

# The development of silvicultural systems in Canada

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## Canada, Sweden: Our Message

- Sustainable forest management aims to provide life-supporting ecosystem services such as biodiversity, water and carbon storage, while at the same time meeting growing world demands for wood products.
- Canada's old-growth boreal forests and Sweden's silviculture and management history together provide fertile collaborative grounds for helping achieve this goal.
- This talk provides a brief history of governance and silviculture in the forests of Canada.

# Canada, British Columbia: Our Story

- Brief history of forest management
- Tenure pattern and ownership
- Trends in stakeholder involvement
- Set asides
- Trends in silviculture
  - Harvesting
  - Regeneration
  - Management of young stands
  - Biotic and abiotic factors



# The Canadian Coastal Forest





## The Boreal Forest (one-third of the world's forest)



West:

*Pinus banksiana*, *P. contorta*

*Picea glauca*, *P. mariana*

*Larix laricina*

*Abies balsamea*

*Populus tremuloides*, *P. balsamifera*

*Betula papyrifera*

East:

*Pinus sylvestris*

*Picea abies*

*Betula pubescens*, *B. pendula*

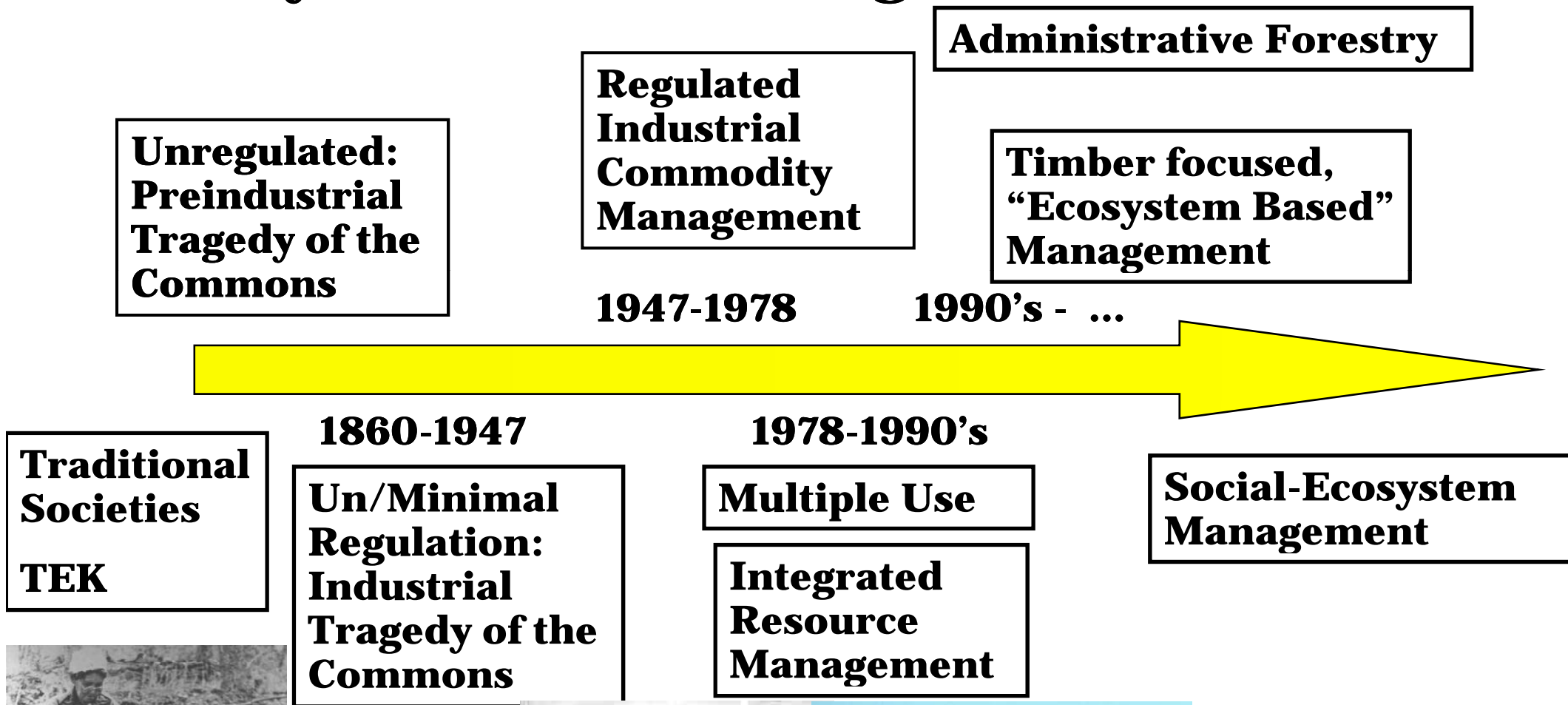


# Canada, British Columbia: Our Story

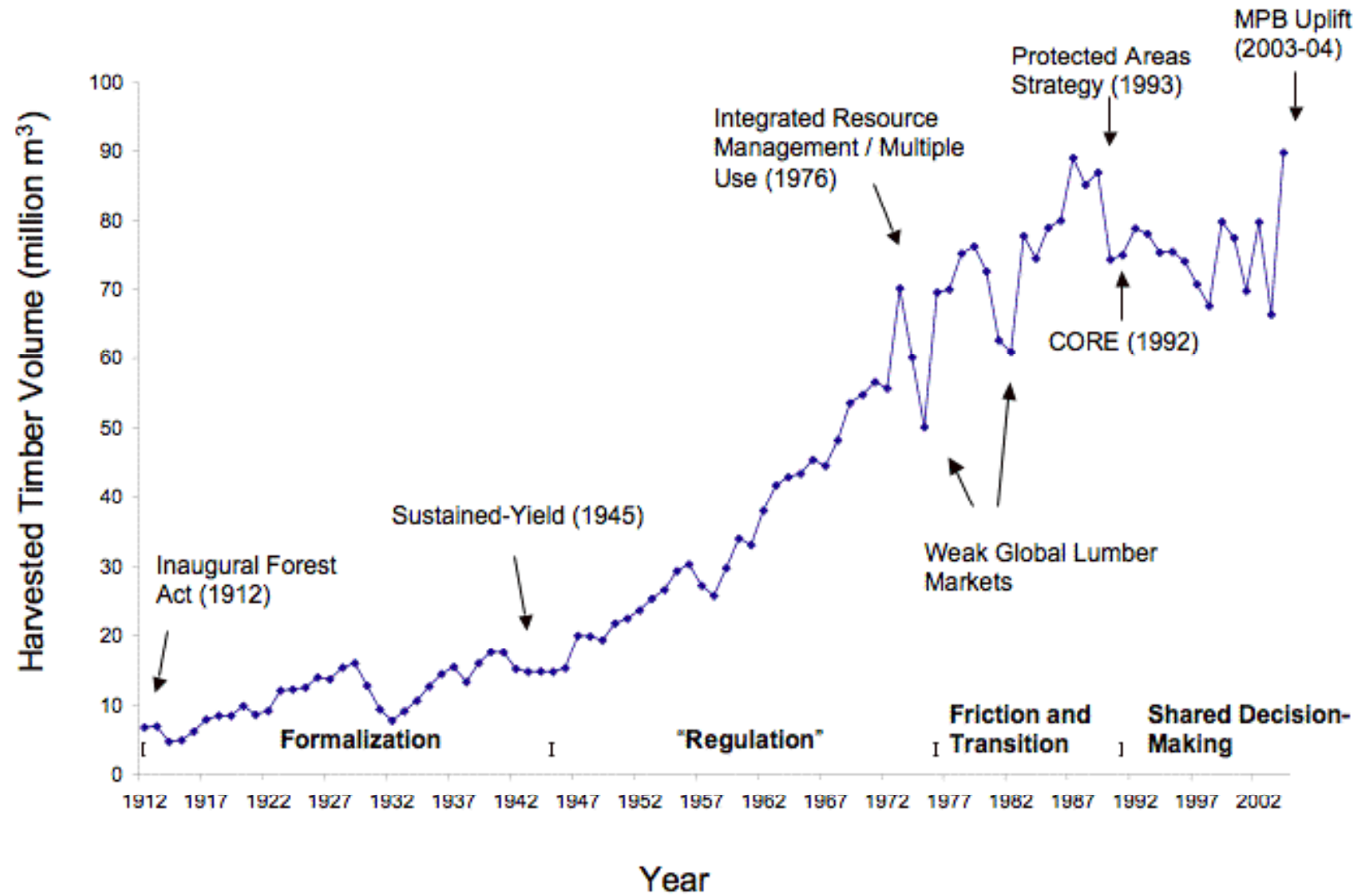
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# History of Forest Management in Canada



# History of harvesting in British Columbia







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- The Canadian Boreal Agreement



# Who owns, who manages?

- 93 percent public (Crown) land
- More private land in Eastern Canada
- Crown land governed and managed by Provinces/Territories
- Tenures to transfer Crown timber rights
- Aboriginal land claims

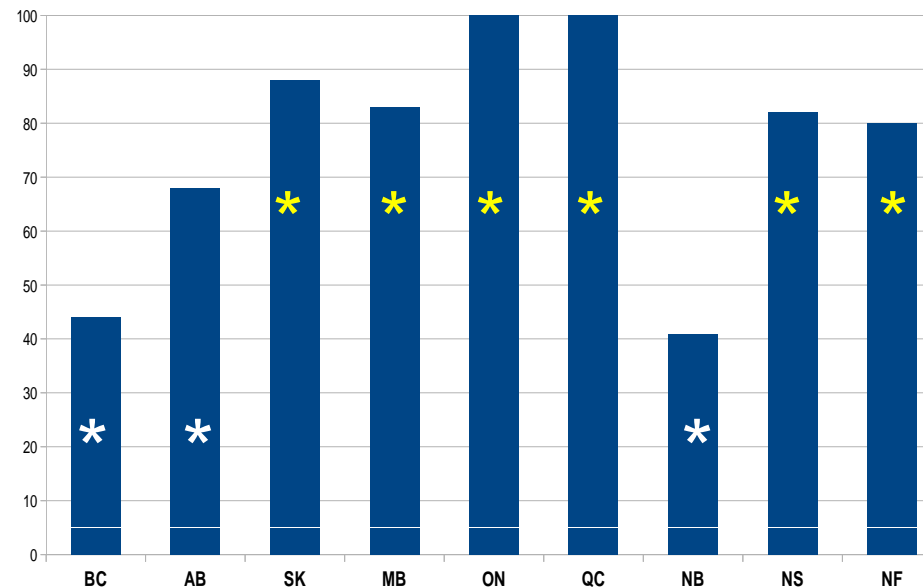




# Who owns, who manages?

- Most tenures in Canada (80%) granted to large forest companies as either area- or volume-based
- Small tenures are a mix of community forests, woodlots, First Nations & small business programs
- Of large tenures
  - >80% area-based Central Canada & Maritimes
  - 40-70% area-based in BC, AB, NB
- AAC set by Chief Forester without interference

Area-based tenures as a percent of provincial AAC

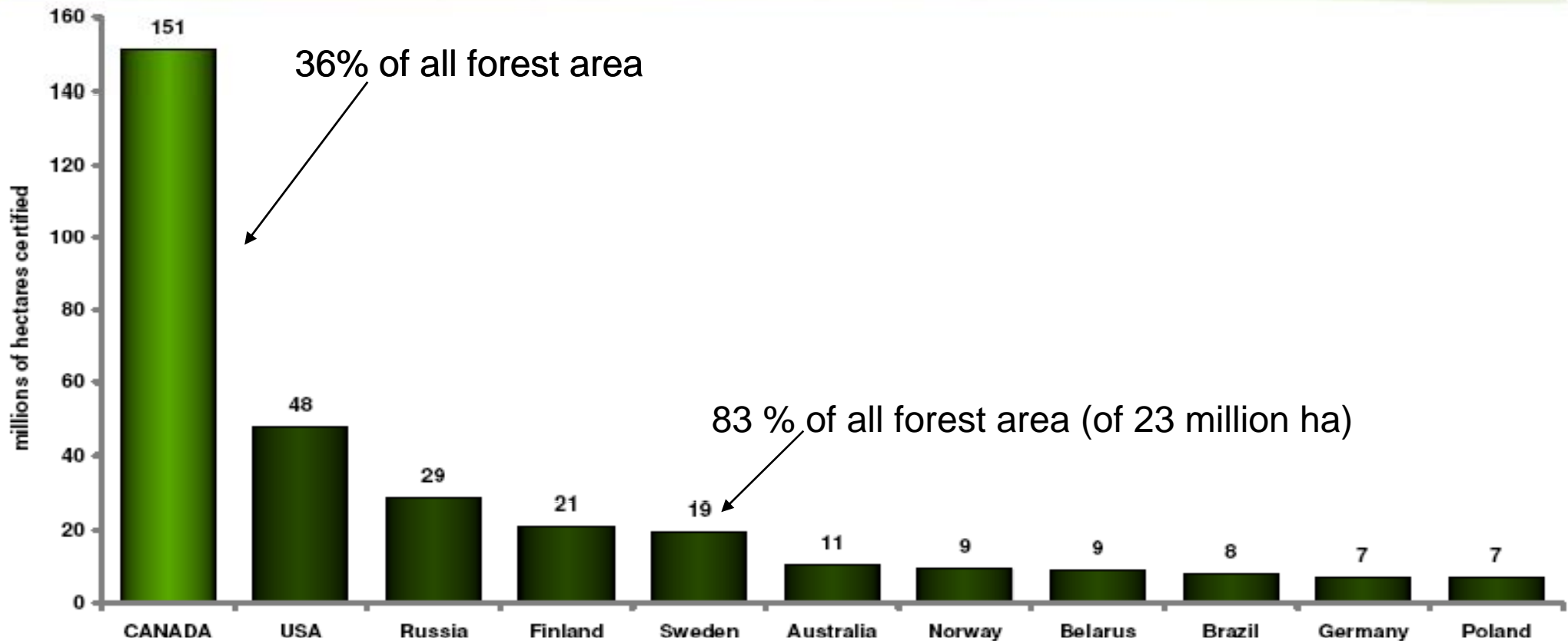




# Forest Certification Statistics

## Canadian Certification in the Global Context

2011 Mid-Year



Sources: [www.certificationcanada.org](http://www.certificationcanada.org) as of June 30/11  
[www.fsc.org](http://www.fsc.org) as of June 15/11  
[www.pefc.org](http://www.pefc.org) as of June 30/11



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# Stakeholder involvement in British Columbia

- Historically few stakeholders involved. Timber rules.
- Registered Professional Foresters practice “forestry” as defined in foresters acts in most provinces.
- Professional reliance centre-piece of Forest & Range Practices Act to foster ‘innovation’ in forest practices
- Provincial standards for Forest Stewardship Plans are considered rigorous and comprehensive
- However, public satisfaction with forest management in BC is declining.*





## Auditor General's Report 2012

- Lack of strategic and measureable goals
- Insufficient public consultation
- Outdated inventory
- Greater than 2million hectars NSR
- Overplanting lodgepole pine
- Reduced biodiversity in plantations
- Insufficient monitoring
- Insufficient compliance and inforcement
- Lack of research



# Case Study: Great Bear Rainforest



Photo: Tofino Photography



Kennedy Lake, Clayoquot Sound



Mearns protest moved to Victoria  
Nuu-chah-nulth Tribal Council marches on Parliament B

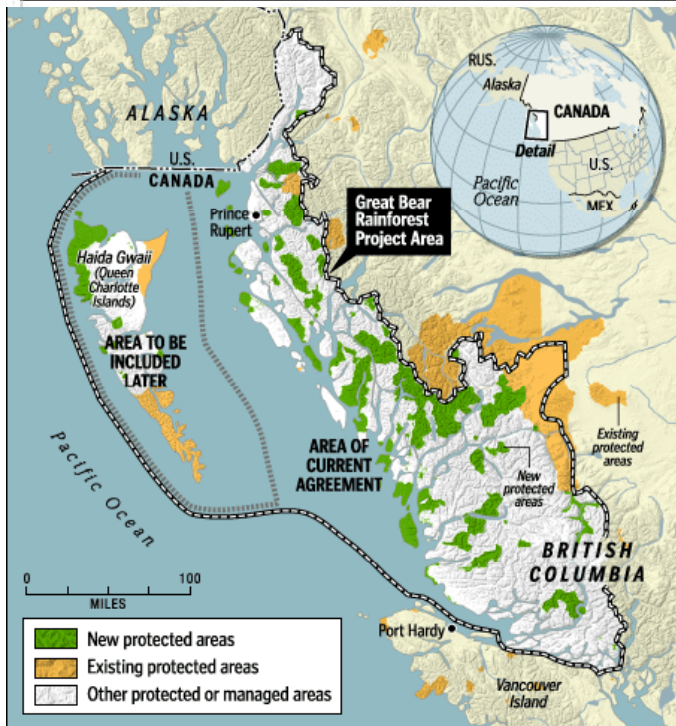






# Great Bear Rainforest History

- 1970-1980's – Wilderness conservation movement starts.
- Late 1980's – "War in the Woods" begins.
- 1993-1995 – ENGO's engage market to stop old growth logging, reform forest management. FSC founded.
- 1998-1999 – A de-escalation of conflict begins.
- 2001 – Landmark protocol between the province and coast First Nations ratified.
- 2009 – Full implementation of the Coast Land Use Decision and Ecosystem Based Management.







**“From Conflict to Collaboration”, 2009**

**B.C. rainforest under threat: environmentalists”, CBC, June 2011**



**New ownership TimberWest**

**ENGO's currently seeking greater protection**

**Protect at Least 50% Globally, Noss 2011, Cons. Biol. 24: 1-4**

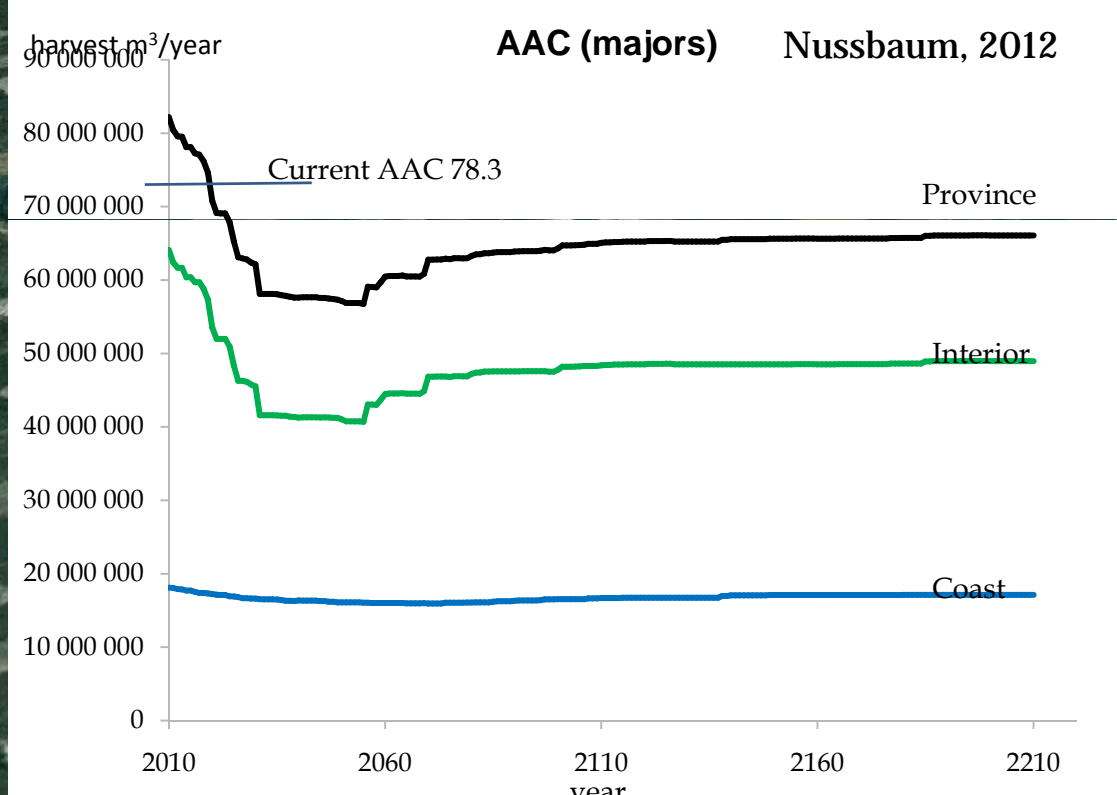


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Google earth





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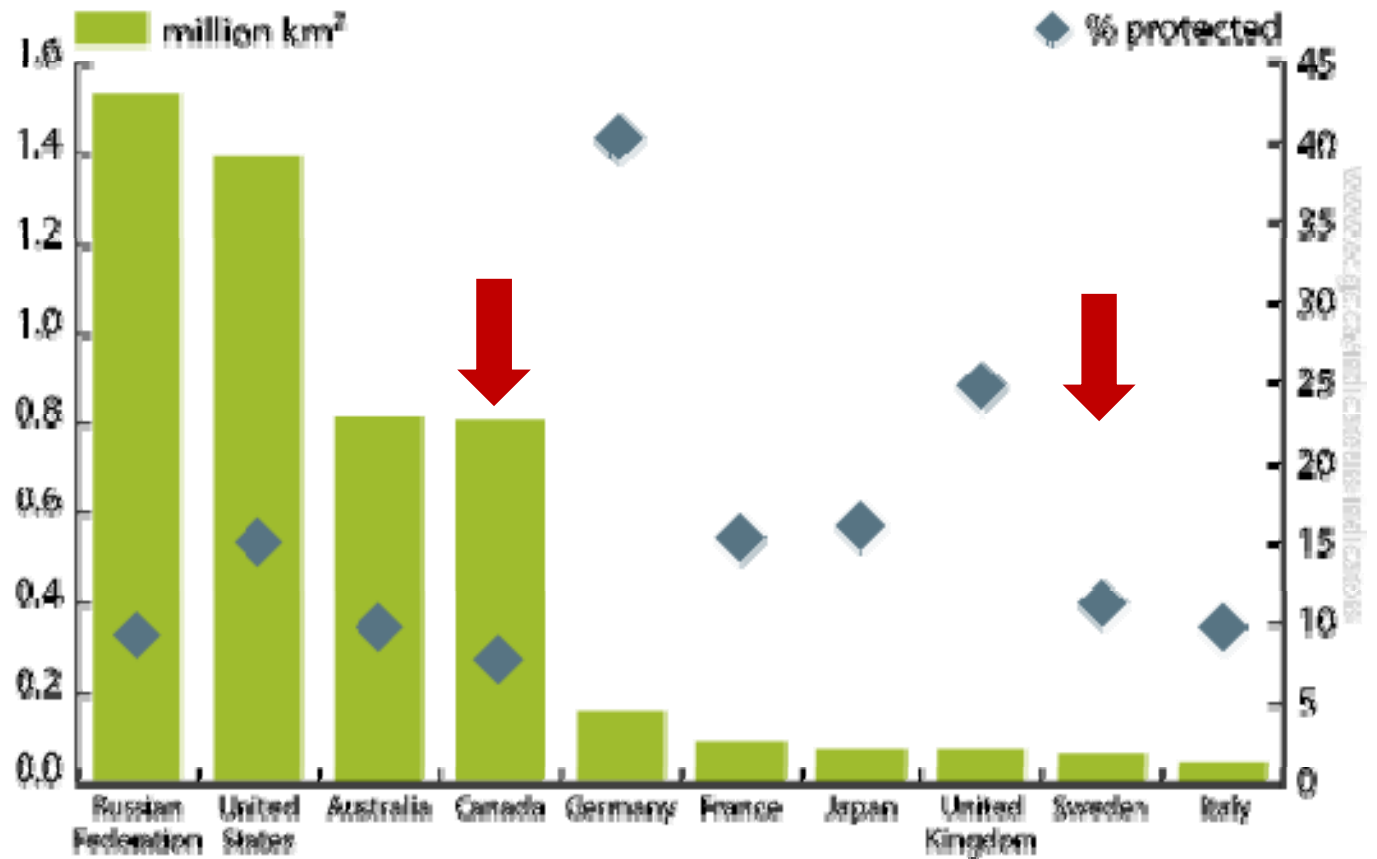


27.6 MM ha in National Parks, 998 MM ha total  
8% legally protected; 36% certified  
13% protected in BC  
Old growth area well represented in set-asides





## Terrestrial protected area and proportion of land territory protected in selected countries, 2009



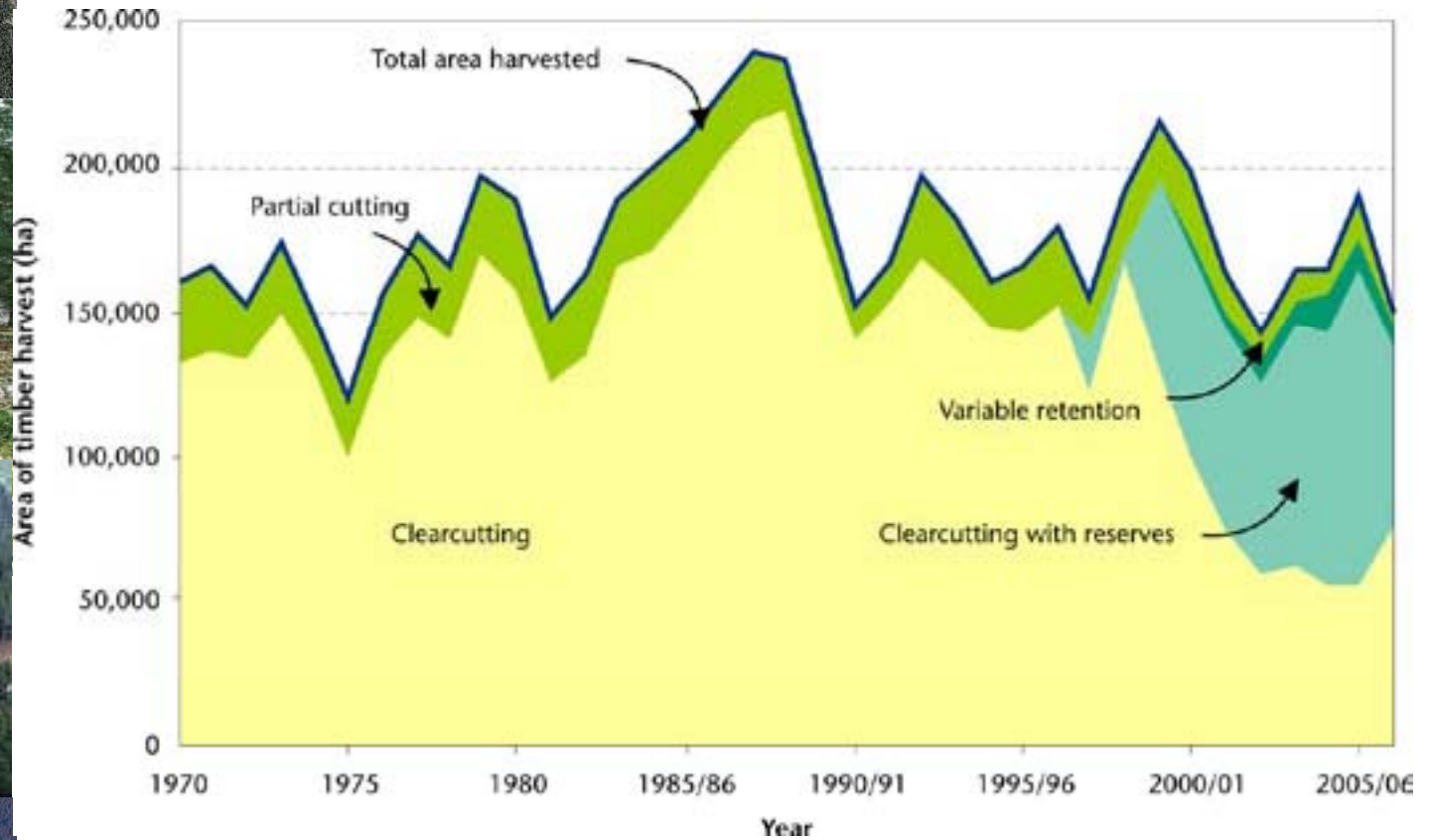


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# Harvesting methods in Canada: 90% clearcut, 6% partial cut, 4% thinned



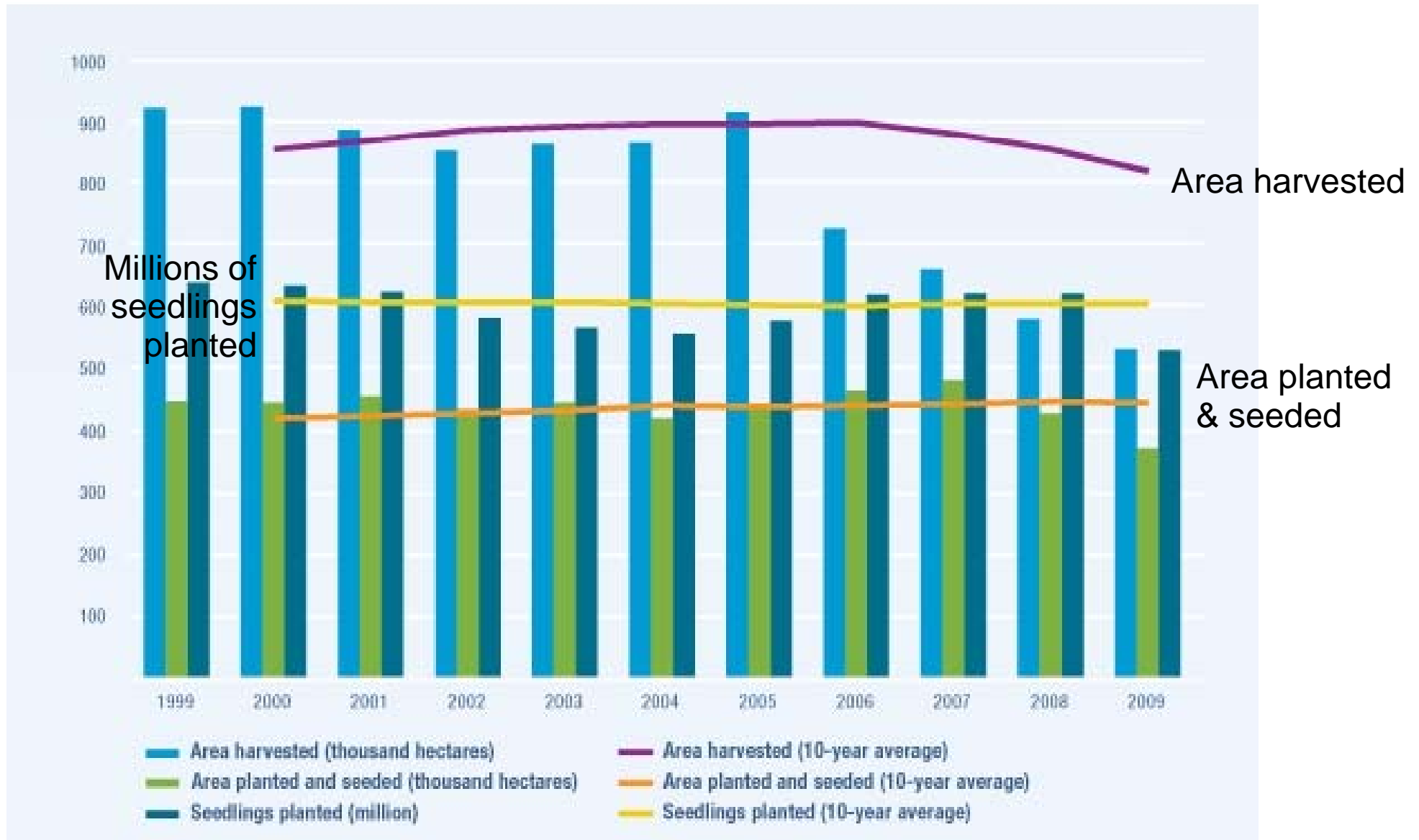


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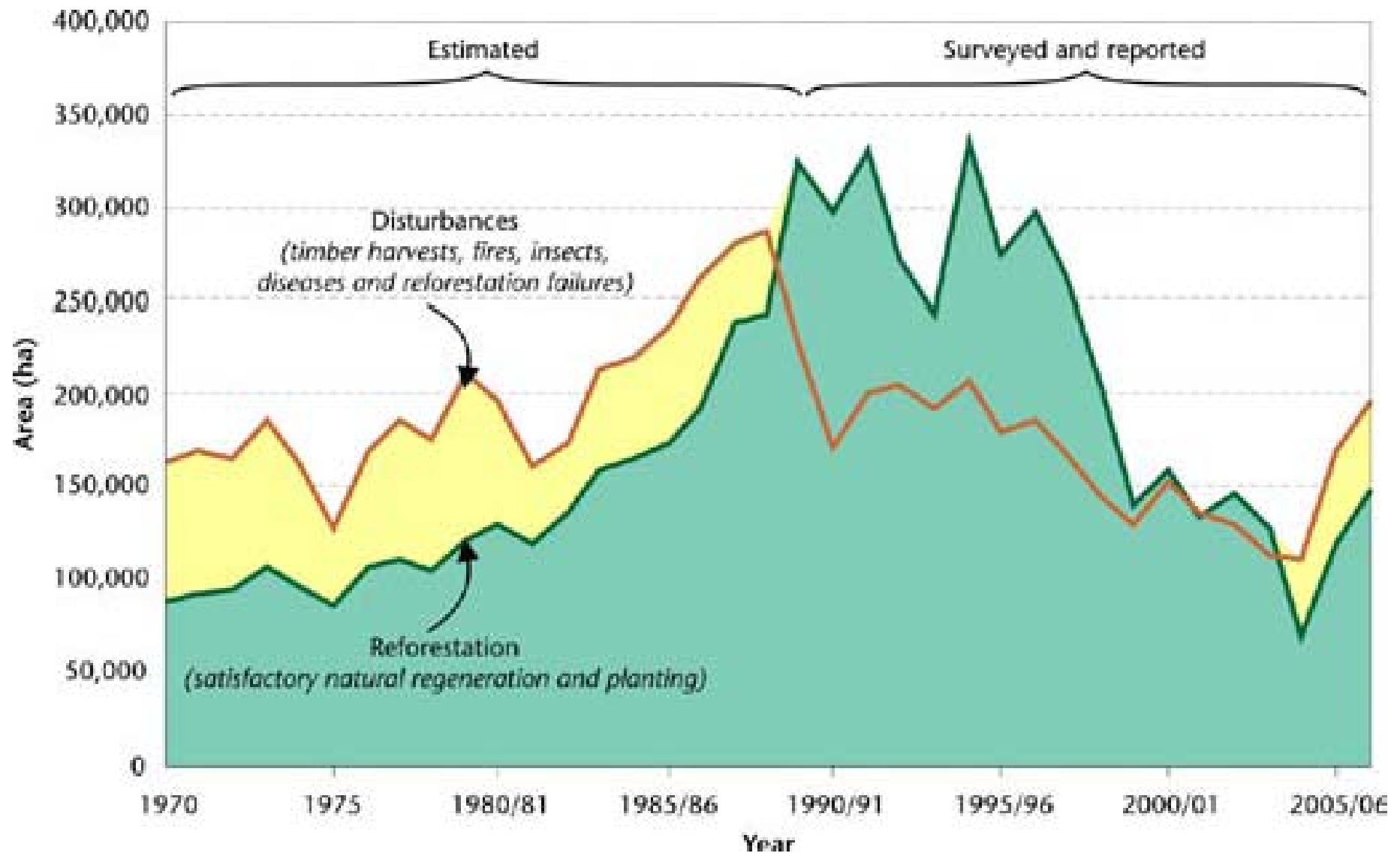
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# Forest Regeneration on Provincial Crown Land



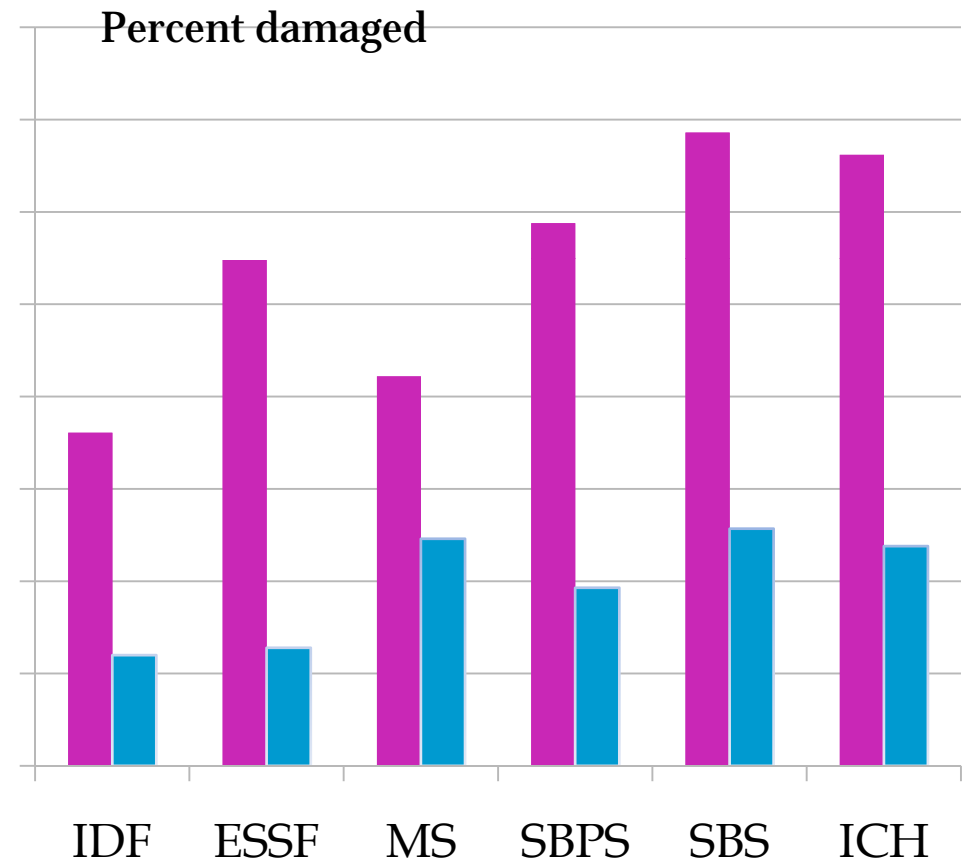
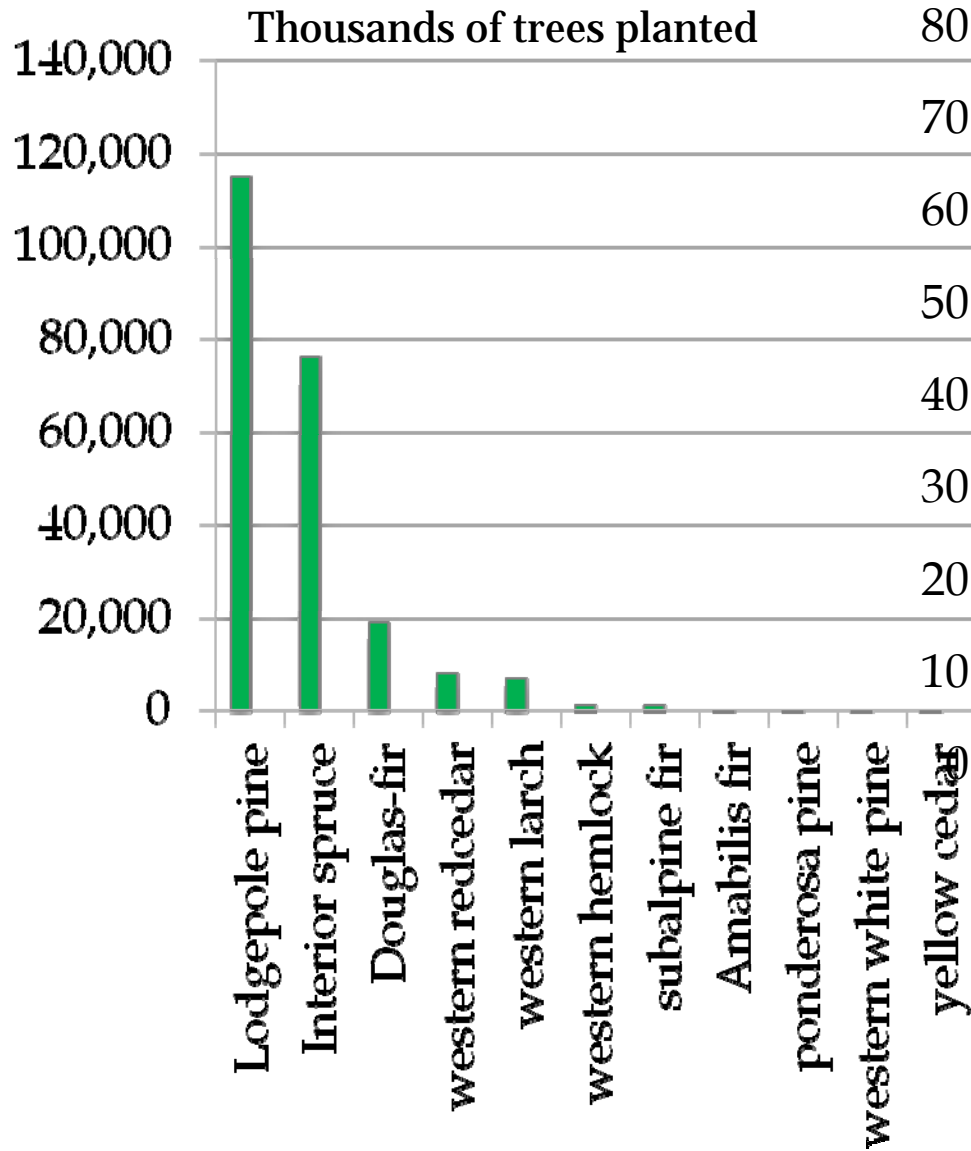
# British Columbia recently fell behind in reforestation of disturbed areas





# Pine, spruce, Douglas-fir dominate planting (96%) in BC

## Lodgepole pine suffering substantial damage in some areas



■ % pine damaged (36-69%)

■ % spruce damaged (10-26%)





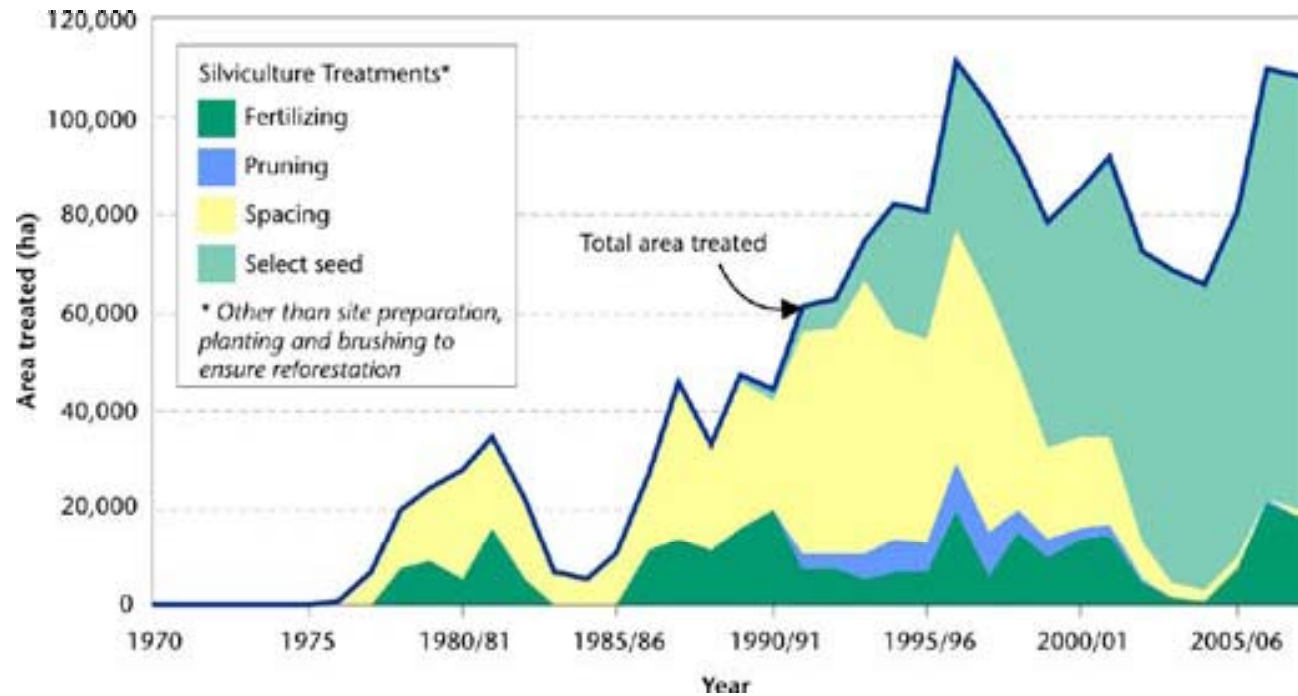
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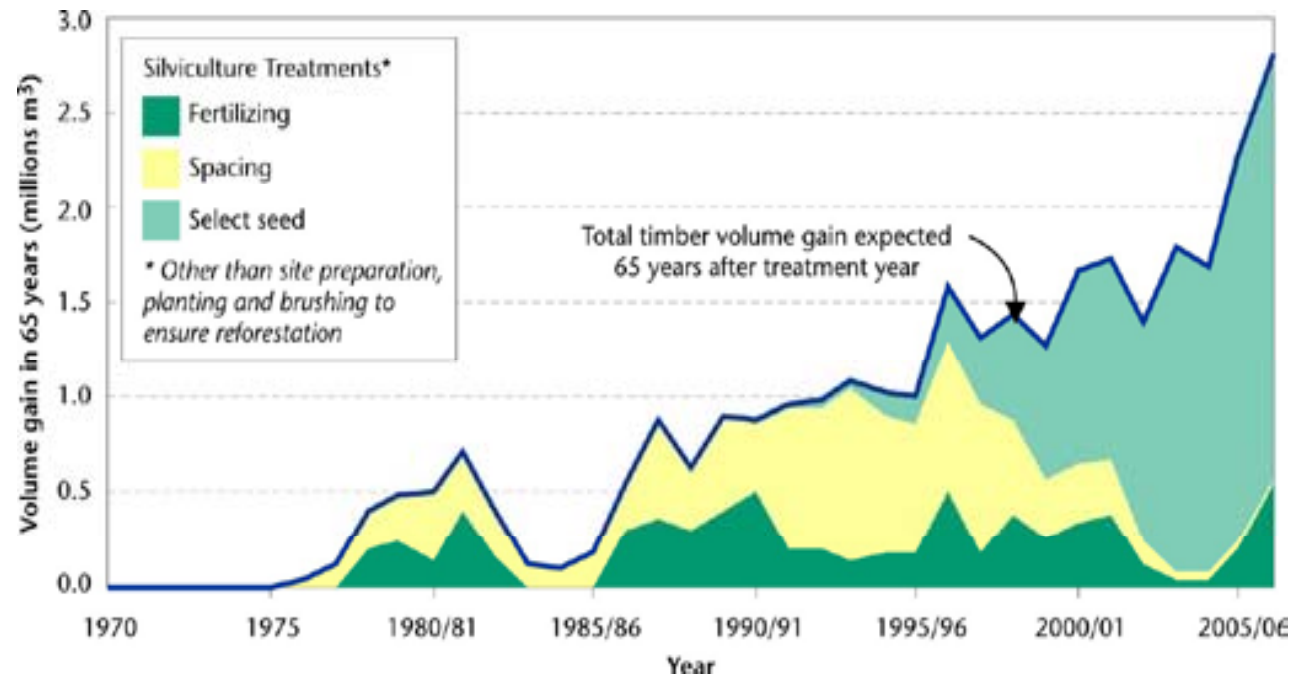


# Management of young stands in British Columbia

Area of various silvicultural treatments on BC public land, 1970–2008.



Volume gain expected in 65 years from silviculture treatments on BC public land, 1970–2007.



# Intensive silviculture practices in Canada



- Investment in intensive silviculture such as pruning, fertilizing and thinning is very low
- Governments only require that basic silviculture is met after harvest
- Stumpage revenues from boreal forest too low to for intensive silviculture investment
- Incentives for investment by private sector low due to high mortality risk and uncertainty of volume-based tenures
- Education and health care costs trump forestry costs





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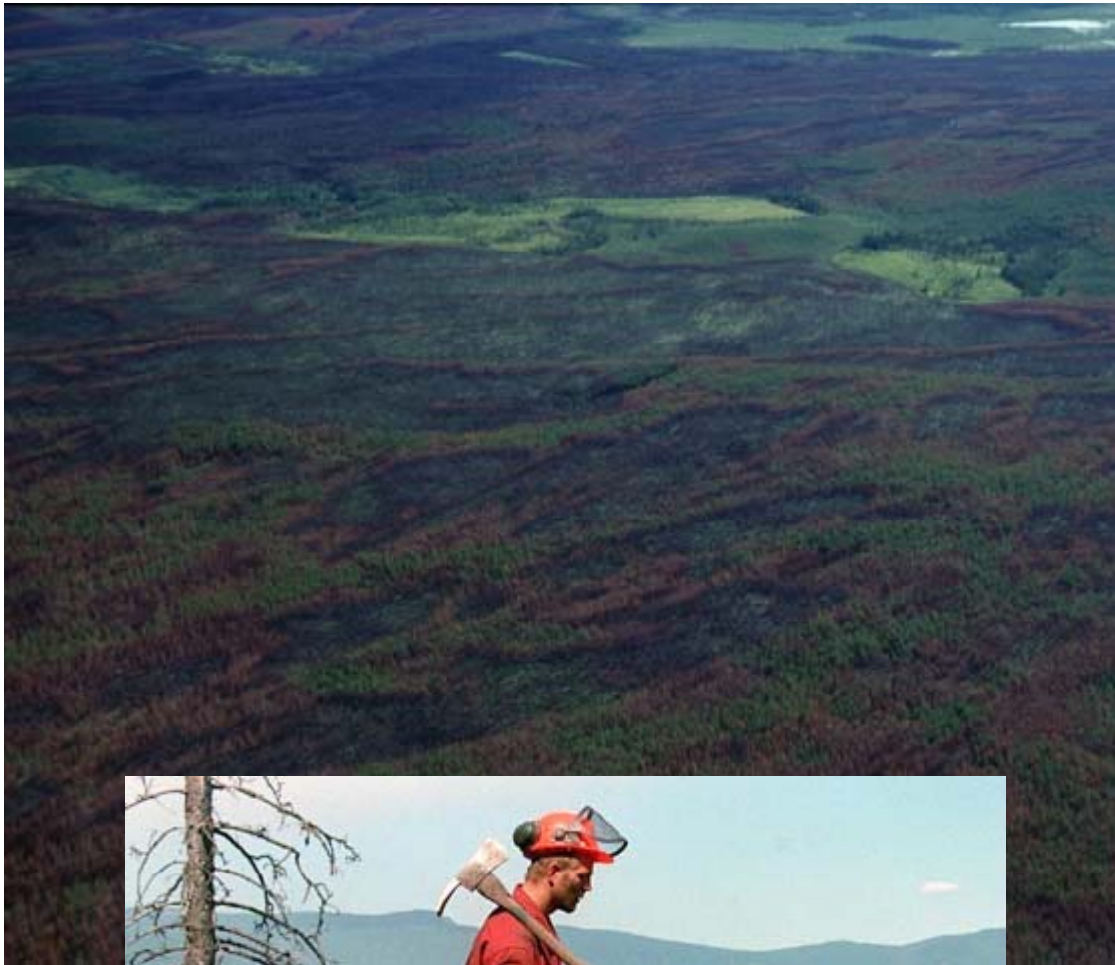
## Natural disturbance in the boreal forests

- Forests are resilient to natural disturbance
- Naturally disturbed by wildfire and insect infestations
- Management paradigm based on emulation of natural disturbances (with many contradictions)
- Increasing stress due to climate change

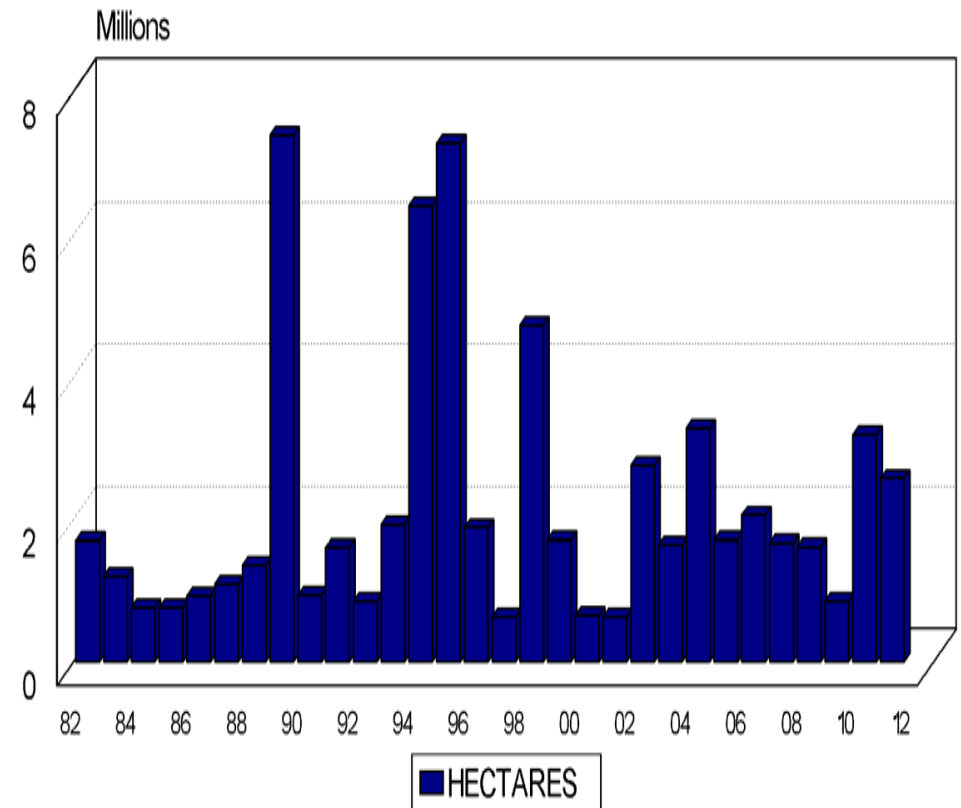




# Area burned in Canada 1982-2012



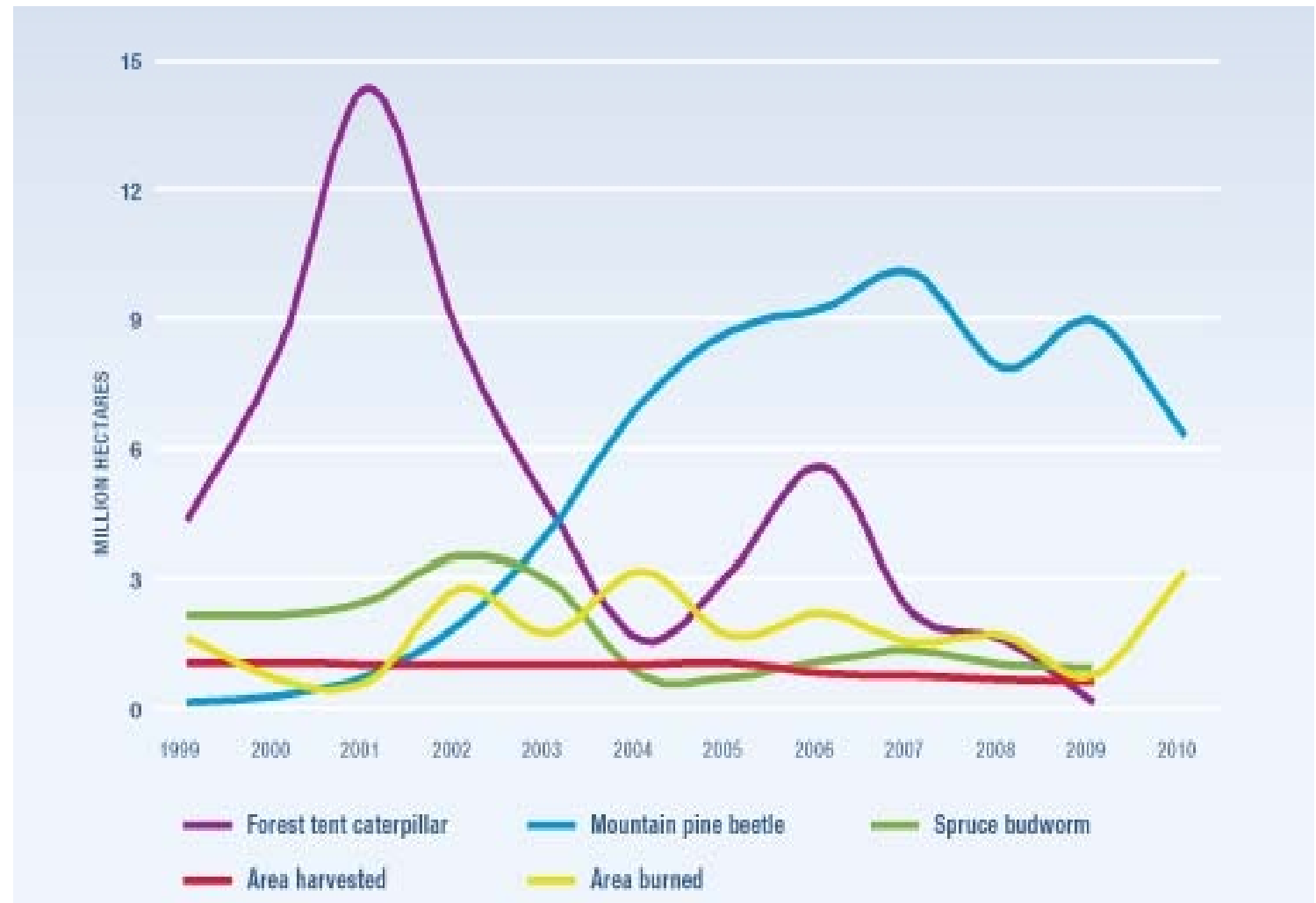
## Hectares by Year



Current as of Aug 31, 2011

# Damage trends in forests of Canada

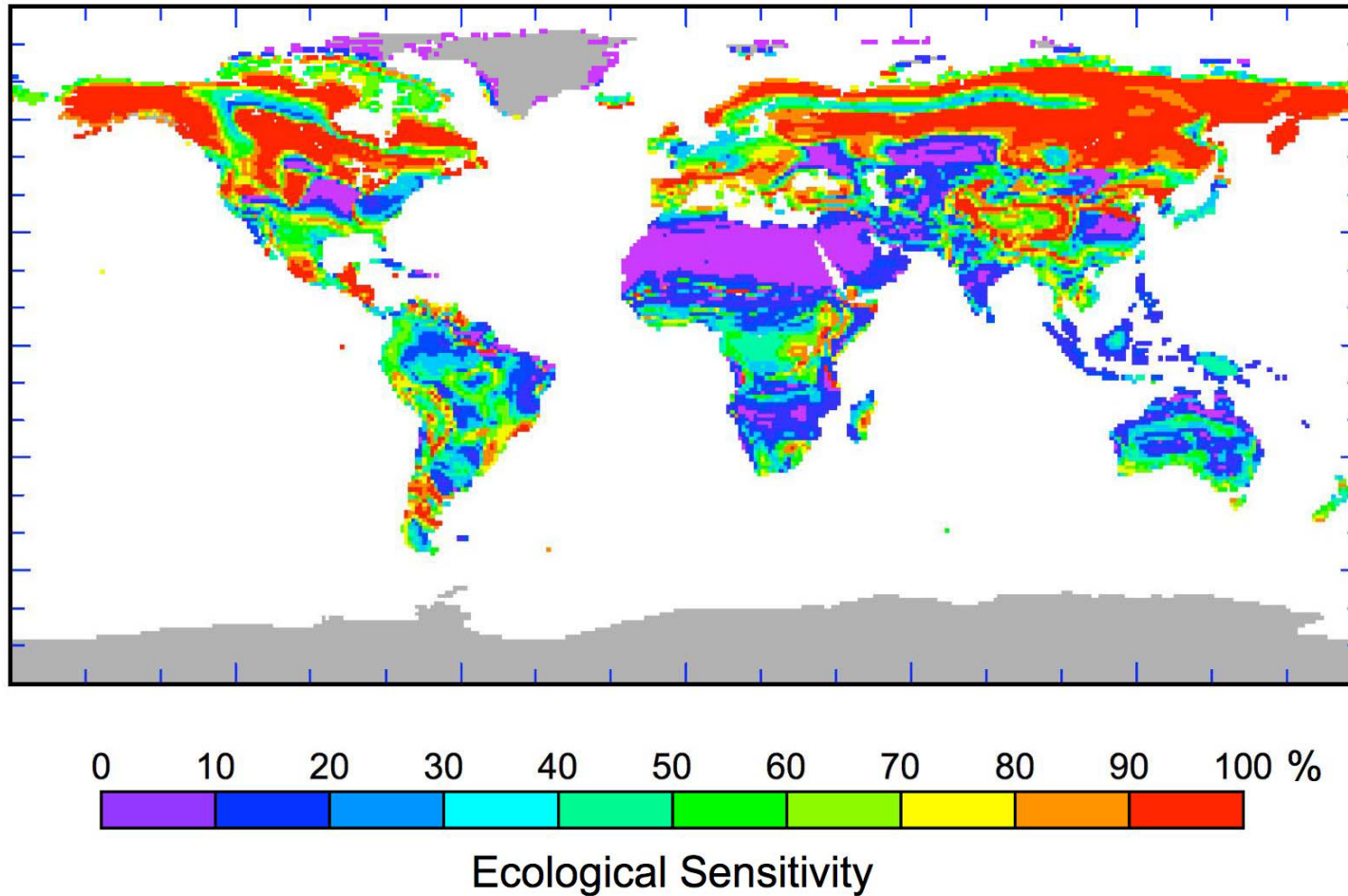
## Changing natural disturbance regimes





# New study shows declining productivity and carbon sequestration in Canadian boreal forest

## 21<sup>st</sup> Century Ecological Sensitivity 1



NASA, Dec. 2011  
Pan, PNAS, 2012



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## Canada, Sweden: Our Message

Canada's large extent of old-growth boreal forests and Sweden's knowledge of silviculture together provide fertile collaborative grounds for developing new innovations for achieving sustainable forest management.

*Thank-you!*