practice

<https://www.ccadaptation.ca/en/facop>

Français



Communauté de pratique
ACC/CCA
Community of Practice

CCACoP

FACoP

LSWCoP

Welcome to the

Forestry Adaptation Community of Practice (FACoP)

...Sharing information and best practices on climate change vulnerability and adaptation in
Canada's forest sector

To share information and best practices on current activities in the area of climate change vulnerability and adaptation assessment in Canada's forest sector



Forest Change Initiative Climate Change Adaptation Tools and Resources

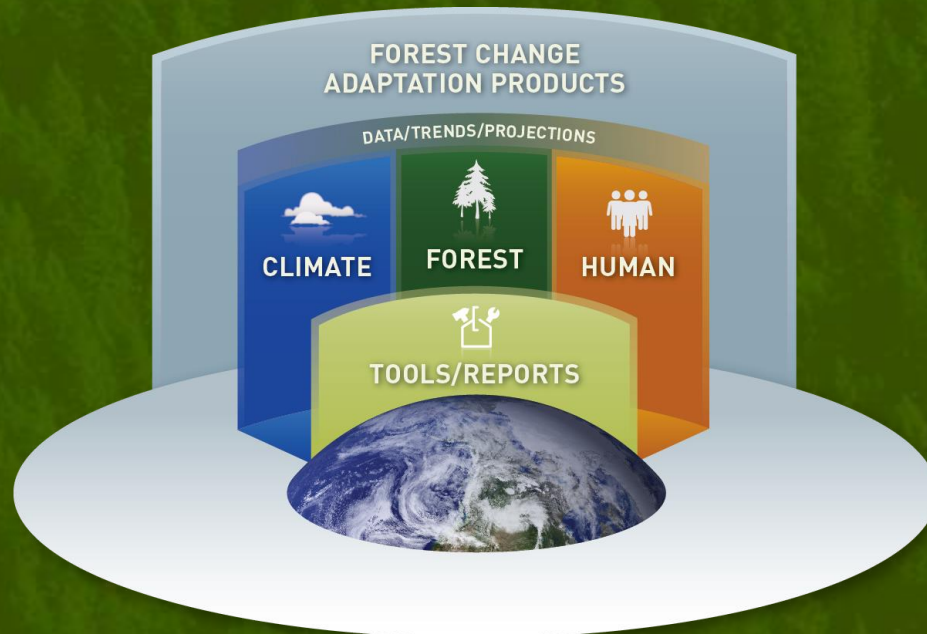
www.cfs.nrcan.gc.ca/forestchange

Natural Resources Canada, Canadian Forest Service
Primary contact: Catherine Ste-Marie (catherine.ste-marie@canada.ca)

Forest Change Approach

Building on existing capacity, knowledge and expertise...

1. **A Tracking System** that reports on indicators of climate change impacts to identify forest sector vulnerabilities
2. **An Adaptation Toolkit** of actionable science for sustainable forest management under a changing climate
3. **Integrated Assessment** of climate change implications for the forest sector to guide policies and investment



Province of British Columbia

The province of B.C. has applied science and modelling to its practical adaptation initiative

A program to generate high-resolution climate data for climate change studies and applications in British Columbia and western North America

<http://cfcg.forestry.ubc.ca/projects/climate-data/climatebcwna/>



Forestry



ClimateBC_Map

-- A Interactive Platform for Visualization and Data Access

Coordinates Input (click on the map or type in coordinates)

Latitude Longitude

Elev (m) Historical

Future

Annual Variables Seasonal Variables Monthly Variables

Three empty scrollable input boxes for selecting variables.

Overlays:

MAT_1961-1990: -15.0 10.2 °C

Map Satellite

skagway Juneau ALBERTA Edm Calg Vancouver Victoria

BRITISH COLUMBIA

MAT (°C)
High : 10.2
Low : -15.0



ClimateWNA_MAP

-- An Interactive Platform for Visualization and Data Access

Coordinates Input (**click on the map** or type in coordinates)

Latitude Longitude

Elev (m) Historical

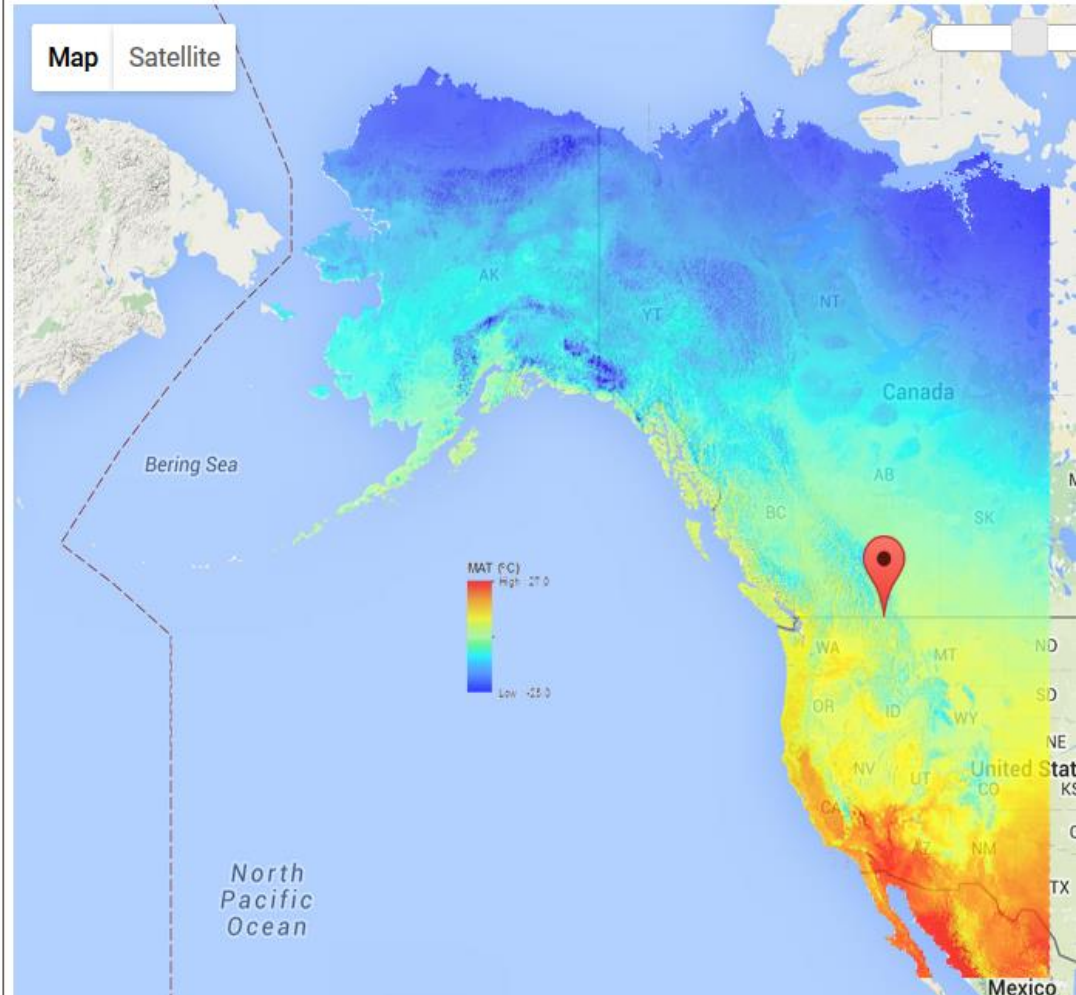
Future

Annual Variables Seasonal Variables Monthly Variables

Three empty scrollable list boxes for selecting variables.

Overlays: Transparency(%):

MAT_1961-1990: -25.0 27.0°C



Forestry



ClimateNA_MAP

-- An Interactive Platform for Visualization and Data Access

Coordinates Input (click on the map or type in coordinates)

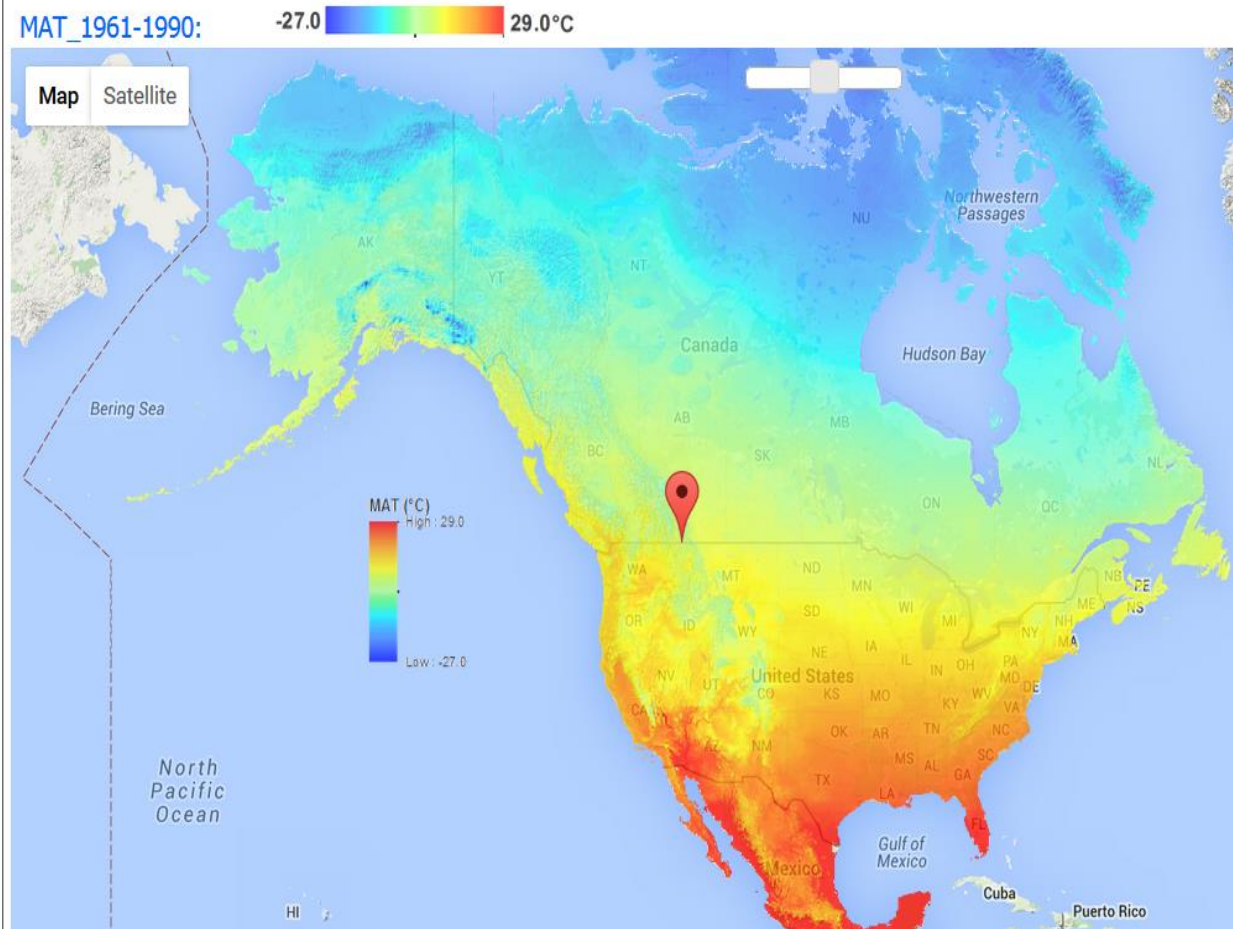
Latitude Longitude

Elev (m) Historical

Future

Annual Variables Seasonal Variables Monthly Variables

Overlays: Transparency(%):





Planning for the Future

Example from BC

Climate Change projections show trees in some regions of BC will become maladapted to the climates in which they are growing



Assisted Migration

The purposeful movement of species to facilitate or mimic natural population or range expansion

Leech, S. M., P. Lara Almuedo, G. O'Neill. 2011. Assisted Migration: adapting forest management to a changing climate.

BC Journal of Ecosystems and Management 12(3):18-34.

<http://jem.forrex.org/index.php/jem/article/view/91/98>.



Assisted Migration

Example from BC

- Establishment of trees adapted to future climates
 - Most well researched
 - Least expensive
 - Low Risk adaptation strategy
- BC Chief Forester's Seed Transfer Guidance
 - Planting zones modified in anticipation of Climate Change
- Tools to assist practitioners



Tree Improvement Branch: Seedlot Selection Tool

Version 3.1

Instructions | I Have A Cutblock | I Have A Seedlot

Species:

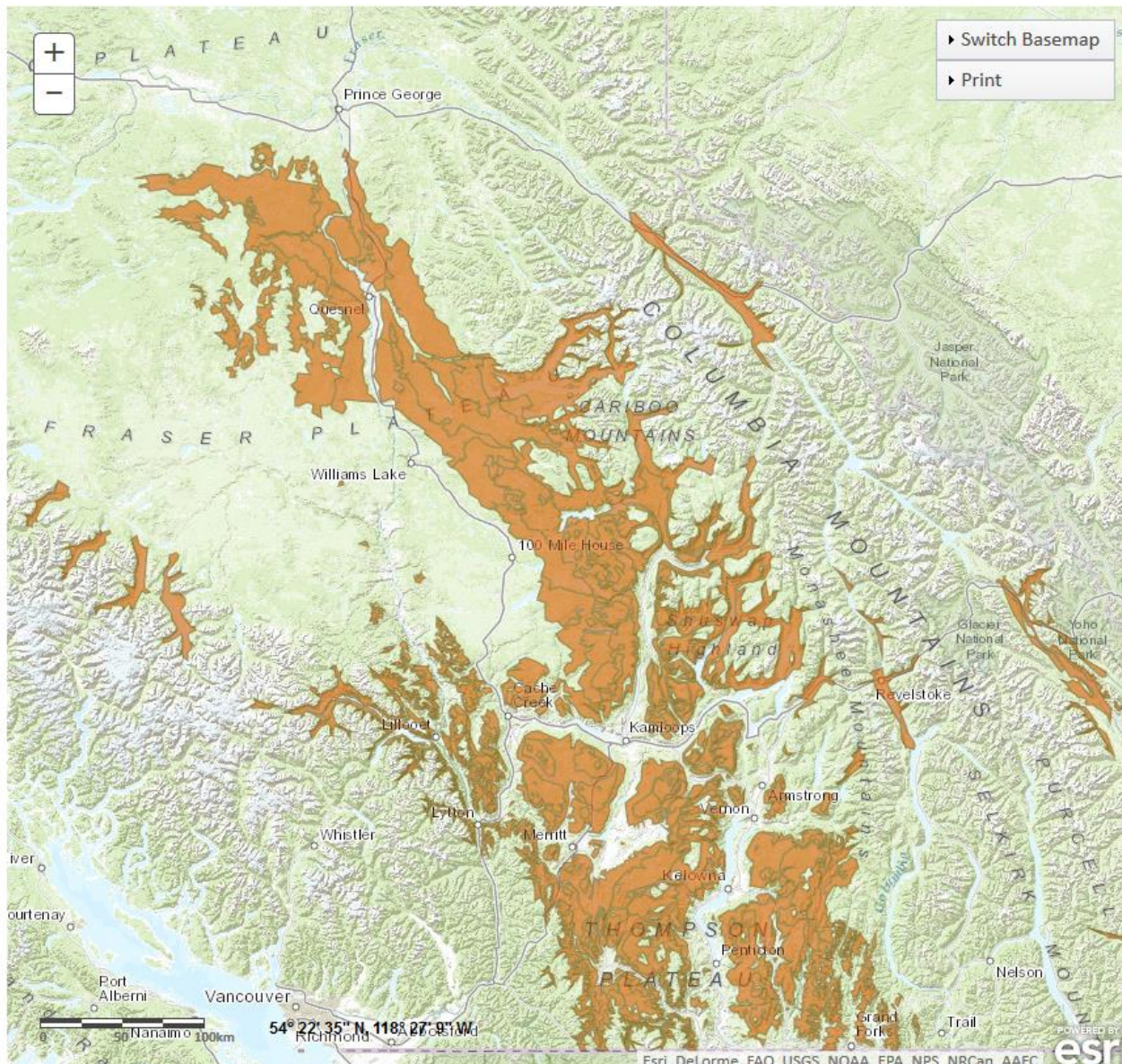
BEC Variant:

Assisted Migration Scenario:

Minimum Suitability:

Plantation BEC	Seed BEC	Suitability
IDFdc	IDFdc	100.0
IDFdc	MSdm3	99.8
IDFdc	ICHmk2	99.7
IDFdc	MSdm1	99.7
IDFdc	ICHmk1	99.4
IDFdc	MSdm2	99.3
IDFdc	MSsk1	99.2
IDFdc	IDFdk2	99.2
IDFdc	ICHdk	99.1
IDFdc	ICHmk3	98.7

Seedlot	Orchard	GW	Class	Seed BEC	Suitability	Genetic Suitability
61194	226	27	A	ICHdk	99.0	1
63410	226	26	A	ICHdk	99.0	1
63199	226	26	A	ICHdk	99.0	1
63013	226	26	A	ICHdk	99.0	1
63348	226	27	A	ICHdk	99.0	1
63309	226	28	A	ICHdk	99.0	1
63058	226	29	A	ICHdk	99.0	1
30885			B	ICHmk1	99.0	1





Tree Improvement Branch: Seedlot Selection Tool

Instructions | I Have A Cutblock | I Have A Seedlot

Species:

FD

BEC Variant:

IDFdc

Assisted Migration Scenario:

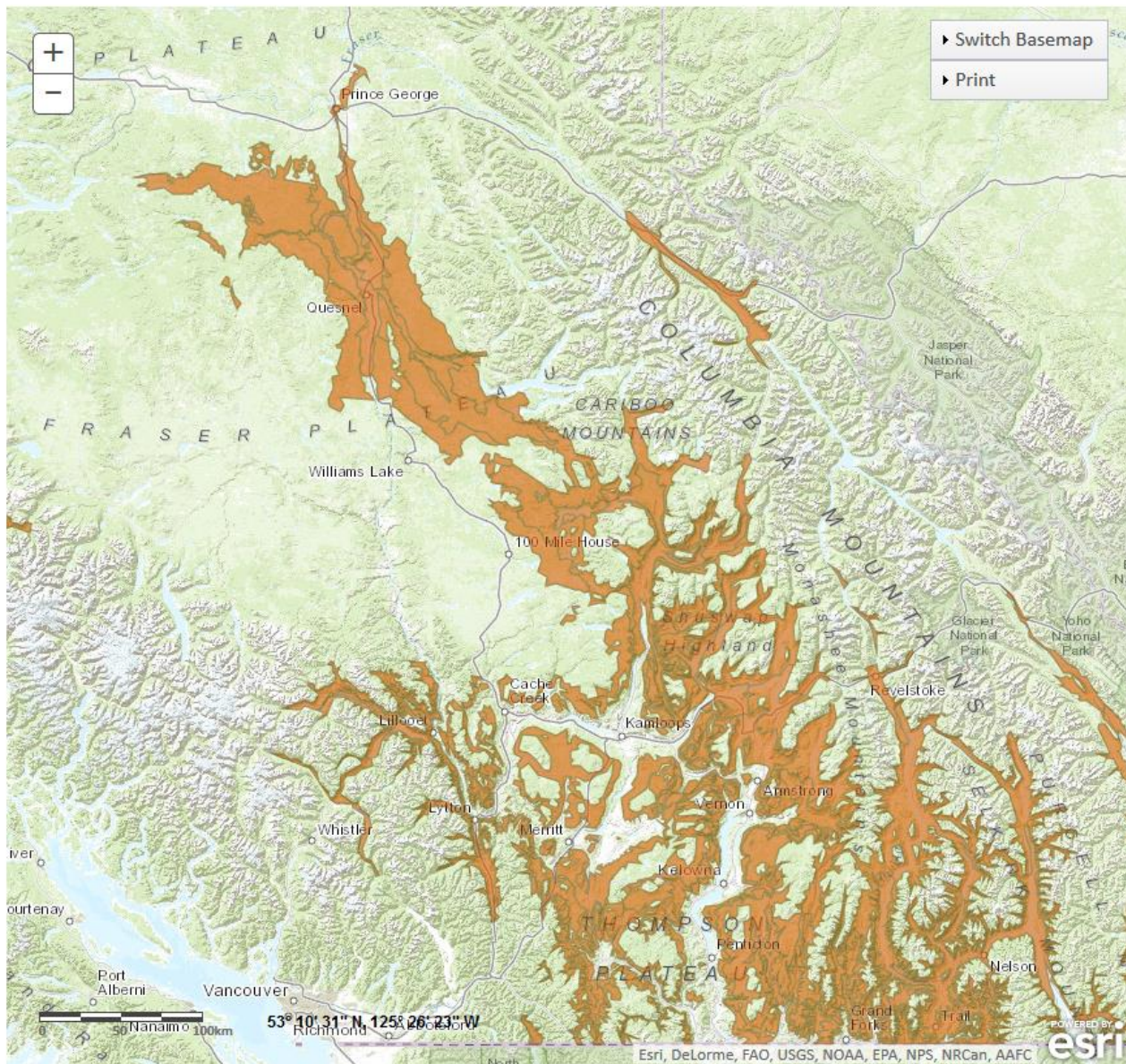
Assisted Migration

Minimum Suitability: 97.0

GO

Plantation BEC	Seed BEC	Suitability
IDFdc	IDFdk2	99.6
IDFdc	ICHdw3	99.4
IDFdc	ICHmk1	99.4
IDFdc	ICHdw2	99.2
IDFdc	ICHmk2	99.1
IDFdc	IDFww1	99.0
IDFdc	IDFdc	98.9
IDFdc	MSdm1	98.9
IDFdc	SBSdw1	98.6
IDFdc	ICHdk	98.5

Seedlot	Orchard	GW Class	Seed BEC	Suitability	Genetic Suitability
53201		B	ICHdw2	96.0	4
48429		B	ICHdw3	98.0	2
30671		B	ICHdw3	98.0	2
30697		B	ICHdw3	98.0	2
47995		B	ICHdw3	98.0	2
48430		B	ICHdw3	98.0	2
30885		B	ICHmk1	99.0	1
30886		B	ICHmk1	99.0	1



[HOME](#) > [CLIMATE CHANGE](#)

- [Climate Change](#)
- [Wildland Fires](#)
- [Forest Pests](#)
- [Innovation](#)
- [Forest In Mind Program](#)

Climate Change

As Canada's forest sector continues to evolve it is subject to the effects of many global forces. A changing climate is one factor that will provide opportunities for and present major threats to Canada's forests, their economic benefits, and the livelihoods of those who depend on them. Adapting to a changing climate is therefore essential for Canada's forest sector to remain resilient and vibrant and for our forest industries to remain competitive in the global marketplace.

In 2008, Canada's premiers, via the Council of the Federation, asked the Canadian Council of Forest Ministers (CCFM) to collaborate on adaptation in forestry. This work was undertaken by the CCFM's Climate Change Task Force (CCTF), which initiated a two-phase program to respond to the request by the premiers. In October 2014, the CCFM agreed to reconvene the CCTF to commence a third phase of work addressing key climate change adaptation issues identified by the task force at the completion of phase 2.

Phase 1, culminated in 2010 with the publication of two reports:

- [Vulnerability of Canada's Tree Species to Climate Change and Management Options for Adaptation](#)
- [A Framework for Forest Management Offset Protocols](#)

Phase 2, completed March 2015, addressed adaptation at the forest ecosystem and forest sector levels, responding directly to a key CCFM objective that "consideration of climate change and future climatic variability is needed in all aspects of sustainable forest management" (as described in *A Vision for Canada's Forests: 2008 and Beyond*). The primary goal was to provide members of the forest sector with state-of-the-art tools and new knowledge that will allow them to assess the vulnerabilities, risks, and opportunities associated with climate change. The CCFM vulnerability assessment tools and techniques are described in a series of nine inter-related reports, specifically designed for forest management decision-makers. A summary report of the CCFM Climate Change Adaptation Series is also available:

- [Climate change adaptation and sustainable forest management: preparing for the future](#) [Summary report](#)
- [Adapting sustainable forest management to climate change: preparing for the future](#) [\(Abstract\)](#) [\(Full Report\)](#)
- [Adapting sustainable forest management to climate change: a systematic approach for exploring organizational readiness](#) [\(Abstract\)](#) [\(Full Report\)](#)
- [Adapting sustainable forest management to climate change: a framework for assessing vulnerability and mainstreaming adaptation into decision making](#) [\(Abstract\)](#) [\(Full Report\)](#)
- [Adapting sustainable forest management to climate change: scenarios for vulnerability assessment](#) [\(Abstract\)](#) [\(Full Report\)](#)
- [Adapting sustainable forest management to climate change: an overview of approaches for assessing human adaptive capacity](#) [\(Abstract\)](#) [\(Full Report\)](#)
- [Adapting sustainable forest management to climate change: an analysis of Canadian case studies](#) [\(Abstract\)](#) [\(Full Report\)](#)
- [Adapting sustainable forest management to climate change: criteria and indicators in a changing climate](#) [\(Abstract\)](#) [\(Full Report\)](#)
- [Adapting sustainable forest management to climate change: a review of assisted tree migration and its potential role in adapting sustainable forest management to climate change](#) [\(Abstract\)](#) [\(Full Report\)](#)
- [Climate change and sustainable forest management in Canada: a guidebook for](#)

For more Information

[http://www.ccfm.org/english/cor
eproducts-cc.asp](http://www.ccfm.org/english/cor
eproducts-cc.asp)



Spanish/Español

Canadá publicaciones de manejo forestal en lengua española

Ordenación forestal sostenible

Un líder en la gestión forestal sostenible

[Políticas Canadienses forestales de gestión sostenible](#)

[La medición de nuestro progreso: Puesta en práctica del manejo forestal sostenible por todo Canadá y más allá](#)

Abrazando la certificación de terceros

[Método para la certificación forestal sostenible](#)

Productos forestales

Edificio verde

[Edificio verde y los beneficios de la madera](#)

Bioenergía

[Bioenergía de los bosques canadienses](#)

Productos forestales legales

[Monitoreo y cumplimiento de la normativa forestal en Canadá](#)

Para más
información

www.SFMCCanada.org

<http://www.sfmcanada.org/en/publications/spanish-espanol>

Canadian Forest Products

Sustainable by nature,
today and tomorrow

We think about the
forests behind our
forest products so
you don't have to.



Photographs courtesy of:

- Natural Resources Canada
- Naturally:wood
- Forest Products Association of Canada