Adaptation aux changements climatiques dans le secteur forestier canadien

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Service canadien des forêts, Ressources naturelles Canada

Atelier AFORCE, Paris, 4 février 2014

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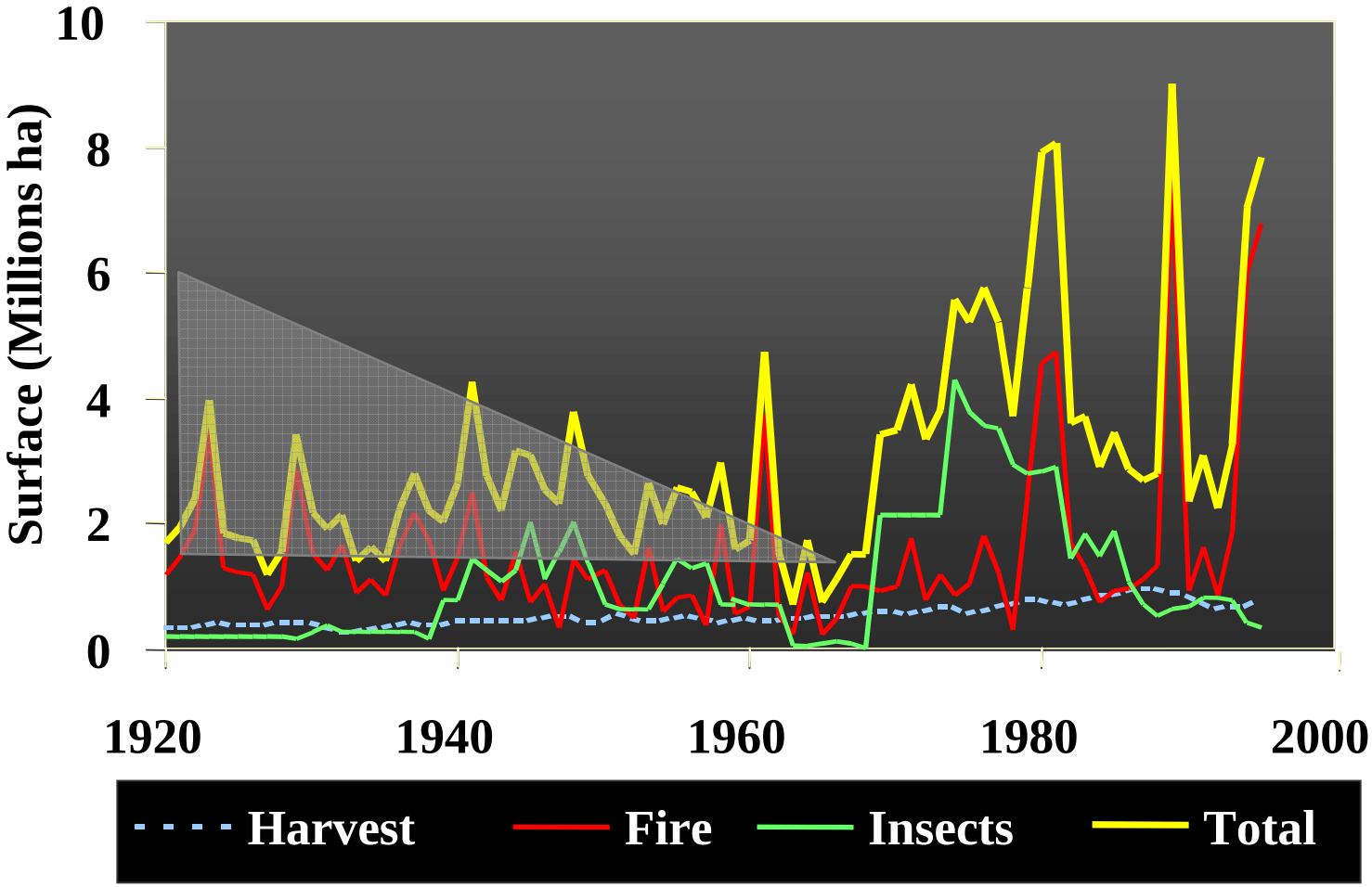
Outline

- Context
  - Canada's forest
  - Canada's forest sector
  - Impacts of climate change on our forest
- National adaptation initiatives
  - Pan-Canadian Climate Change Task Force (CCFM)
  - Forest Change (Canadian Forest Service)
- Conclusion - lessons learned

Canada’s forest is vast

and remote from populated areas

Our landscapes are shaped by large scale disturbances

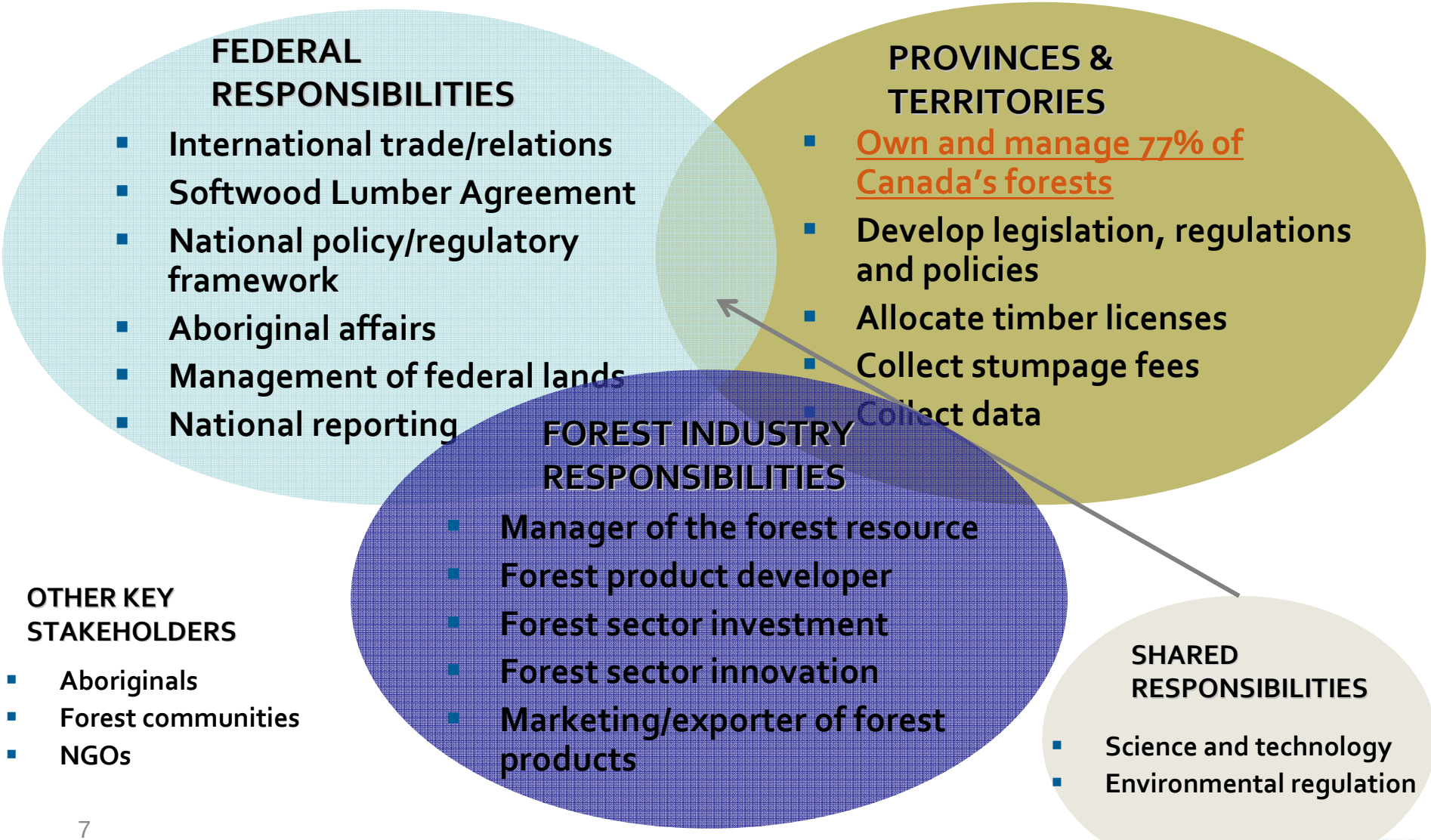


Source: Kurz et Apps, 1999 (modifié)

Tracking climate change impacts in Canada is challenging

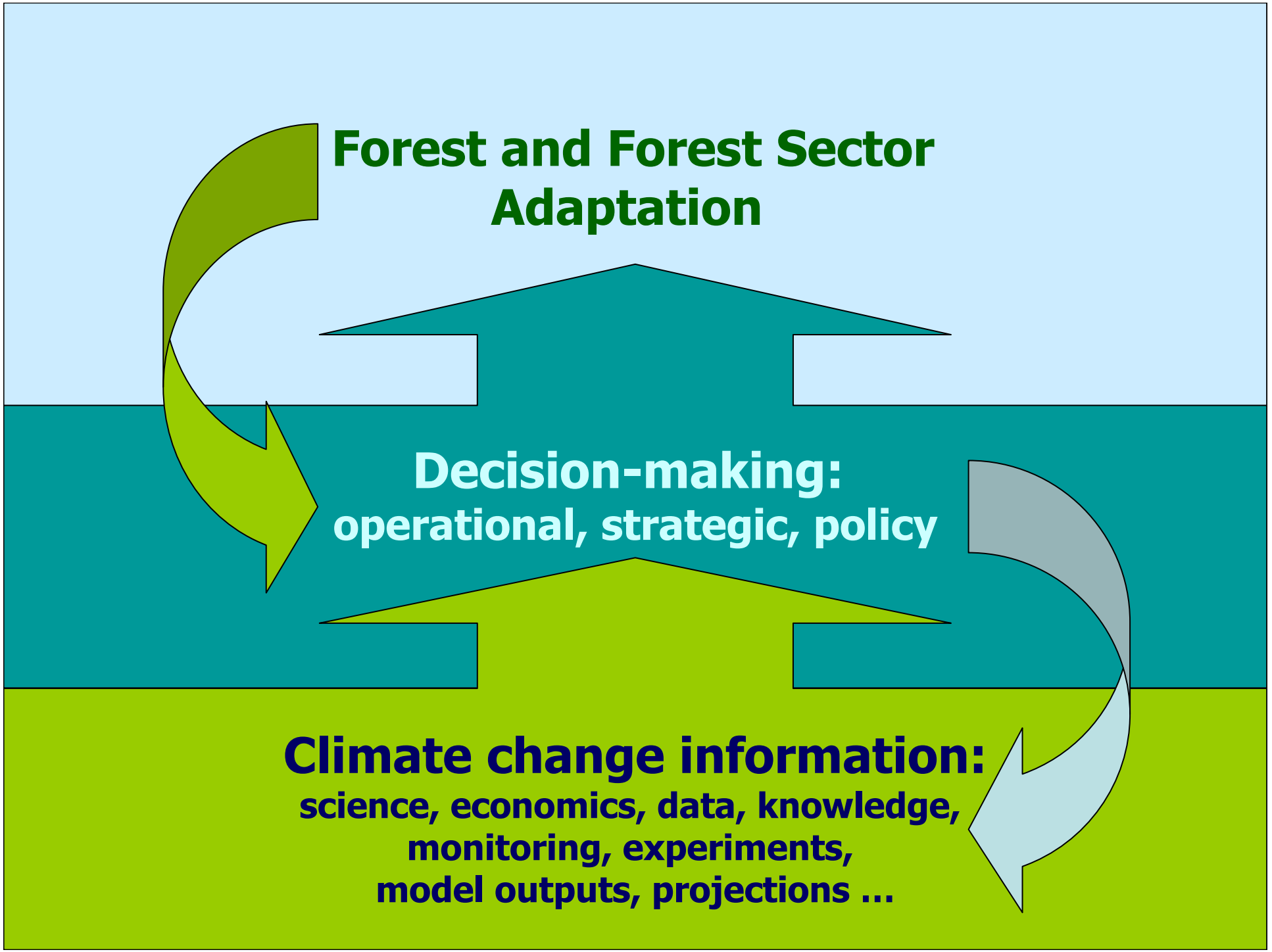
- Monitoring forest properties is instrumental to the diagnosis and attribution of the impacts of climate change
- In Canada, tracking climate change impacts is particularly challenging and resource consuming given the size, remoteness and nature of our forests

Forest governance in Canada

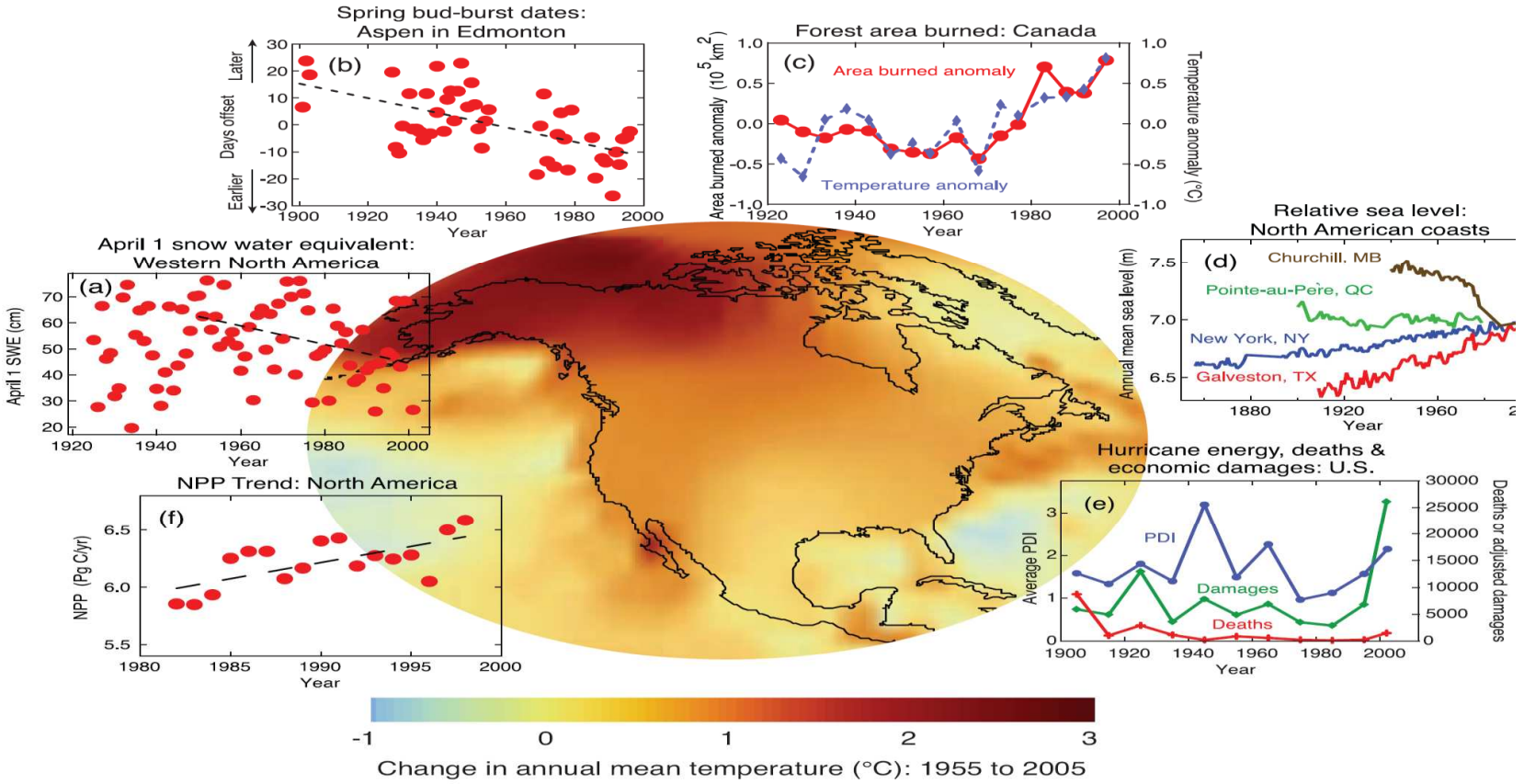


OTHER KEY STAKEHOLDERS

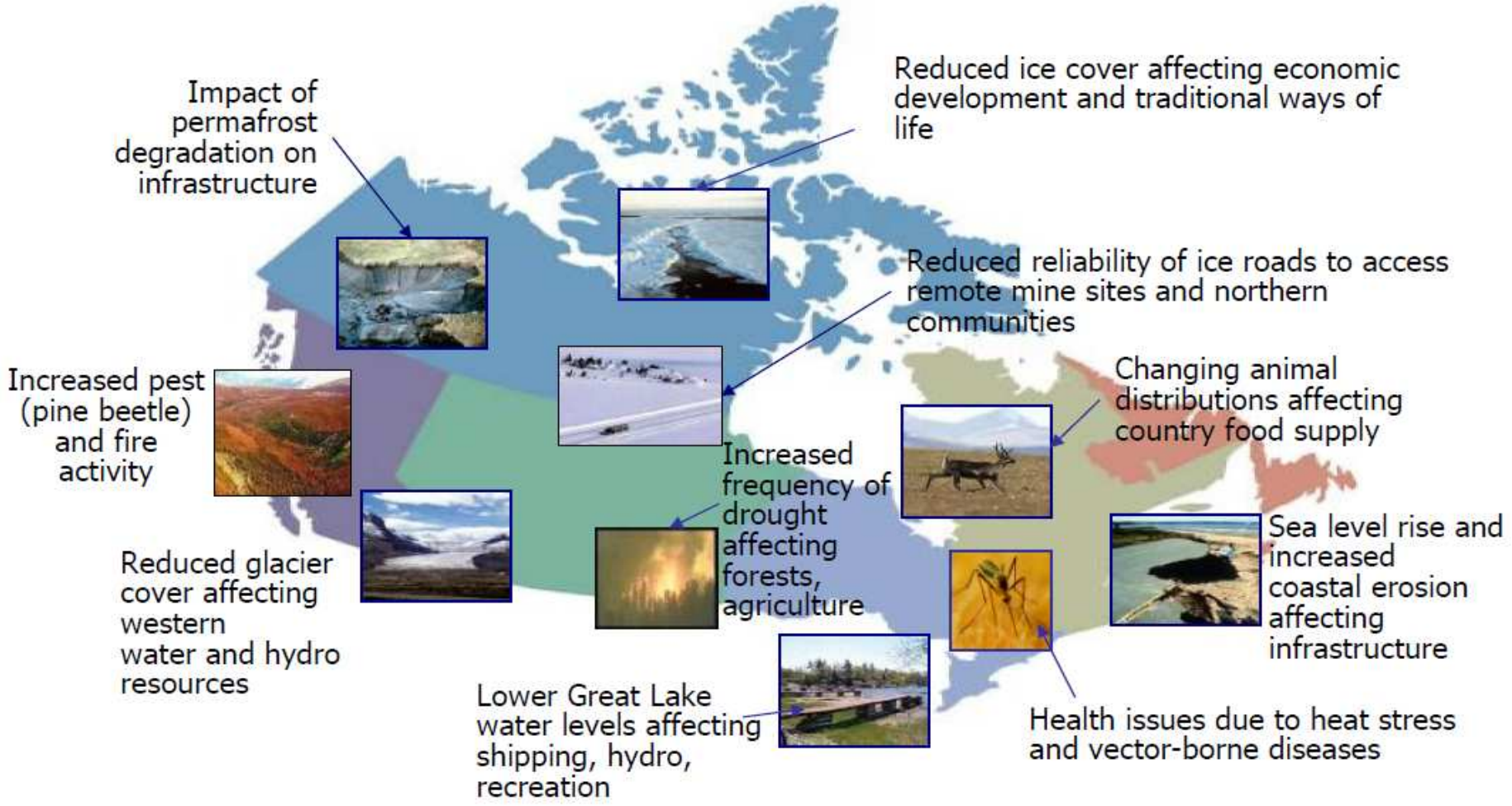
- Aboriginals
- Forest communities
- NGOs


Forest and Forest Sector Adaptation
Decision-making:
operational, strategic, policy
Climate change information:
science, economics, data, knowledge,
monitoring, experiments,
model outputs, projections ...

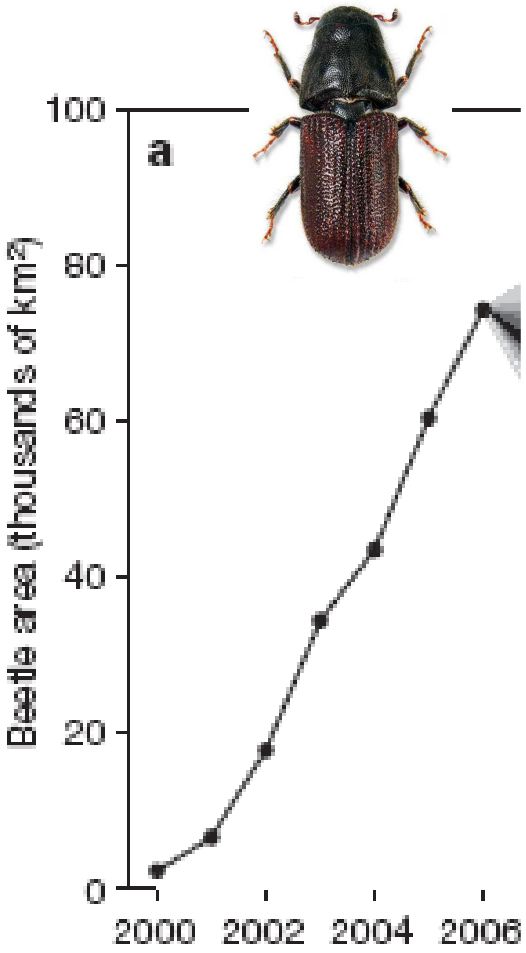
Canada’s climate is changing

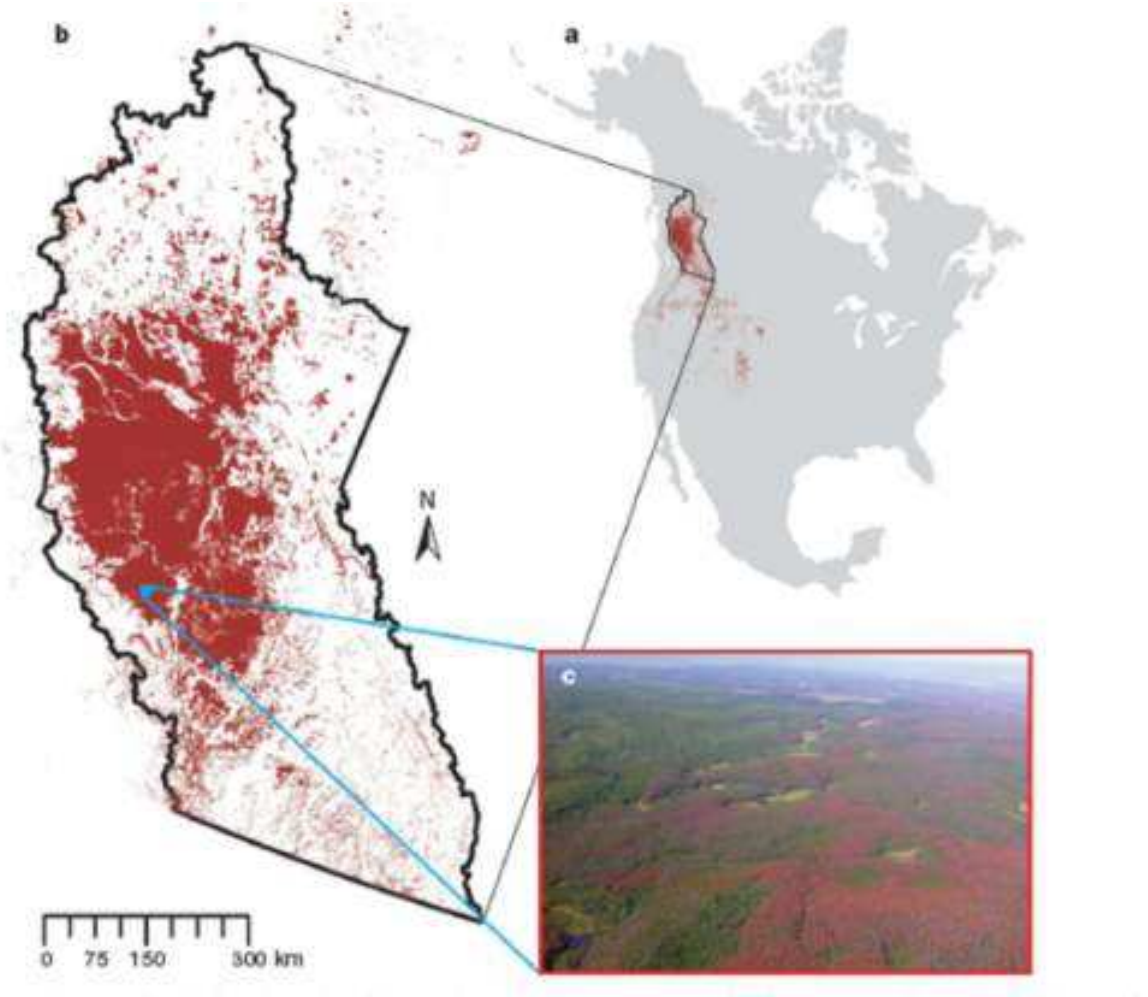


With a range of impacts on our forest



In the early 2000… the beetle hit





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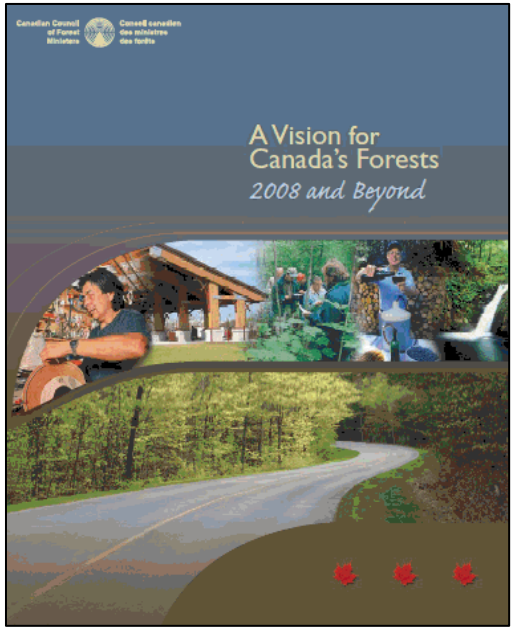
Kurz et al. 2008

… and raised awareness

Jan 2008 – Premiers ask their Forest Ministers to collaborate with the federal government on adaptation.

CCFM – *A Vision for Canada's Forests: 2008 and Beyond*

"Consideration of climate change and future climate variability is needed in all aspects of sustainable forest management."



The CCFM Climate Change Task Force (CCTF)

CCFM Climate Change Adaptation Series

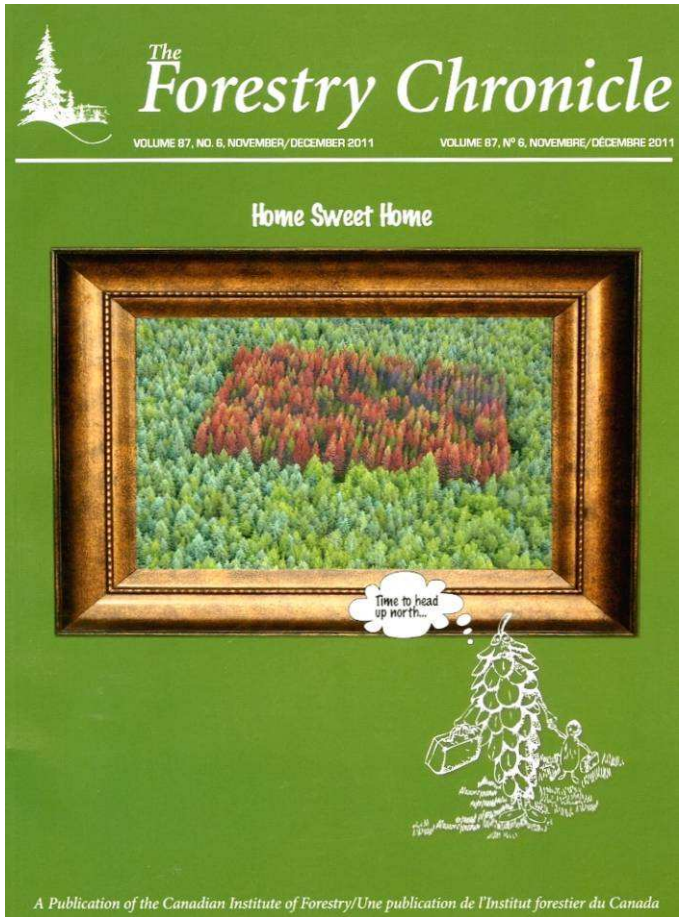
www.ccfm.org

A Guidebook

Table 5.2. Potential adaptation options for SFM objectives and assessment of importance to implement option.

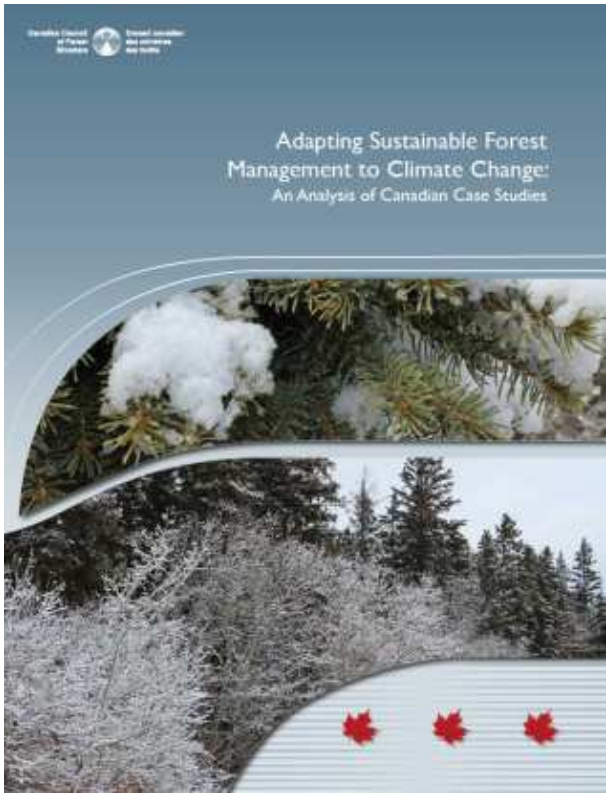
SFM Management Objective	SFM Impact/ vulnerability	Potential adaptation option	Strategic, Operational or Adaptive Capacity (S, O, or AC)	Reduce negative impact (R) or increase potential opportunity (O)	Importance of implementation to achieve management objective in study area				Important Option
					Current climate conditions	Scenario 1	Scenario 2	Scenario 3	

A synthesis on assisted migration



- Introduction;
- Ecological Implications and Constraints;
- Vulnerability assessment tools;
- The Debate - Socio-Ethical considerations;
- The Practice of Assisted Migration;

15 case studies across Canada



Johnston and Edwards (2013)

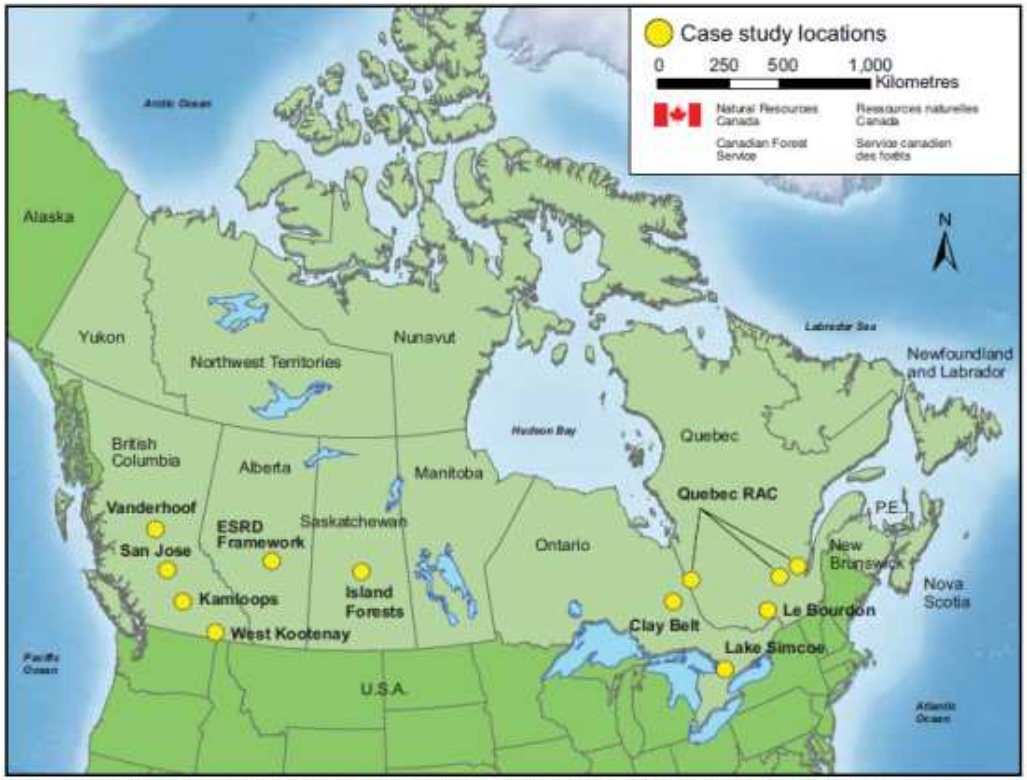


FIGURE 1. Locations of vulnerability assessment case studies included in the CCFM climate change adaptation initiative. ESRD – Environment and Sustainable Resource Development (Alberta); RAC – Regional Adaptation Collaborative (Natural Resources Canada).

From science to action – Forest Change

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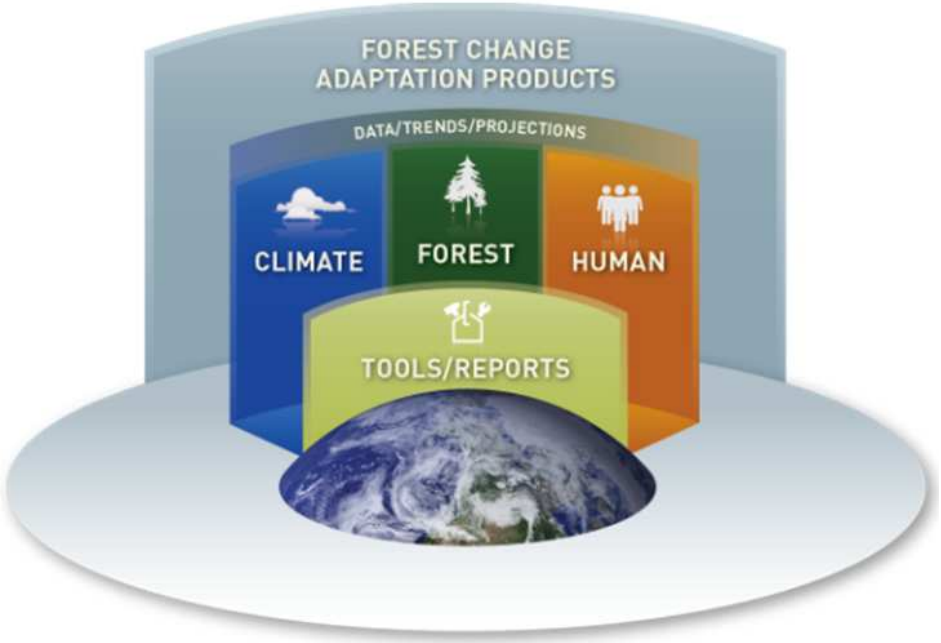
A one-stop portal for adaptation

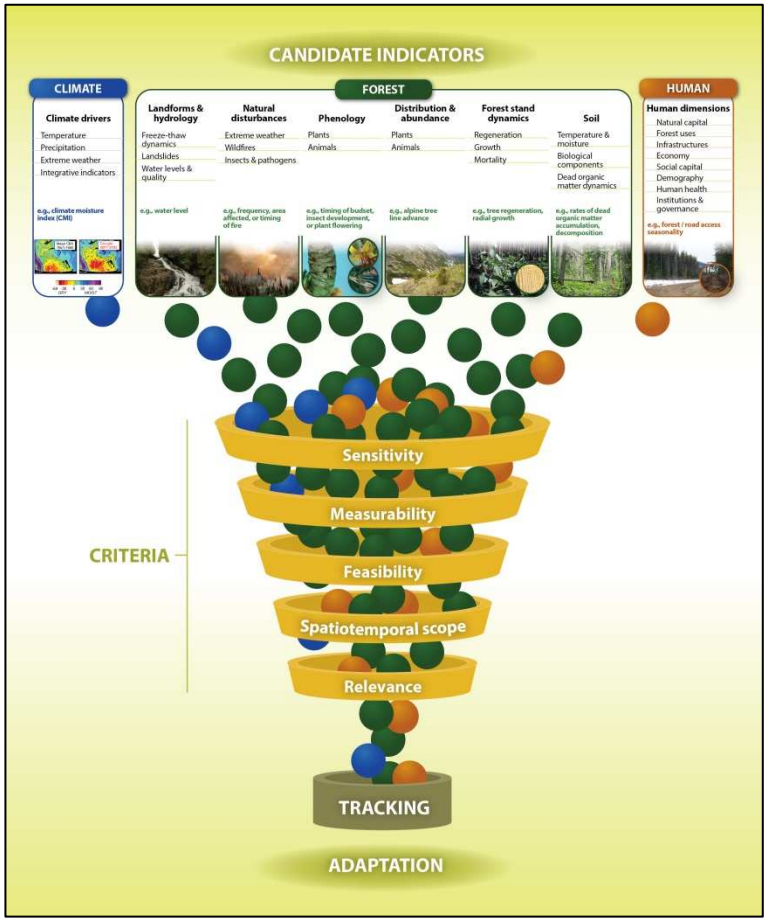
1. **A tracking system** that reports on indicators of climate change impacts to identify forest sector vulnerabilities
2. **An adaptation toolkit** of actionable science for sustainable forest management under a changing climate
3. **Integrated assessment** of climate change implications for the forest sector to guide policies and investment



Forest Change indicators

CFS information report

- An extensive list of indicators of the effects of climate change on the forest and forest sector
- A framework with criteria and considerations for prioritization of indicators for monitoring and reporting
- A scan of existing initiatives



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Contact: Sylvie Gauthier (LFC)

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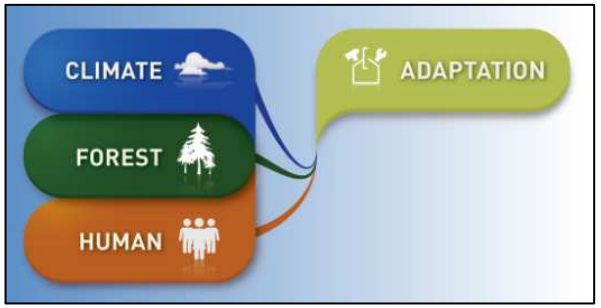
Forest Change Indicators



MATURE

- Drought (CMI, SMI)
- Fire weather (start of Fire Season)
- Vegetation changes (distribution of major tree species)
- Fire regime (area burned)

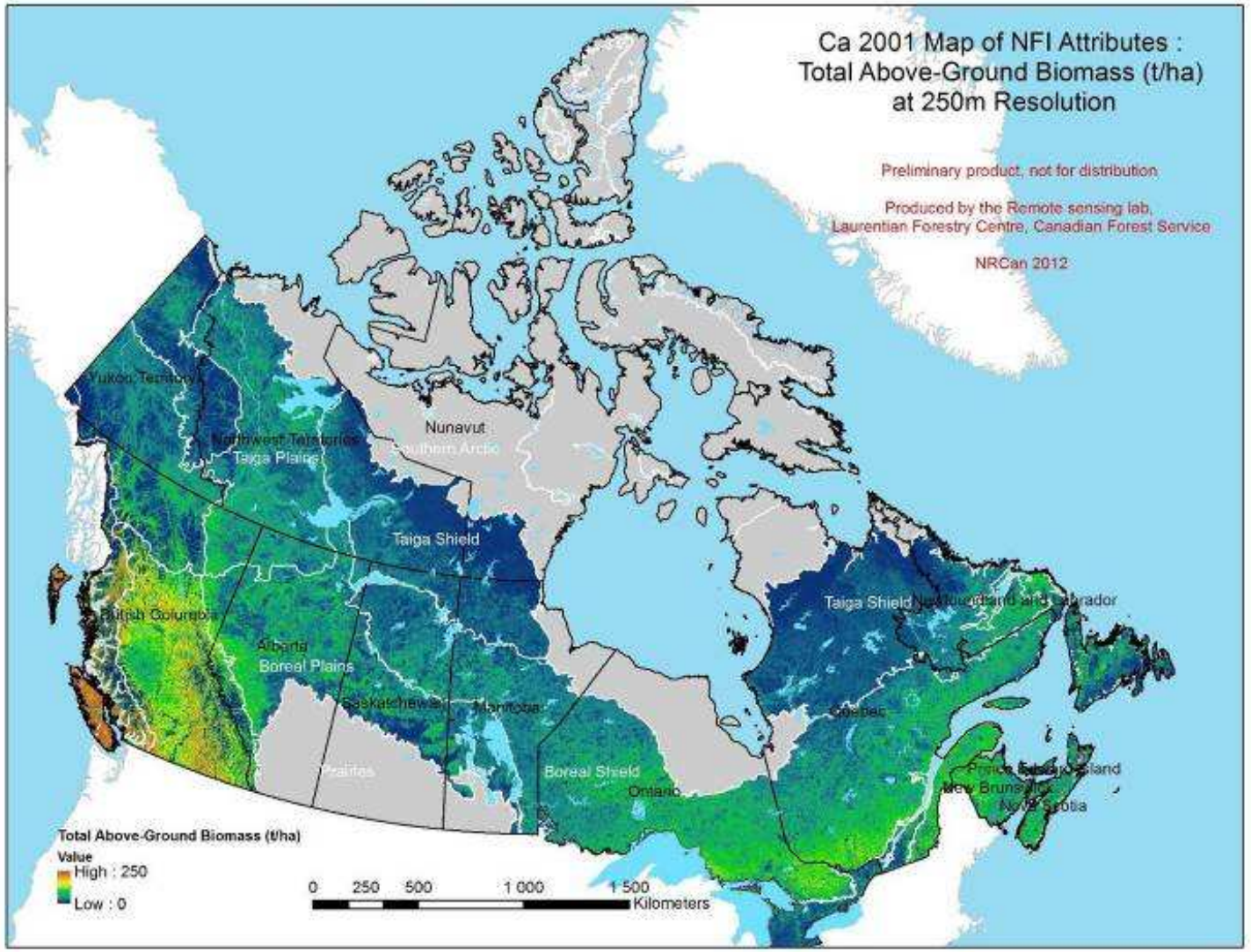
SECOND WAVE

- Pest incidence (major pest species distribution)
- Phenology (timing of budburst)
- Tree mortality

NEEDING MORE WORK

- Extreme weather consequences
- Forest growth and productivity (radial growth)
- Tree regeneration (percent of young forest following any disturbance)
- Biodiversity (bird community changes)
- Socio-economic indicators

Mapping Forest Attributes



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Contacts: André Beaudoin, Pierre Bernier (LFC)
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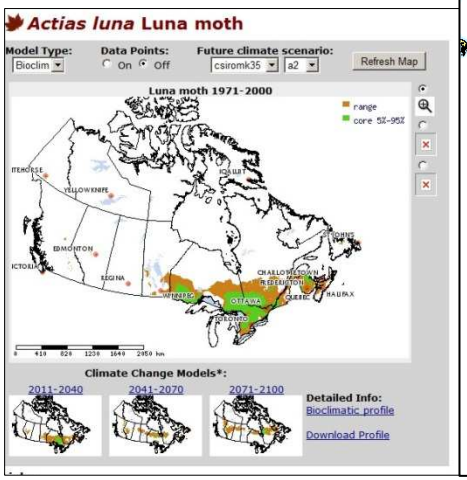
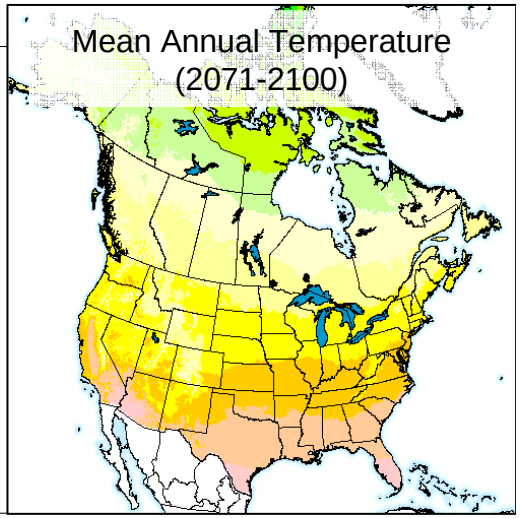
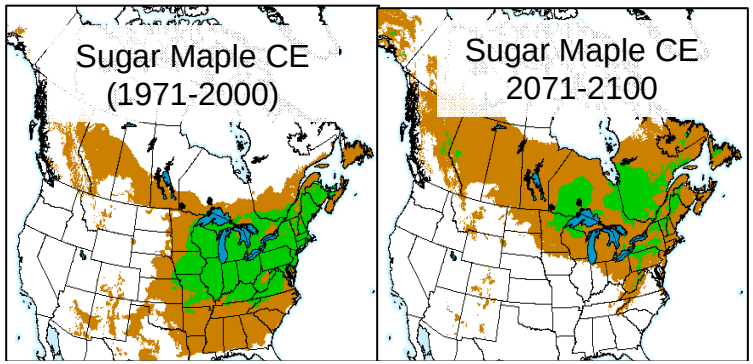
A toolkit to adapt forest management to climate change

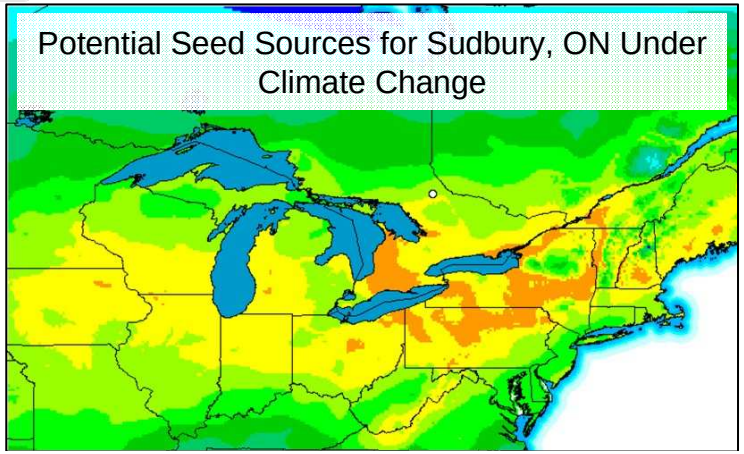
	Acer saccharum	*Carya glabra*	*Fraxinus americana*	*Picea mariana*	*Pinus banksiana*	*Pinus ponderosa*	*Populus tremuloides*	*Quercus rubra*
Leaf Area : Sapwood ratio	1.22	?	?	?	0.11	0.15	0.19	0.8
Leaf hair or wax	n	y	n	y	y	y	n	n
Relative rooting depth	deep	deep	med	shallow	med	deep	shallow	deep
Resistance								
Xylem recovery capacity	y	y	y	n	n	n	y	y
Stomatal density	260	?	190	?	?	?	160	440
Specific leaf area	23	?	?	?	6.5	?	17.6	15.2
Xylem resistance to cavitation	- 3.8	- 2.1	- 1.9	?	?	-2.6	?	- 1.6
Resilience								
Vegetative reproduction	med	med	med	med	none	none	high	med
Seed resistance to dessication	14 400	440	2 200	890 000	290 000	26 500	7 200 000	280
Presence of a seed bank	n	n	semi	n	aerial	?	n	n

Legend : Sensitive Tolerance ? Not documented









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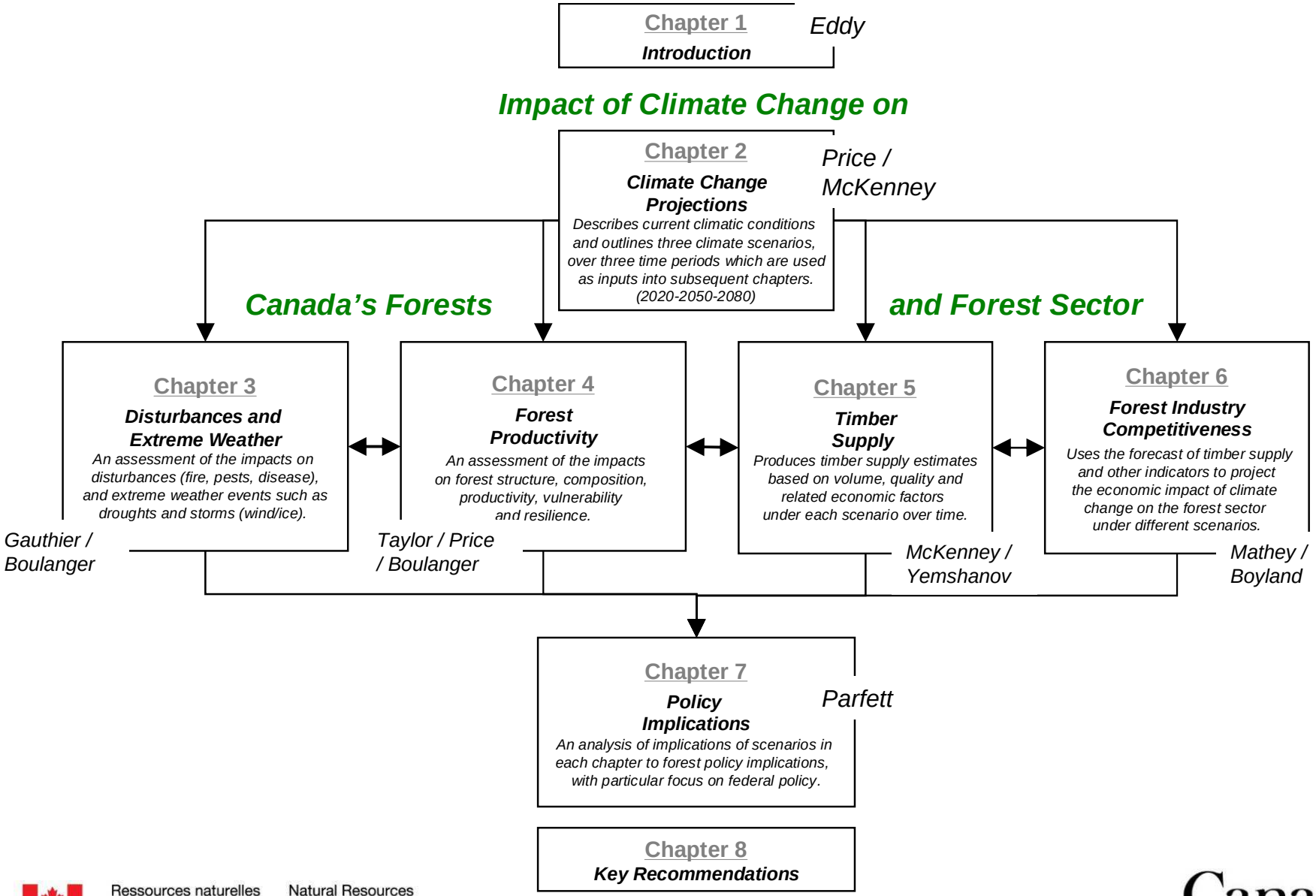
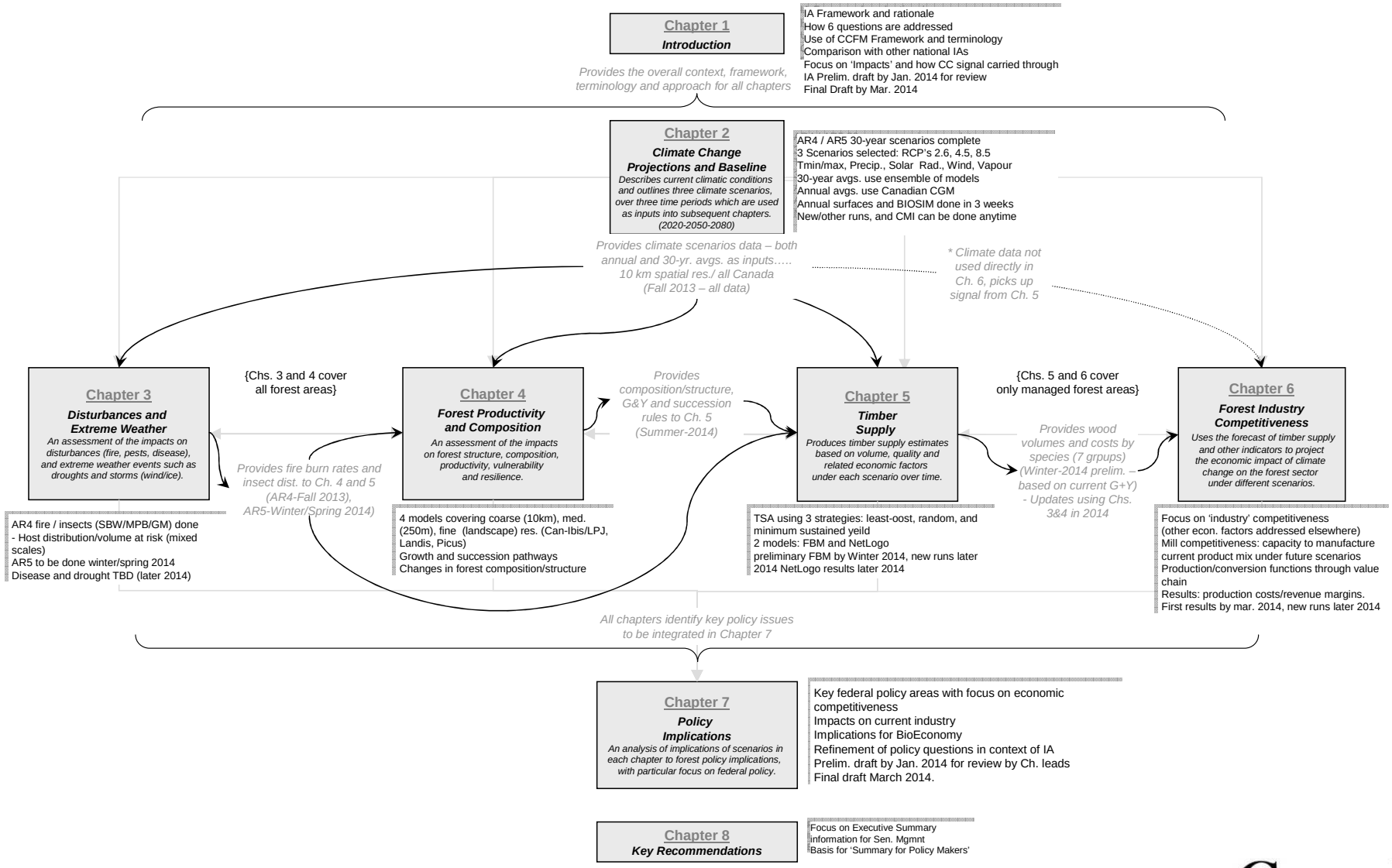
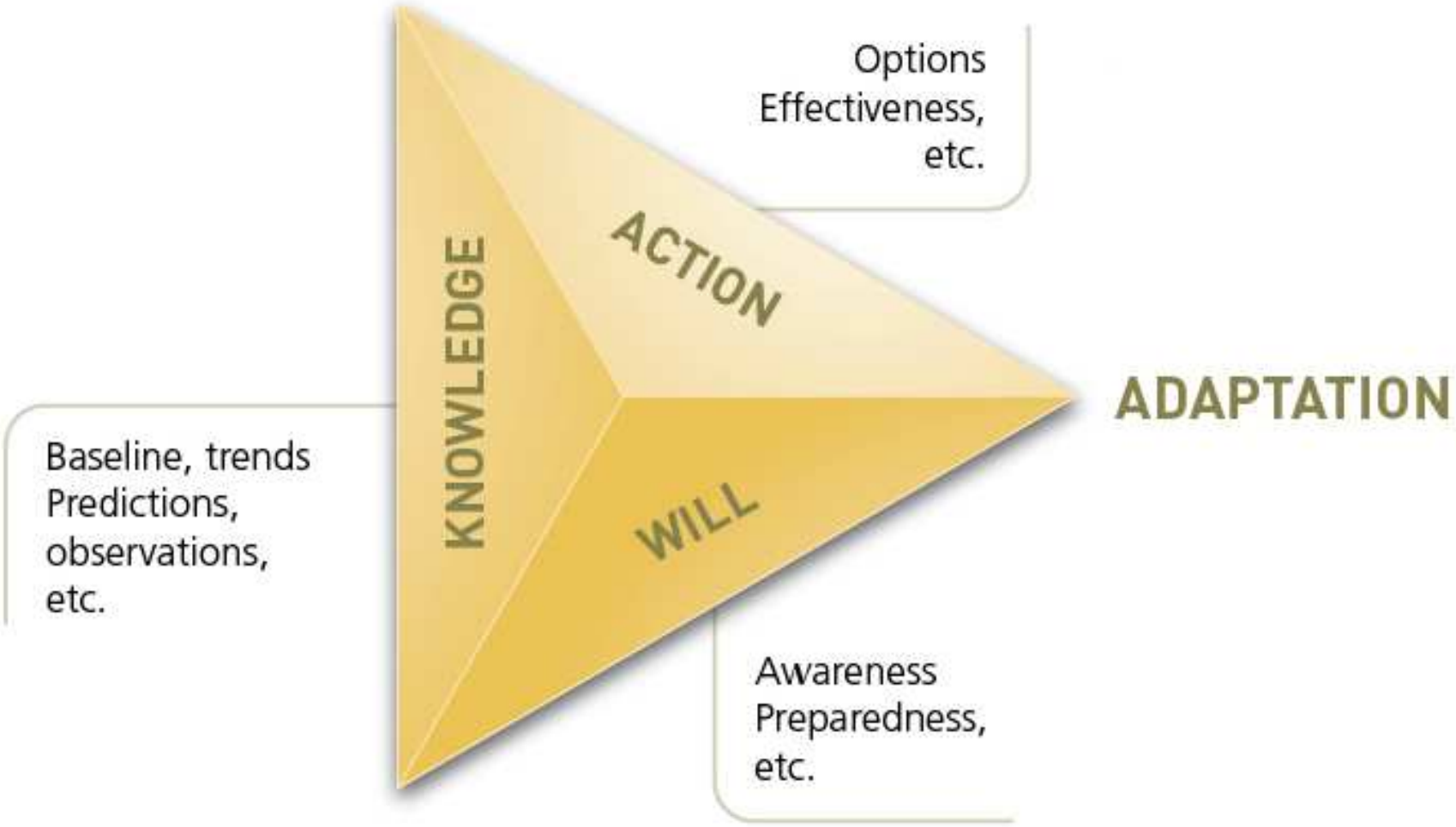
Forest Change Integrated Assessment



A complex challenge



Moving forward on adaptation



Adaptation requires « knowledge »

- Monitoring data and science is required for diagnosis, attribution and projection of climate change impacts
  - Raising awaress and the will to intervene
  - Inform adaptation action
- Focus on information that is relevant for decision-making
- Build on existing capacity and optimize the use of new technologies (e.g. remote sensing)
- Information has to be available and accessible, but also actionable.
  - Importance of **knowledge exchange –** Involvement of end-user from the onset and throughout the development of knowledge products

Adaptation requires the « will »

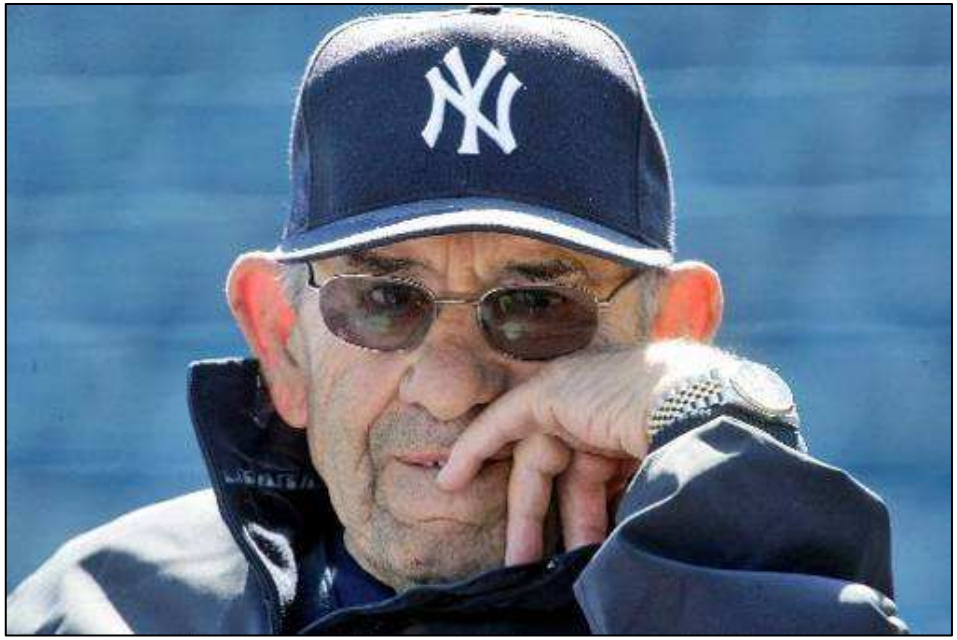
- Adaptation requires support from leaders – champions
- Raise awareness by producing different knowledge products (synthesis of information, video capsules, apps)
- Integration of knowledge across disciplines to translate biophysical information into socio-economic terms that resonate with policy makers
- Sharing a common language

Scientific Words	Non-scientific Meaning	Better Words
Enhance	Improve	Intensify, increase
Uncertainty	Not knowing	Range
Risk	Low-probability event	Probability
Error	Wrong, incorrect	Uncertainty associated with a measuring device or model
Bias	Unfair and deliberate distortion	Offset from the observed value
Positive trend	A good trend	Upward trend
Positive feedback	Constructive criticism	Self-reinforcing cycle, vicious circle
Theory	A hunch, opinion, conjecture, speculation	Physical understanding of how this works

Adaptation requires « action »

- Flexibility for innovative management approaches
- Mainstreaming – adaptation should be incorporated into the existing decision making processes rather that a parallel process
- Uncertainty can be a barrier to adaptation.
  - Solutions;
    - Risk management included in planning processes
    - Robust and diversified adaptation actions
    - Adaptive management framework → iterative process of monitoring, assessing and adjusting
    - Use of scenario approach

Merci! Thank you!



"The future ain't what it used to be"

-Yogi Berra