



CANADIAN FIBRE SUPPLY

Challenges & Opportunities

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VIRKESFORUM 12.9.2018, STOCKHOLM, SWEDEN

CANADA IS KNOWN AS THE LAND OF FORESTS



Canada:

- 400 million ha forest land
 - 90% Provincial & Territorial
 - 6% private land
 - 2% Aboriginal
 - 2% Federal
- 161 million m³/a annual cut
- 779,577 ha harvested



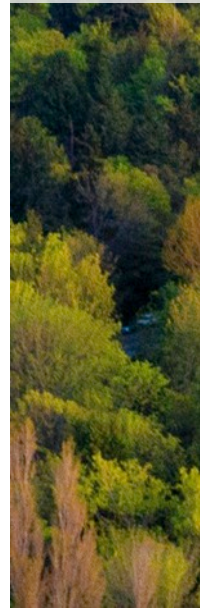
British Columbia:

- 60 million ha forest land
- One of the largest public forests on earth
- Only 5% private ownership
- 10% protected areas
- 68 million m³/a annual cut
- 192,615 ha harvested

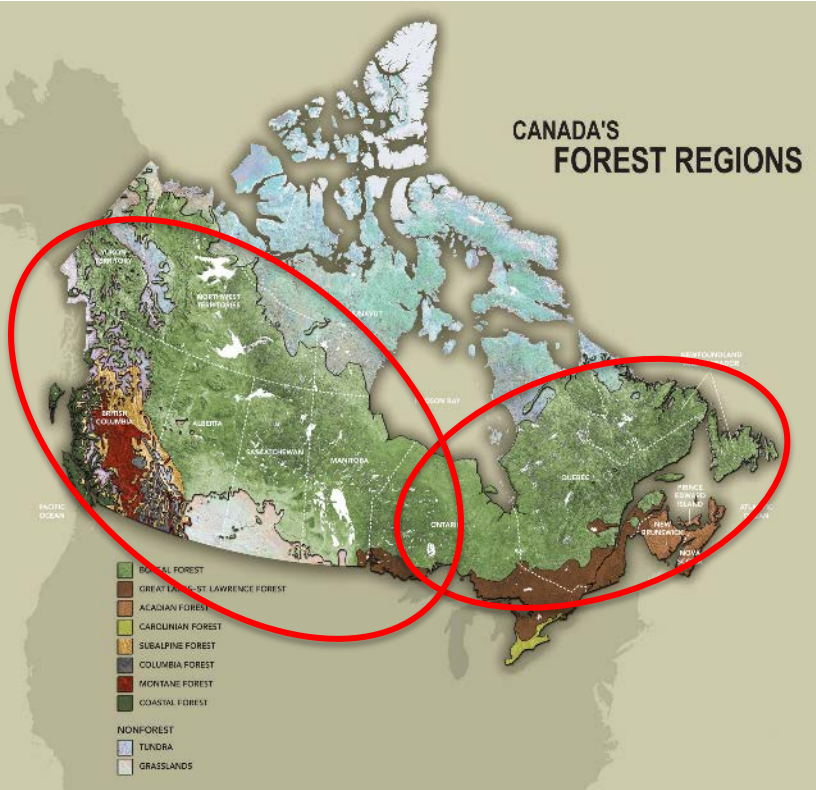


Sweden:

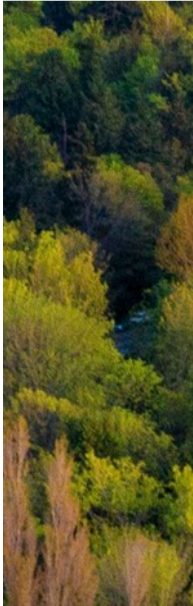
- 21 million ha forest land
 - 81% private
 - 19% public
- 82 million m³/a annual cut



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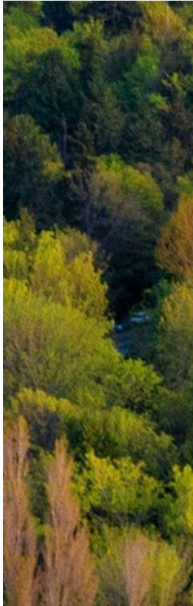
Source: Natural Resources Canada



Nordic countries



Western Canada



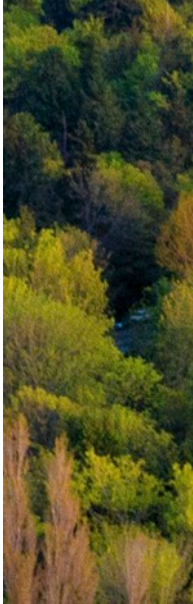
WOOD SUPPLY STRENGTH

- Abundant supply of fibre
- Large tree in Western Canada
- Efficient large scale operations
- Ability to focus on a limited number of commodity products



WOOD SUPPLY CHALLENGES

- Long transportation distances
- Complicated tenure system
- Public perception
- Climate change



INSECT PESTS – MAJOR THREAT TO MIDTERM FIBRE SUPPLY



Photo credit: Allan Carroll

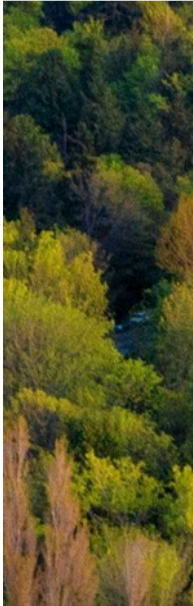
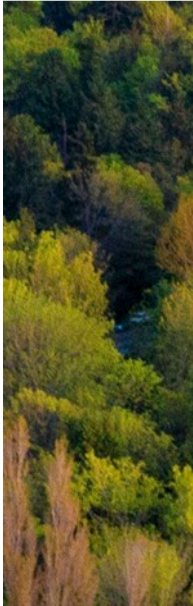
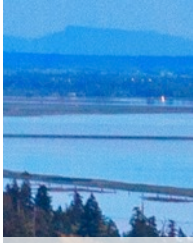




Photo: L. Maclauchlan

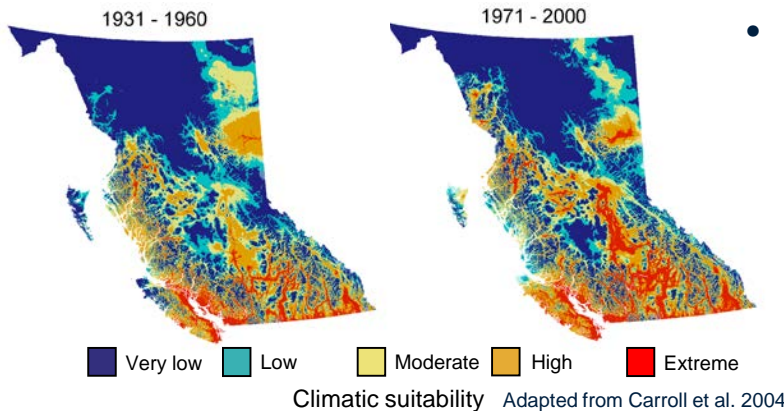


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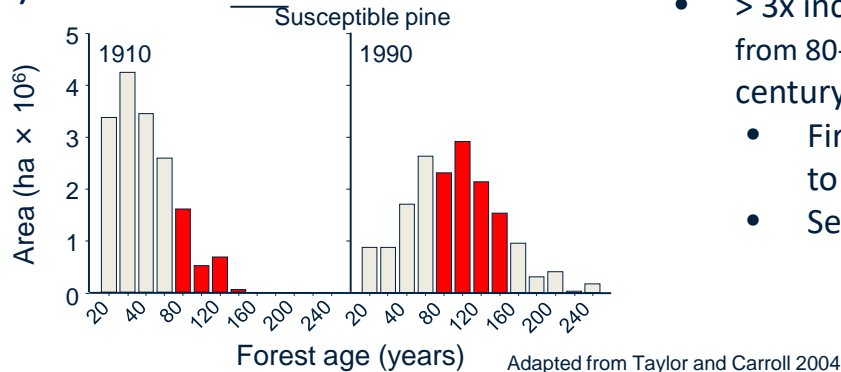
ANTHROPOGENIC EXACERBATION OF OUTBREAK REQUIREMENTS

1) Favorable climate



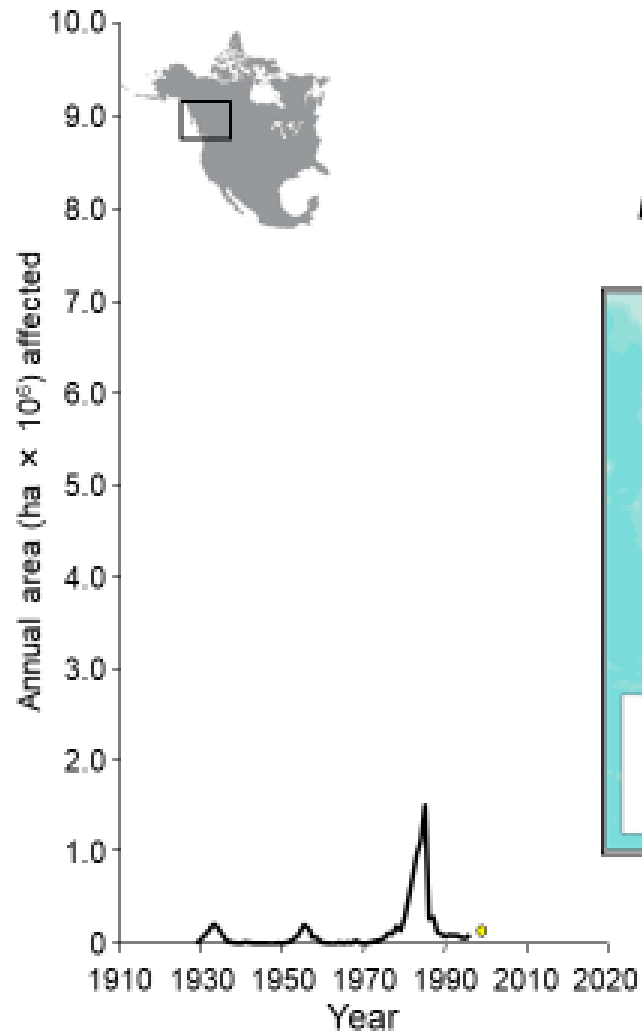
- $>1^{\circ}\text{C}$ increase in mean annual temperature since 1950
 - Increased beetle survival
 - 75% increase in area of extreme climatic suitability
 - Rapid range expansion into newly available habitats

2) Abundant hosts

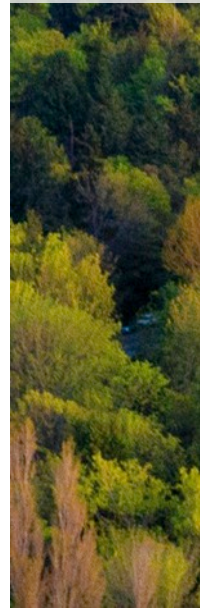
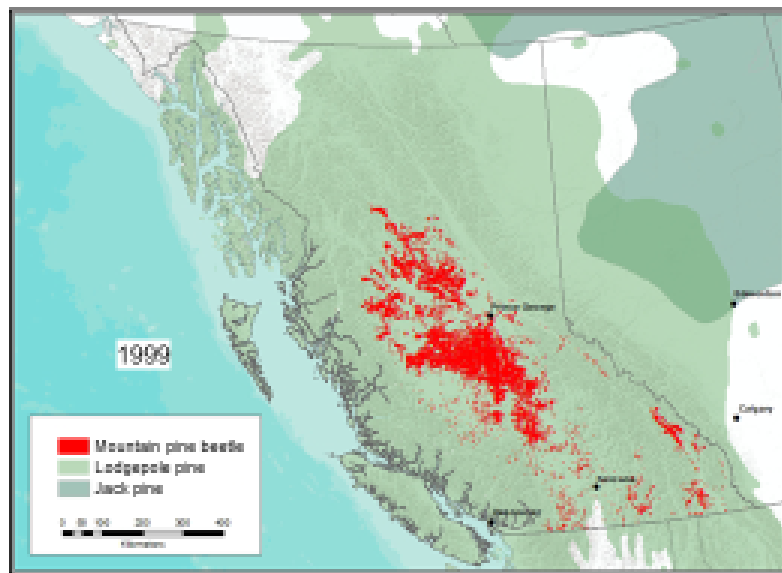


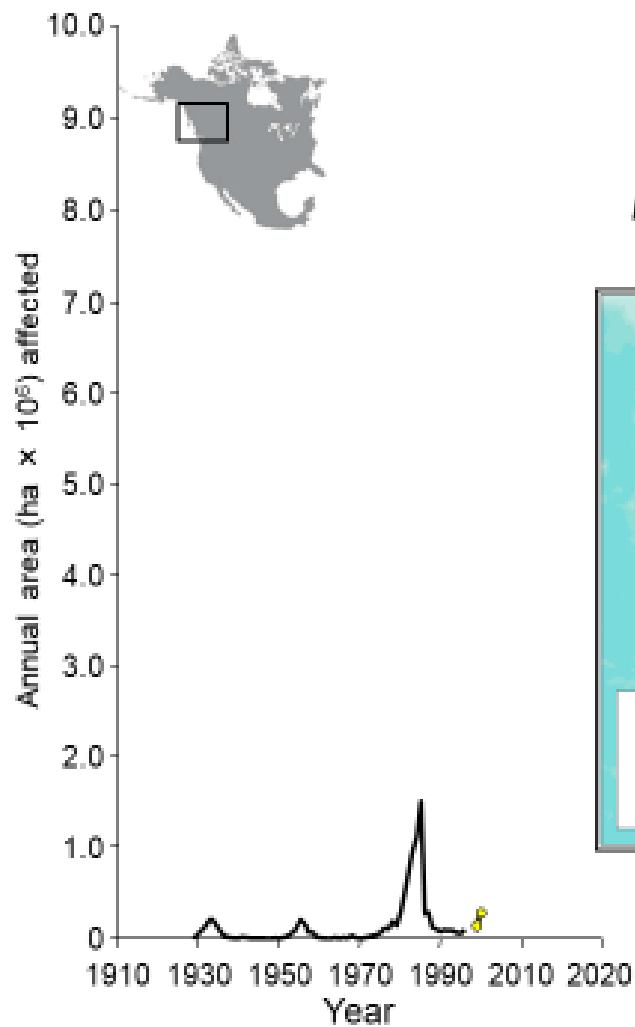
- $> 3x$ increase in susceptible pine (trees from 80-160 yrs old) during the previous century
 - Fire suppression (wildfires reduced to $<1\%$ of past impacts)
 - Selective harvesting



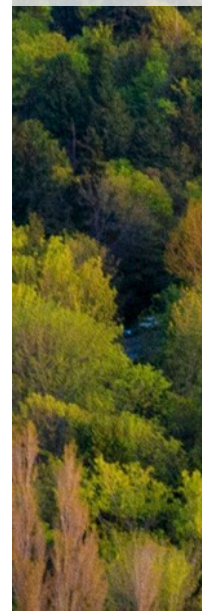
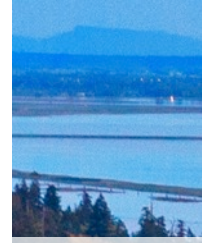
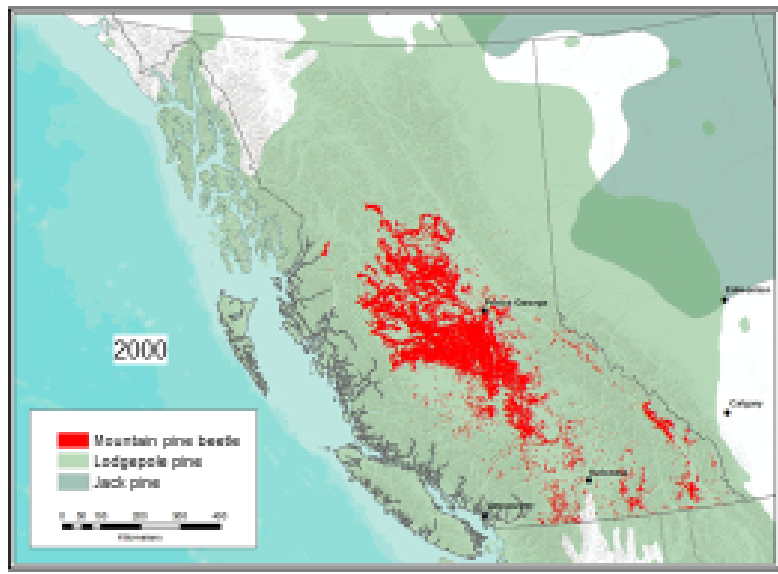


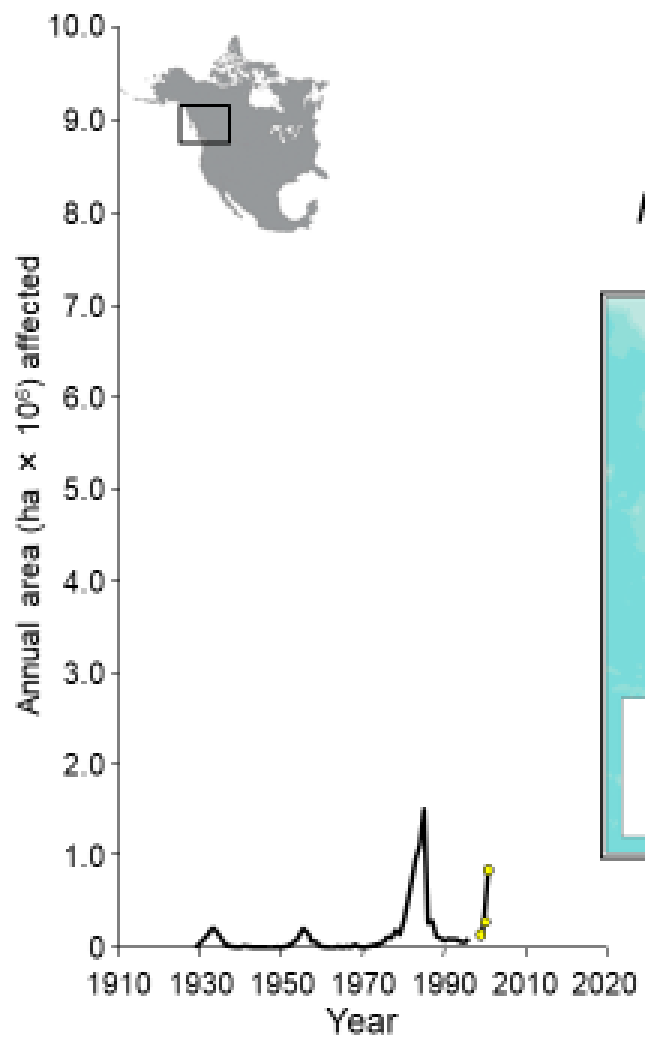
The synergy:
Favorable climate x abundant hosts





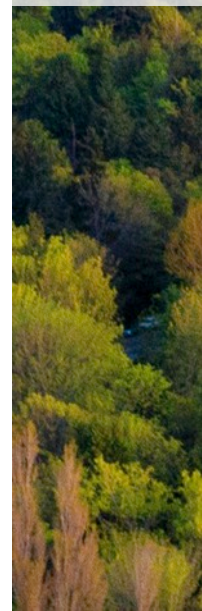
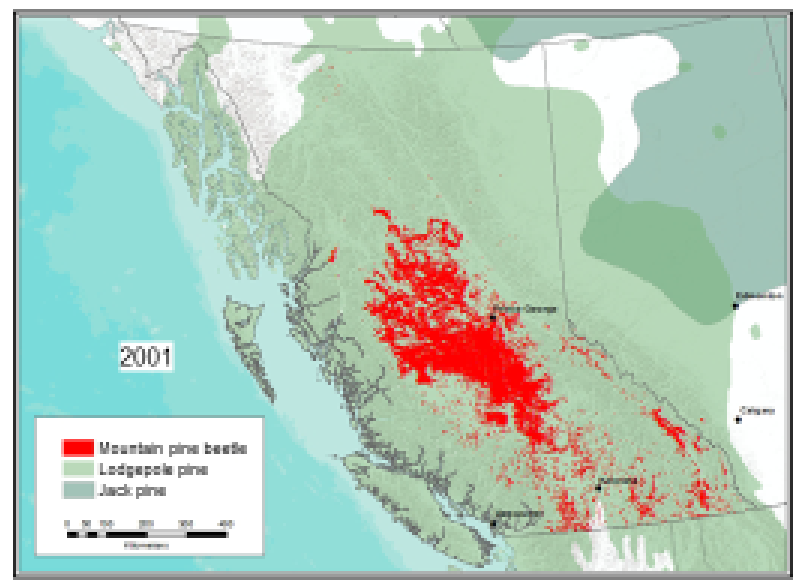
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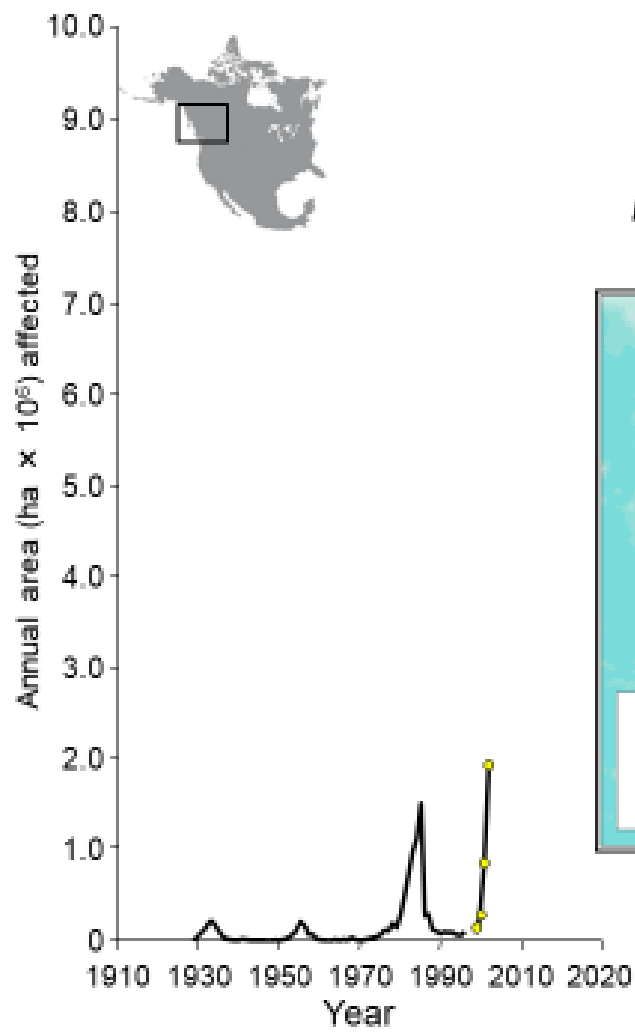




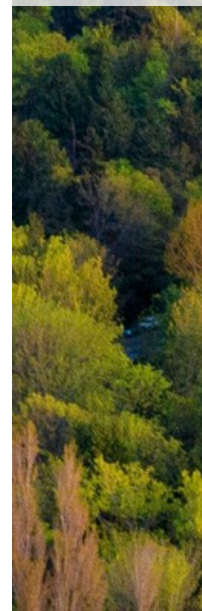
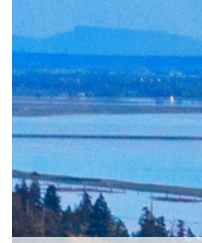
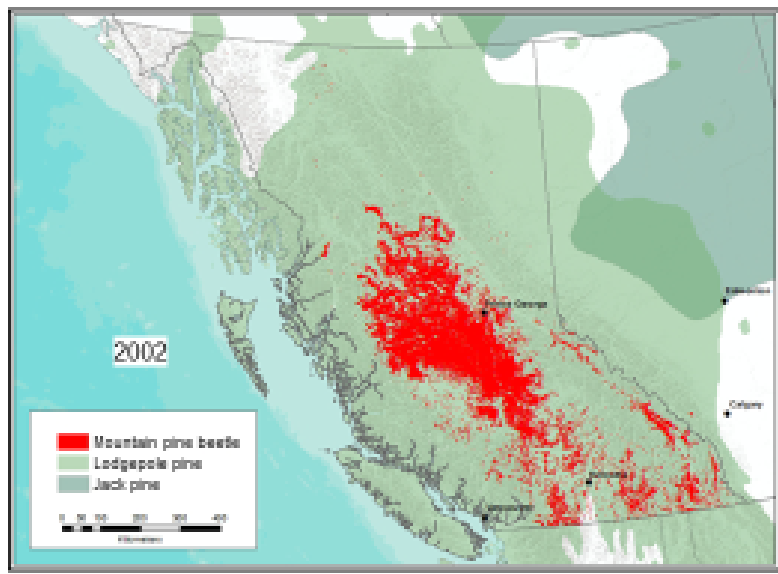
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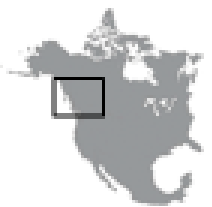
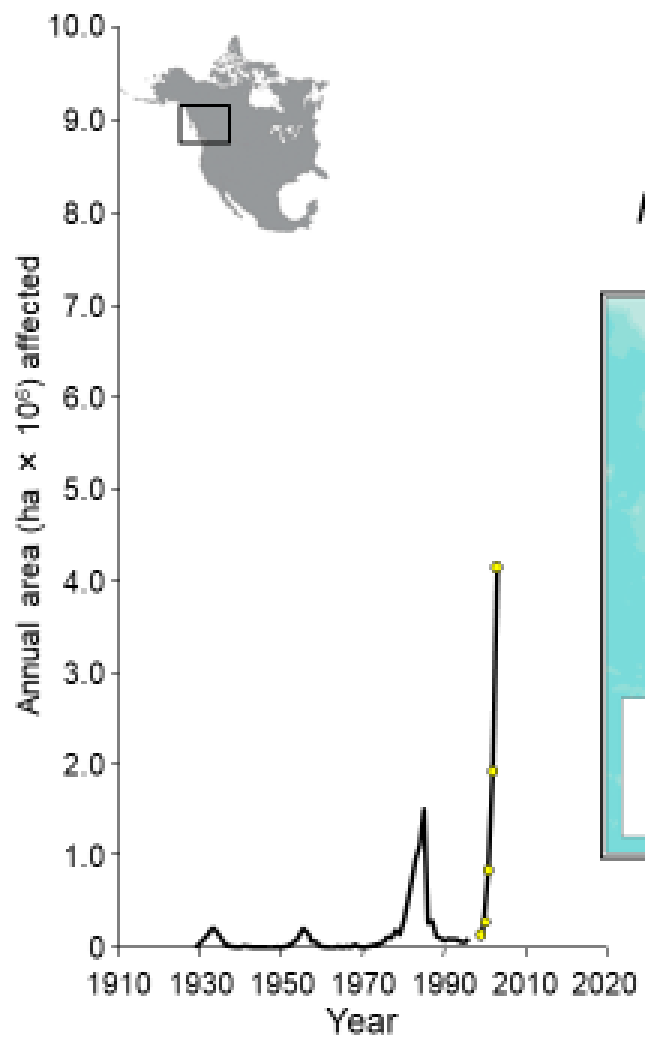
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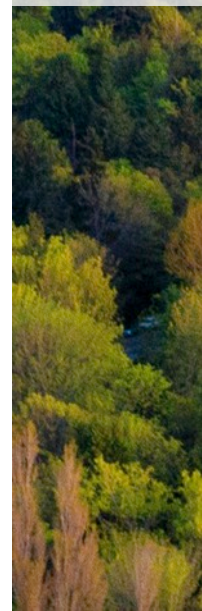
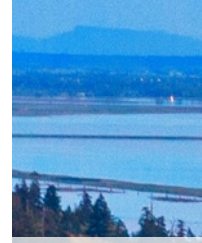
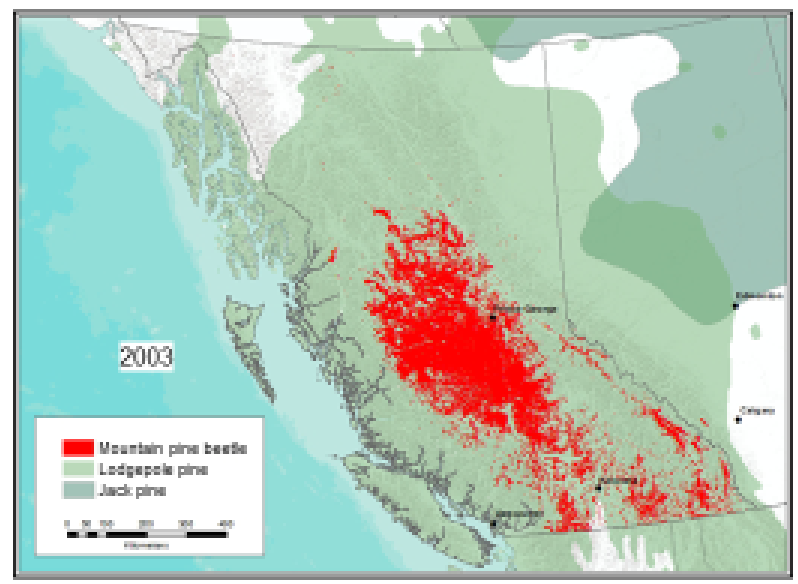
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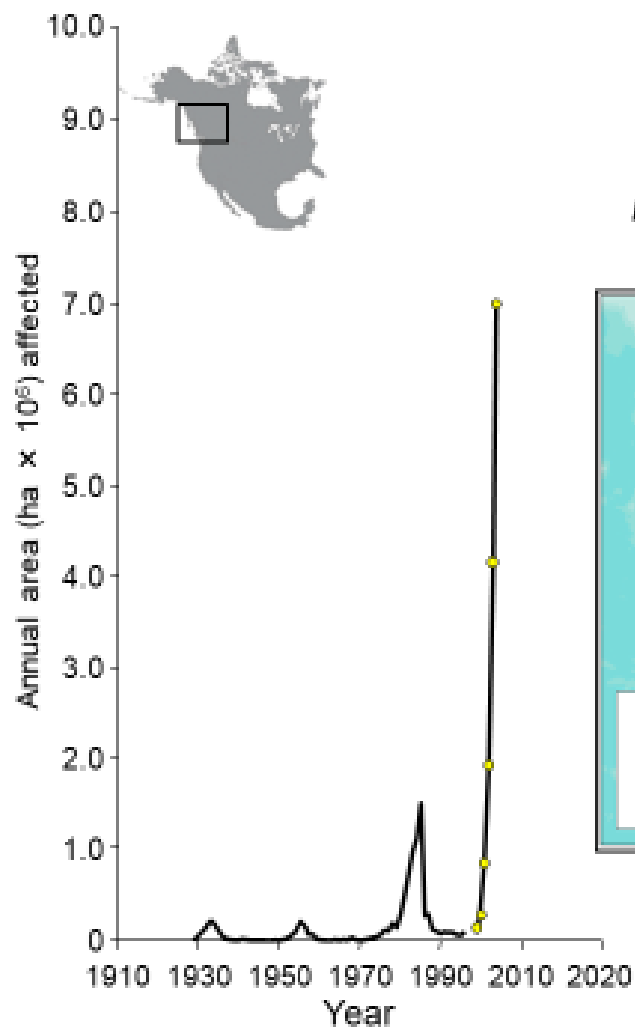




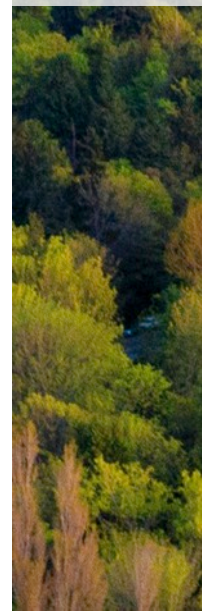
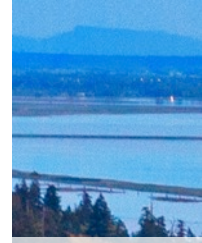
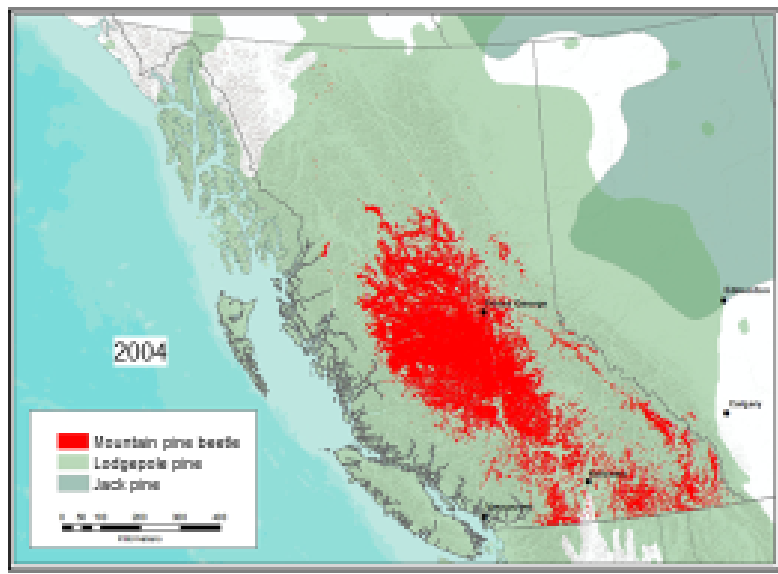
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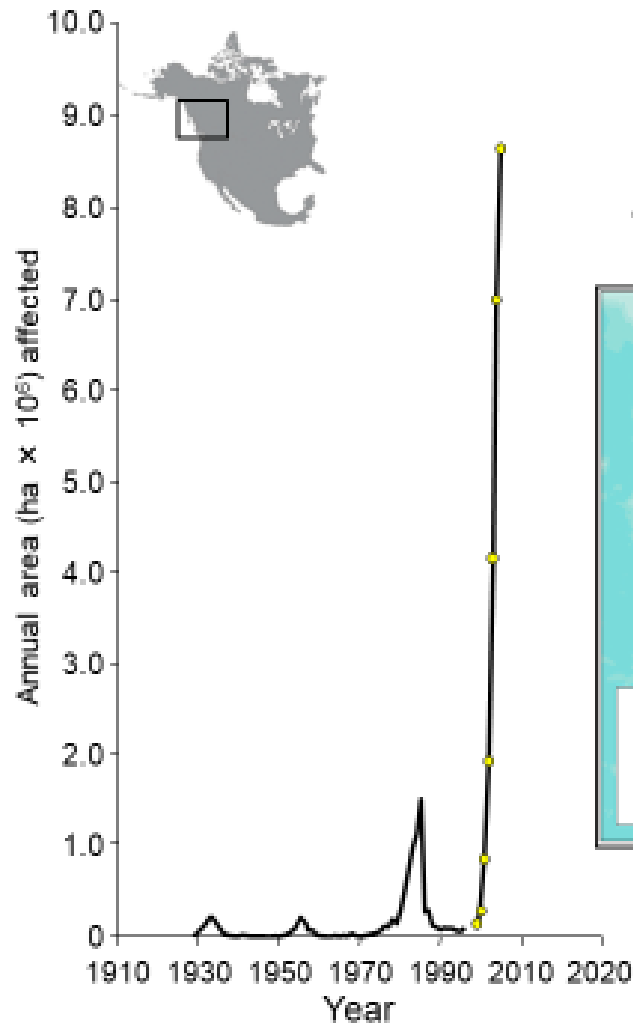
Favorable climate x abundant hosts



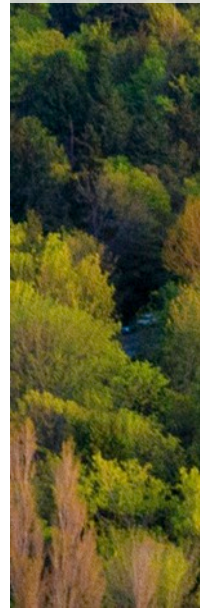
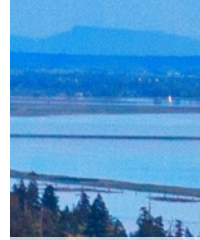
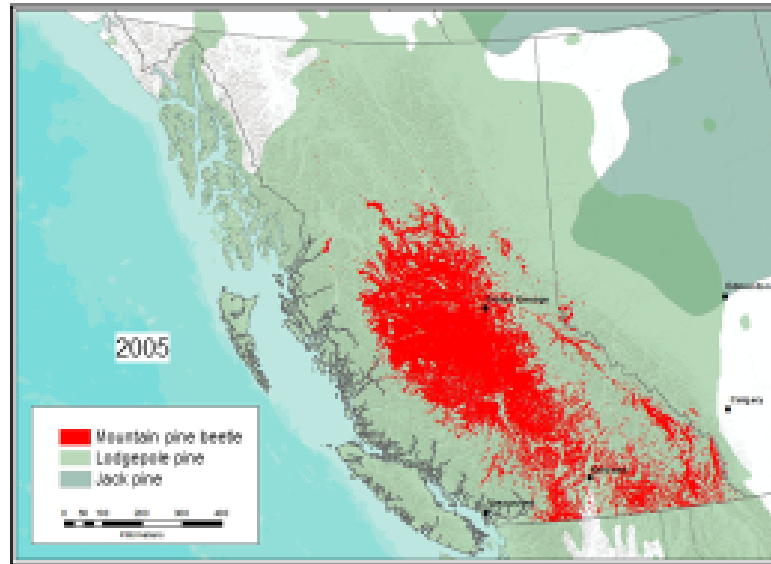


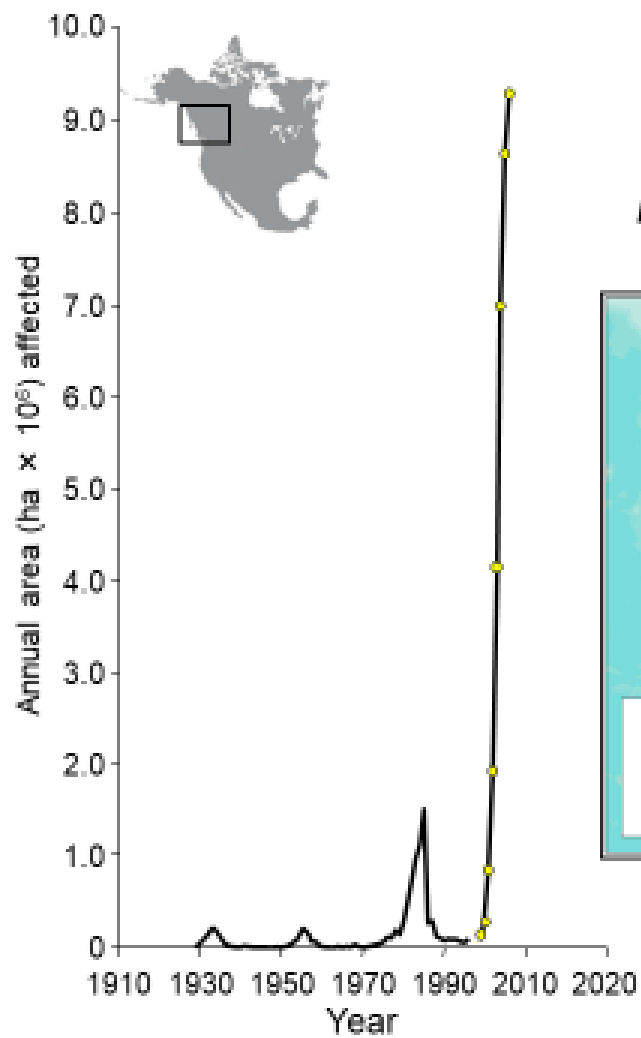
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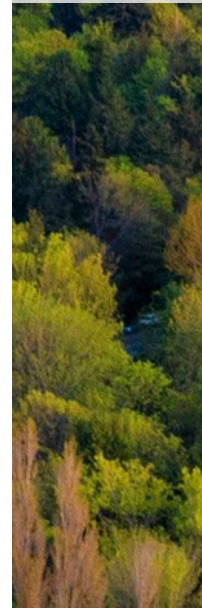
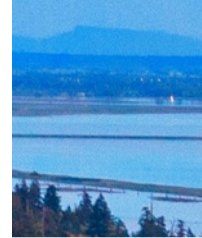
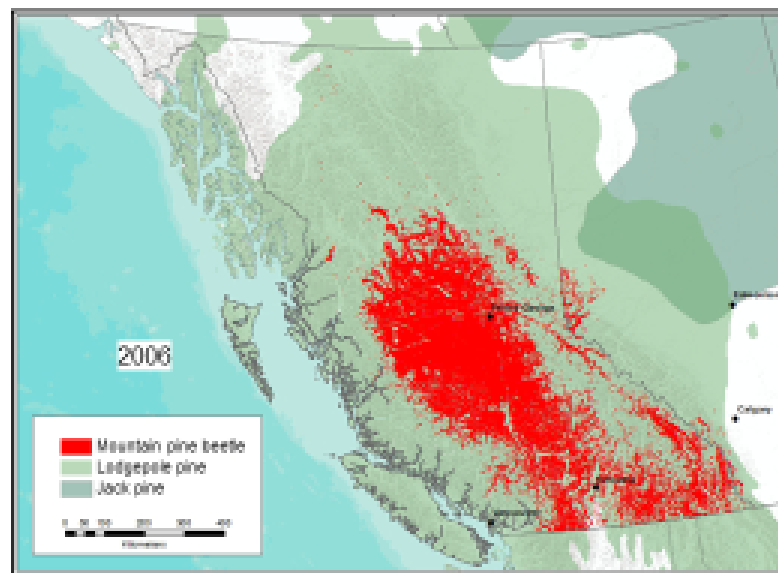


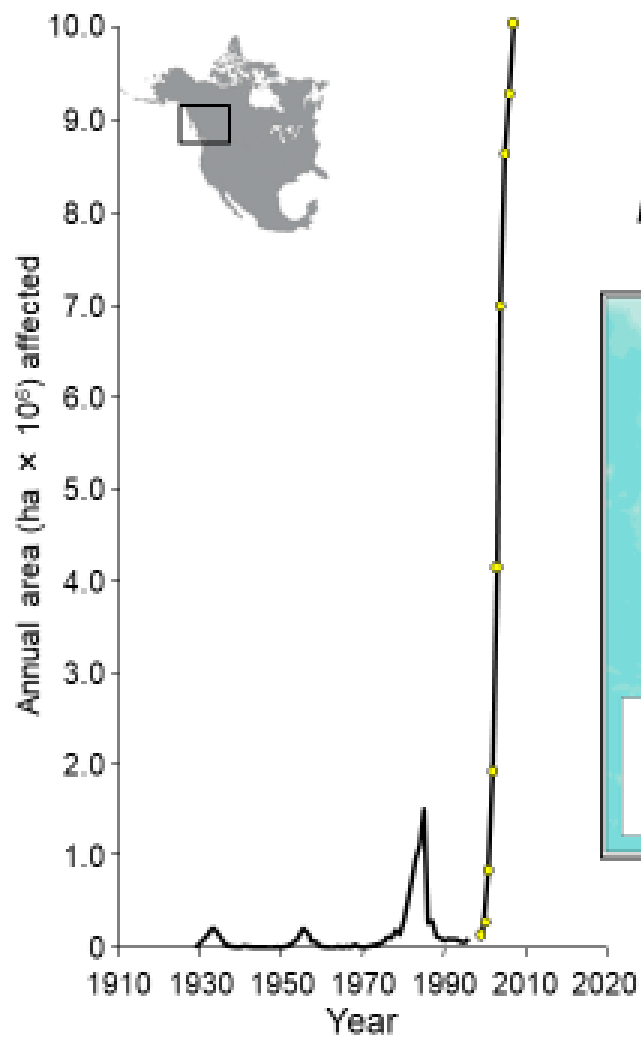
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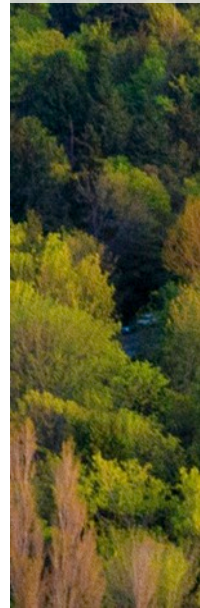
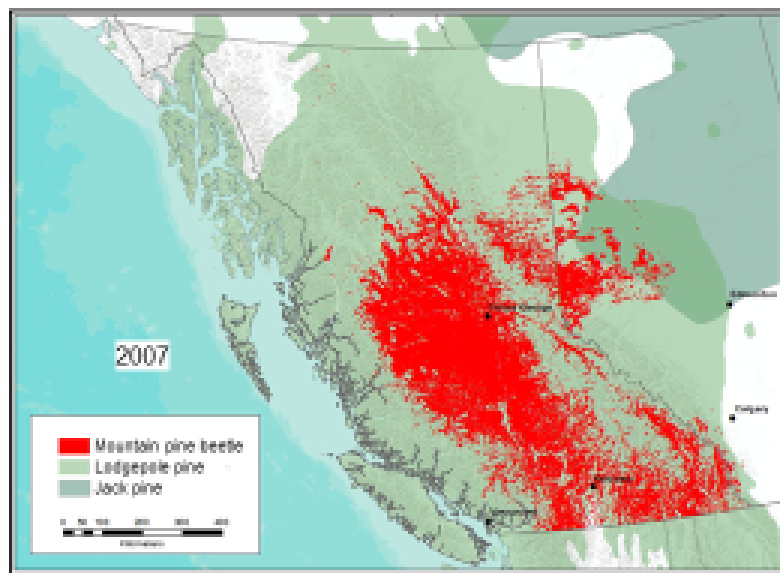


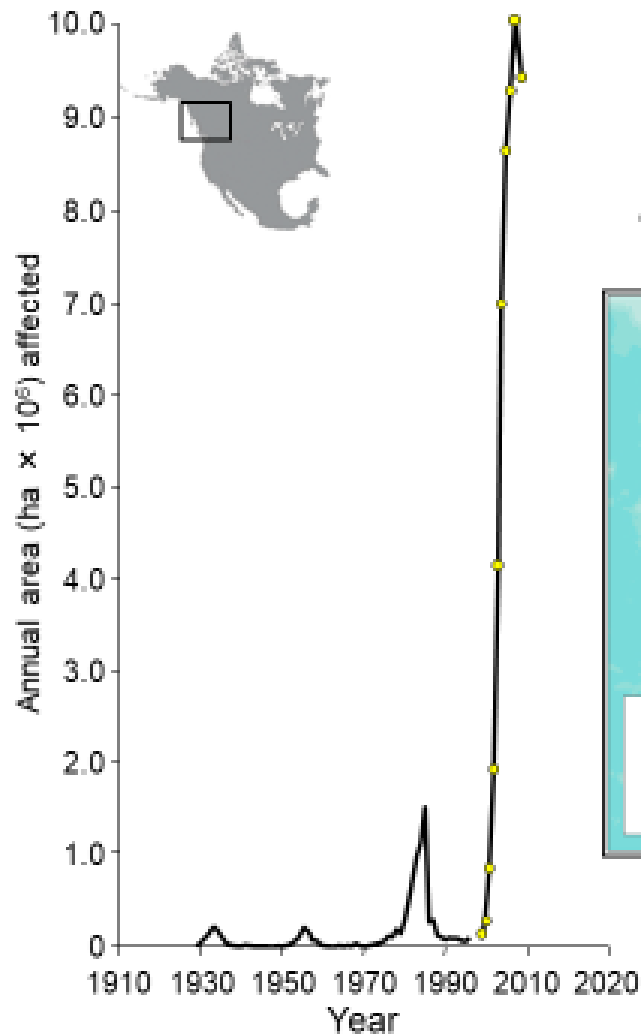
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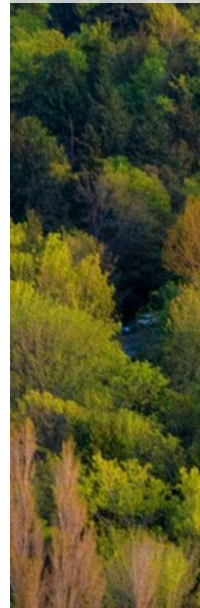
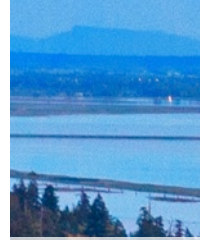
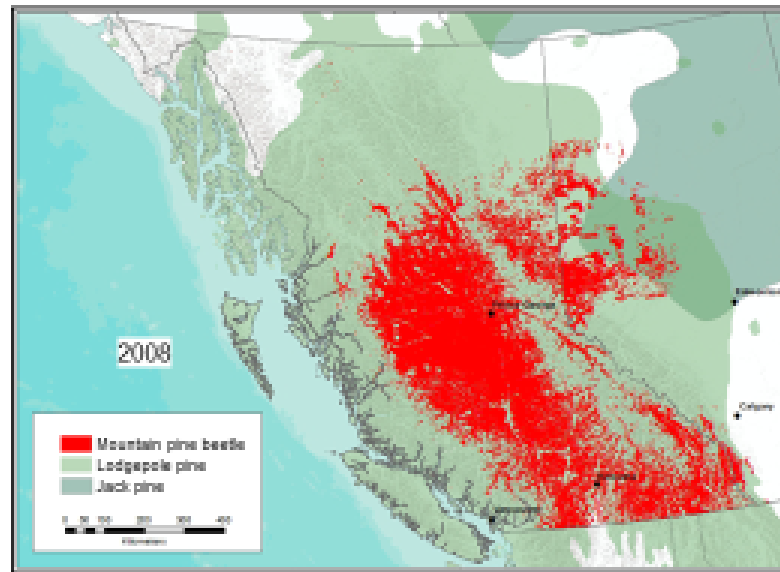


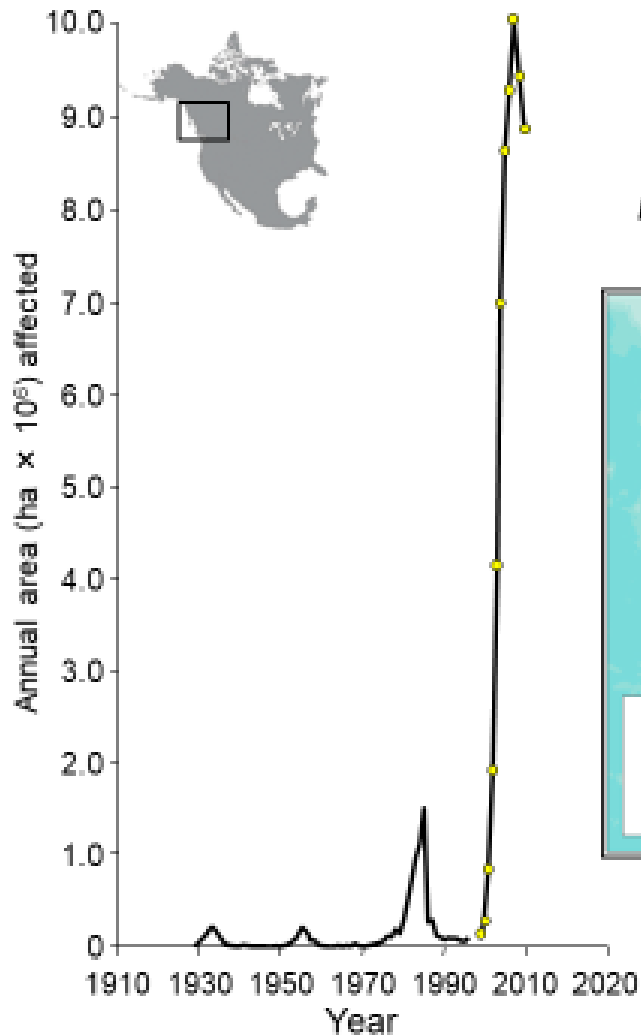
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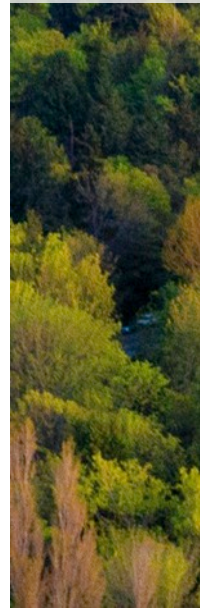
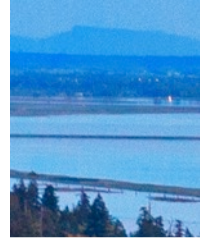
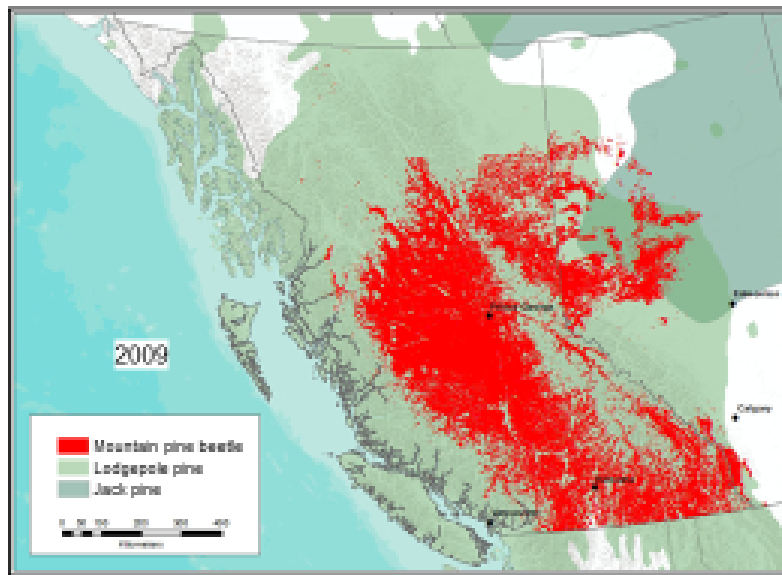


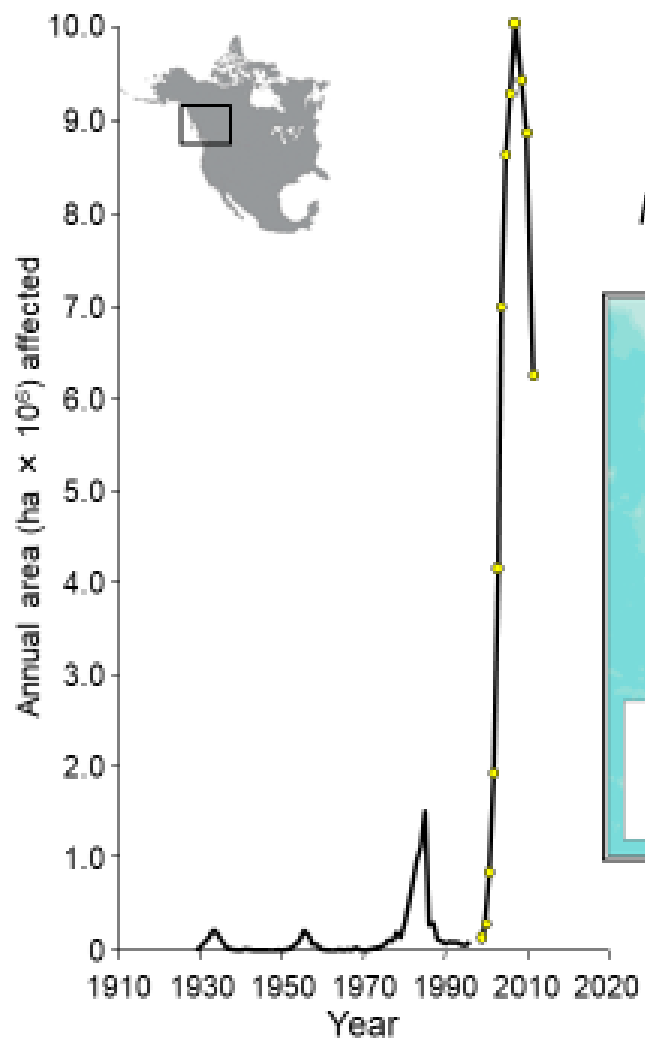
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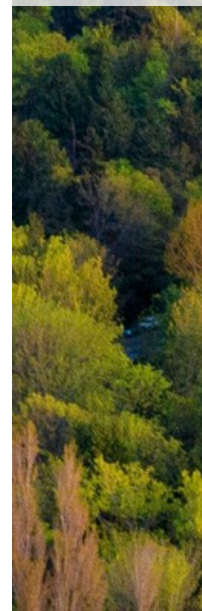
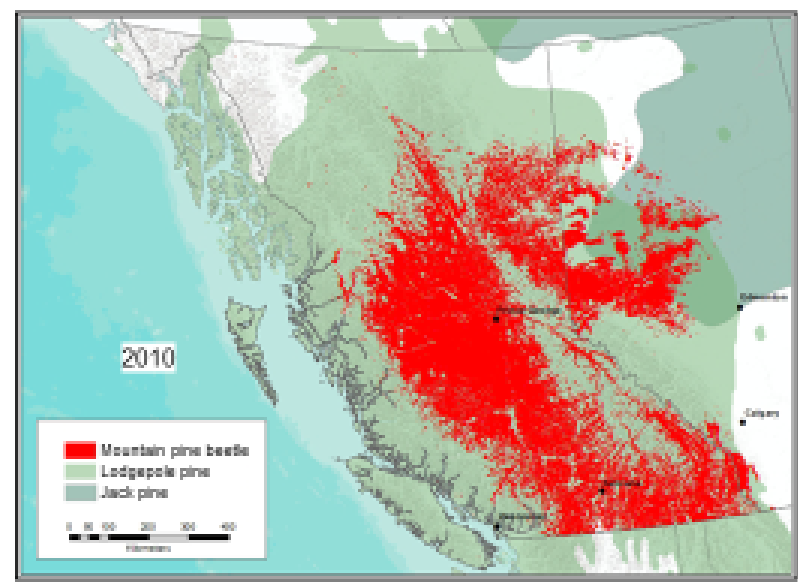


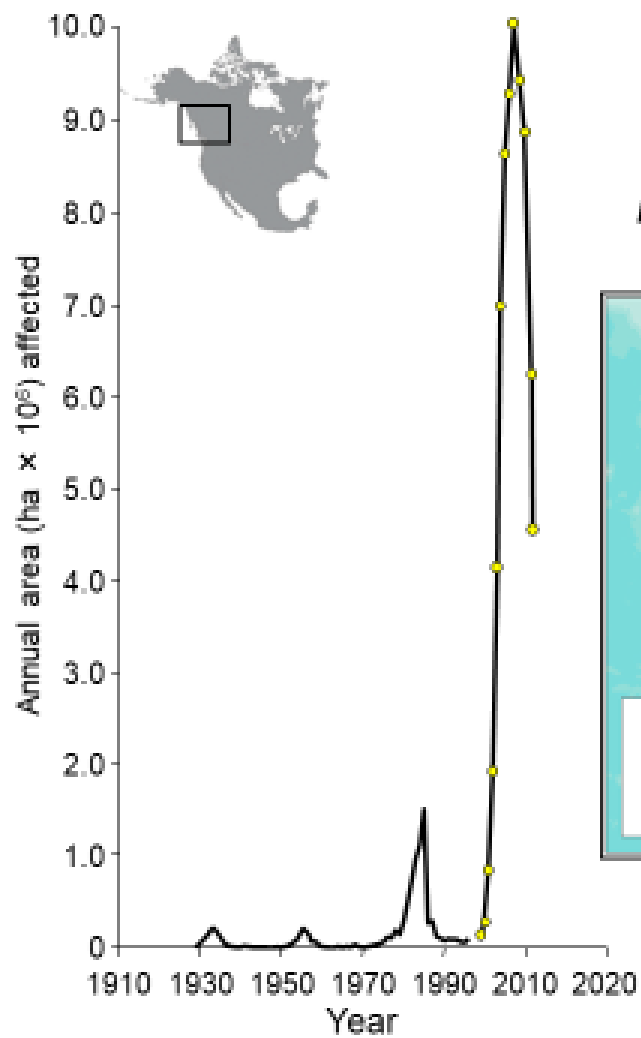
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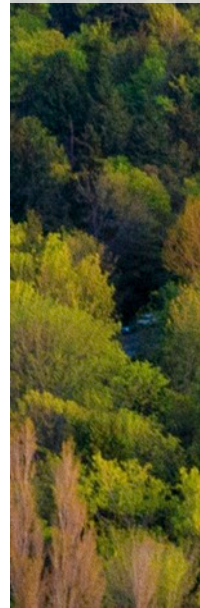
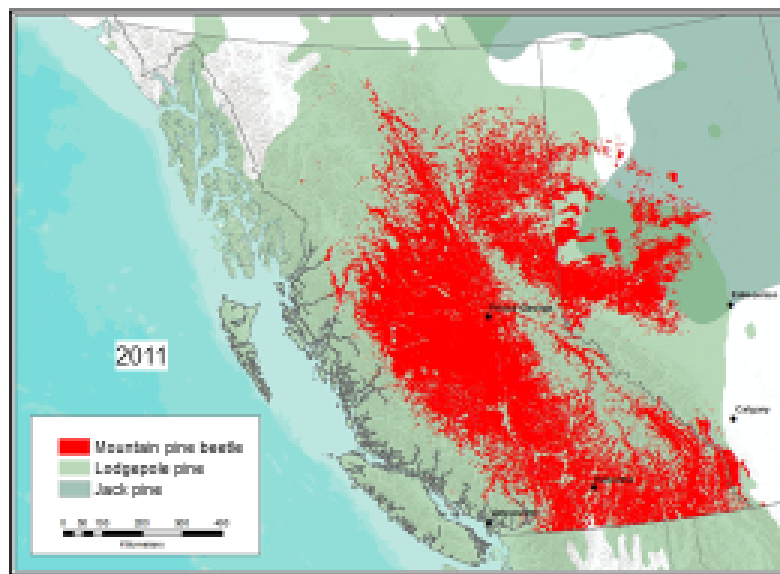


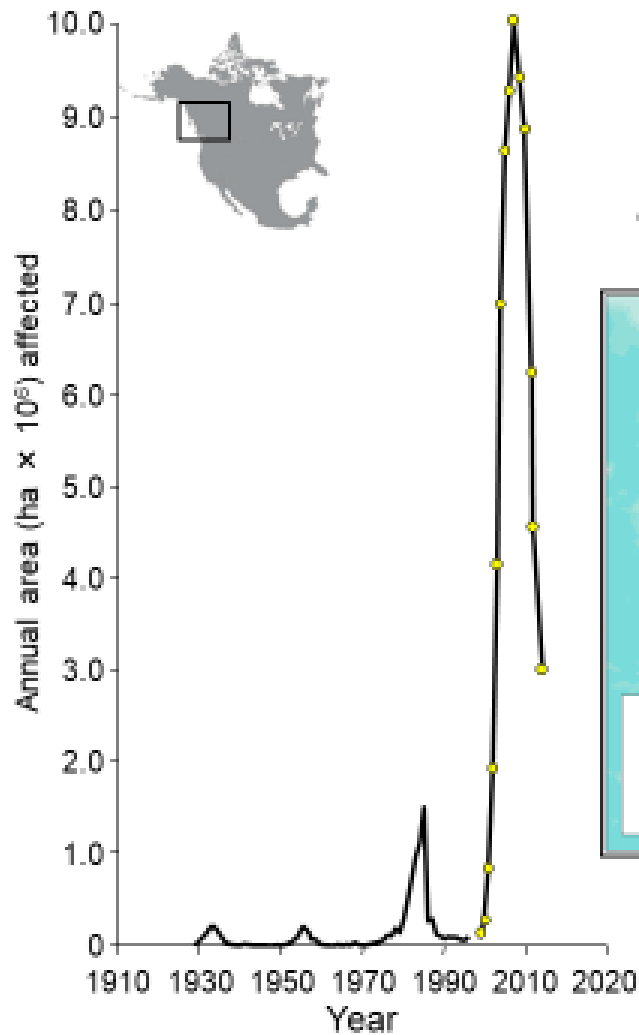
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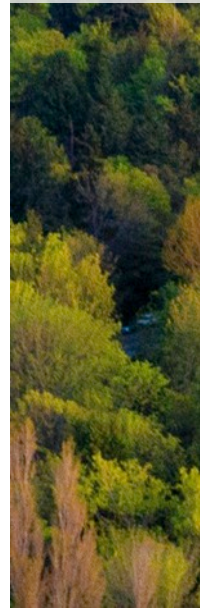
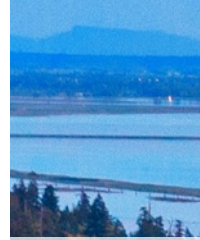
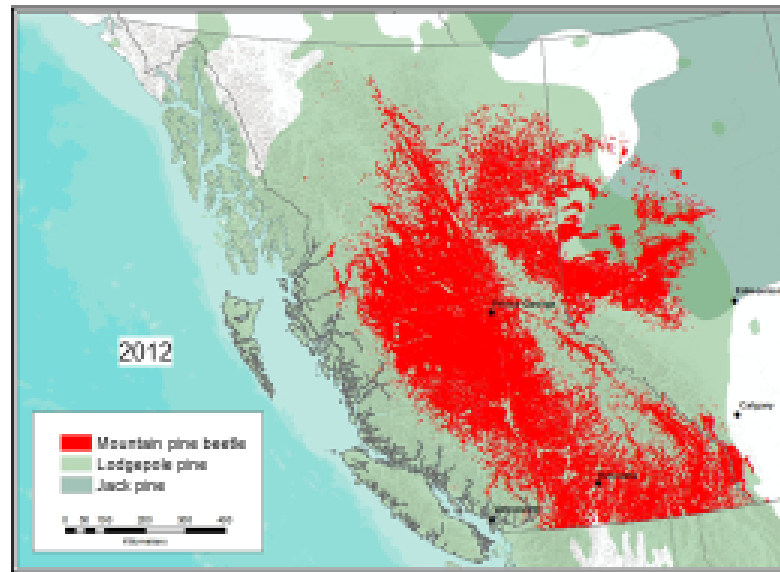


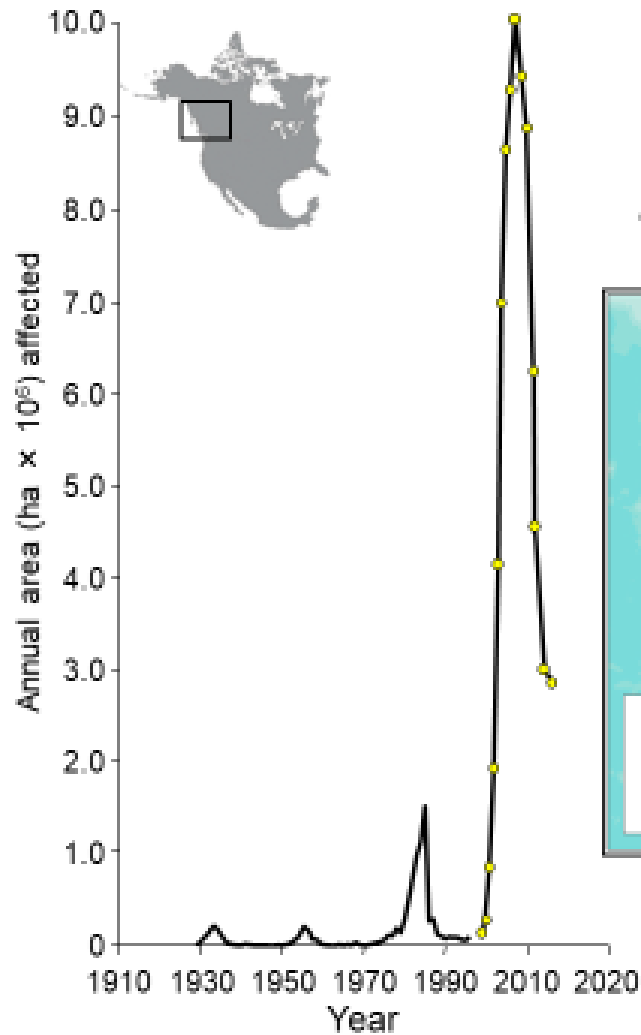
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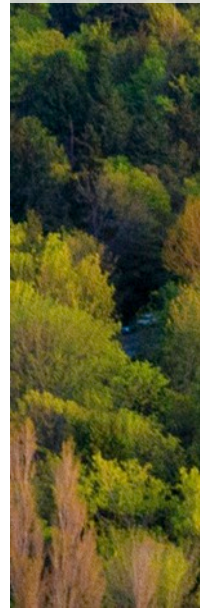
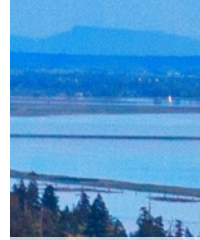
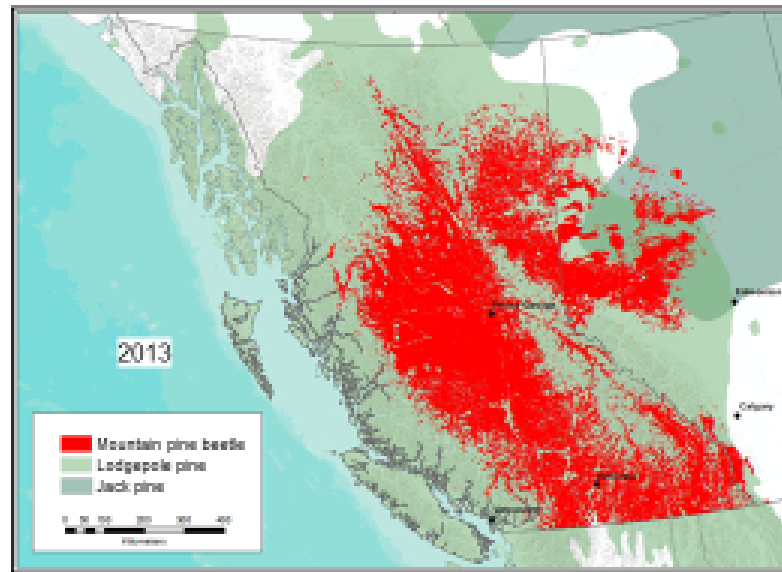


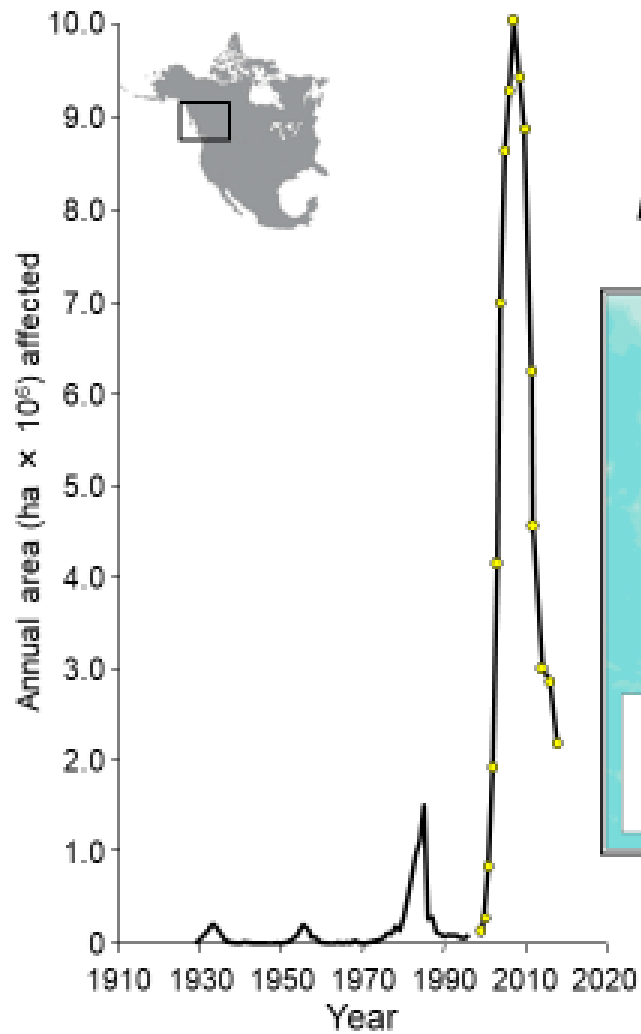
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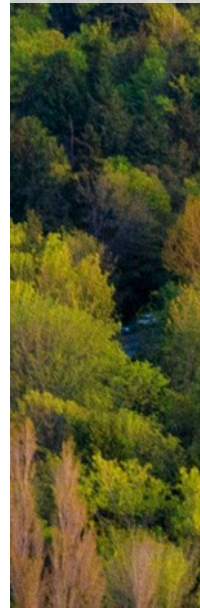
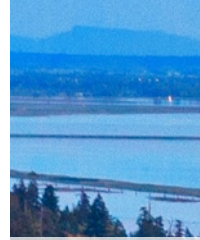
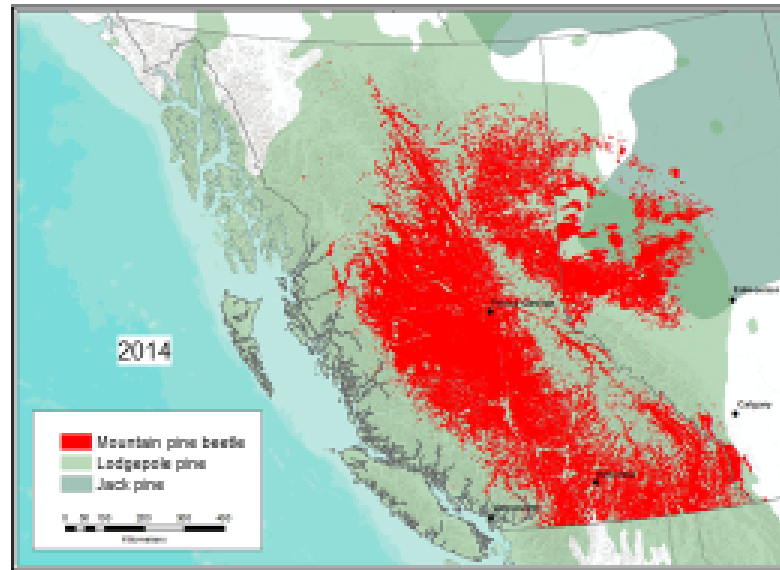


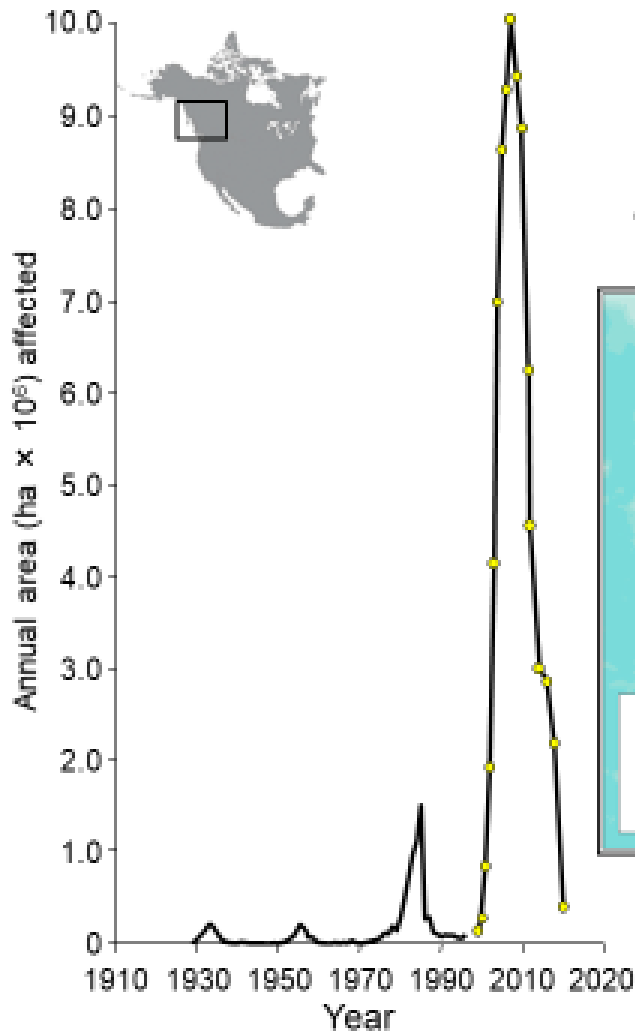
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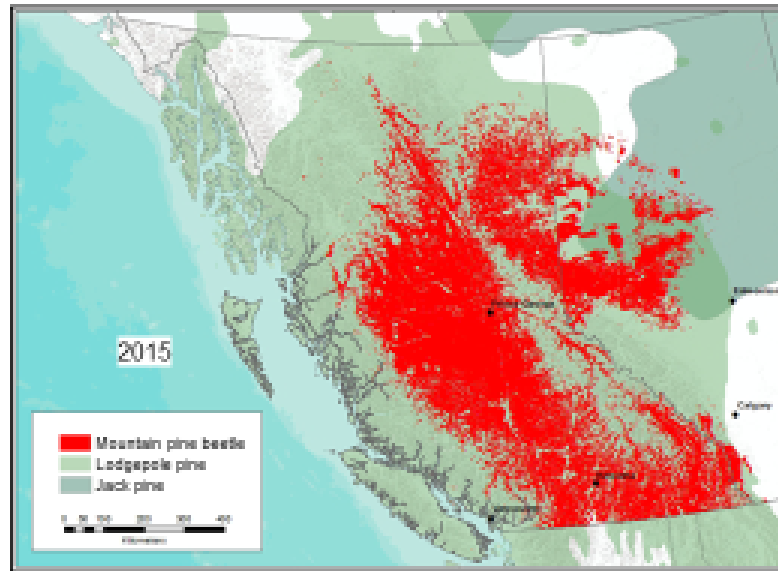
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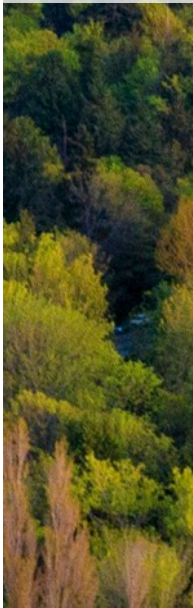


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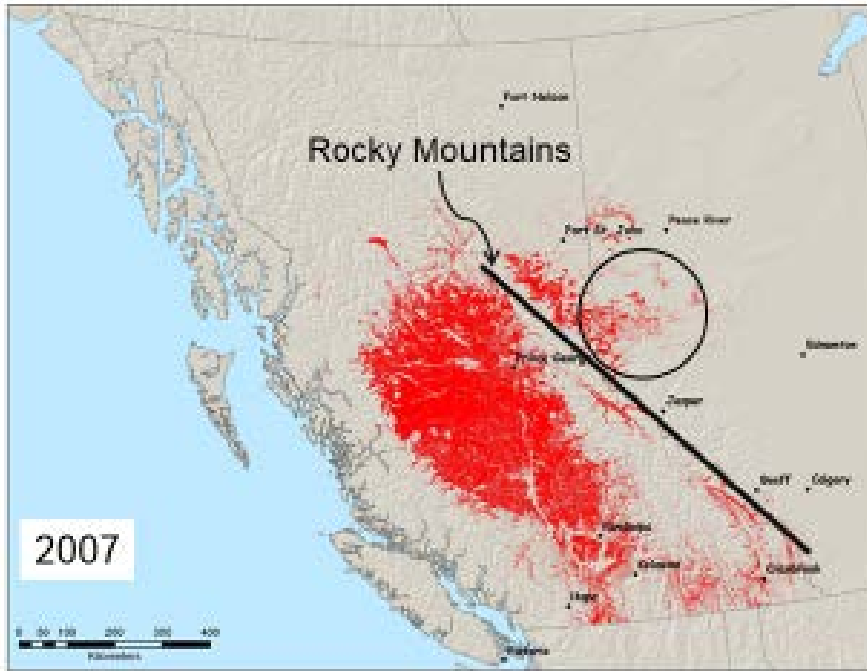
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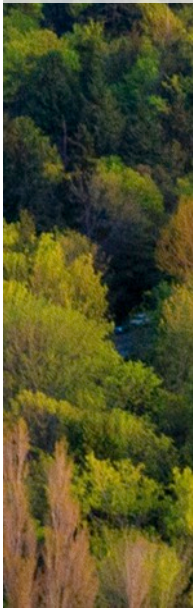
- 18 million ha affected
- 60% mortality of all mature pines in BC
- Unprecedented outbreak



THE TIPPING POINT: BREACH OF THE ROCKY MOUNTAINS

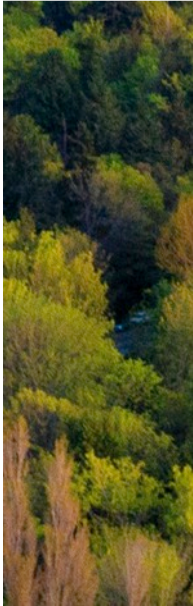
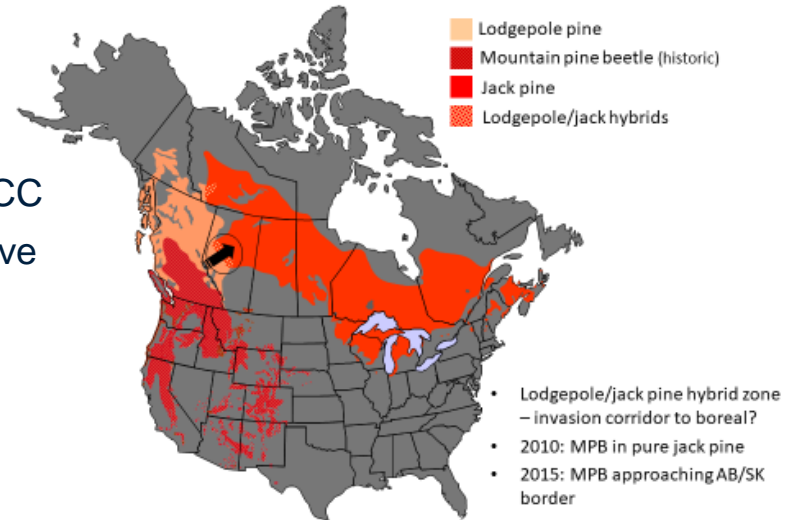


- Long-distance dispersal events in 2002, 2006
- Beetles travelled 300 – 400km east across northern Rockies
- Invasion of the Alberta plateau
- Persistence due to a warming environment
- A novel disturbance agent in naïve habitat

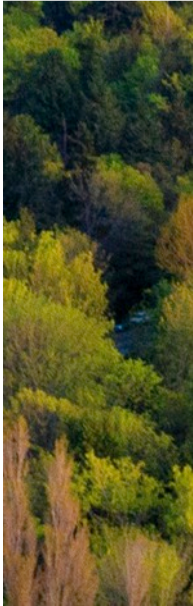
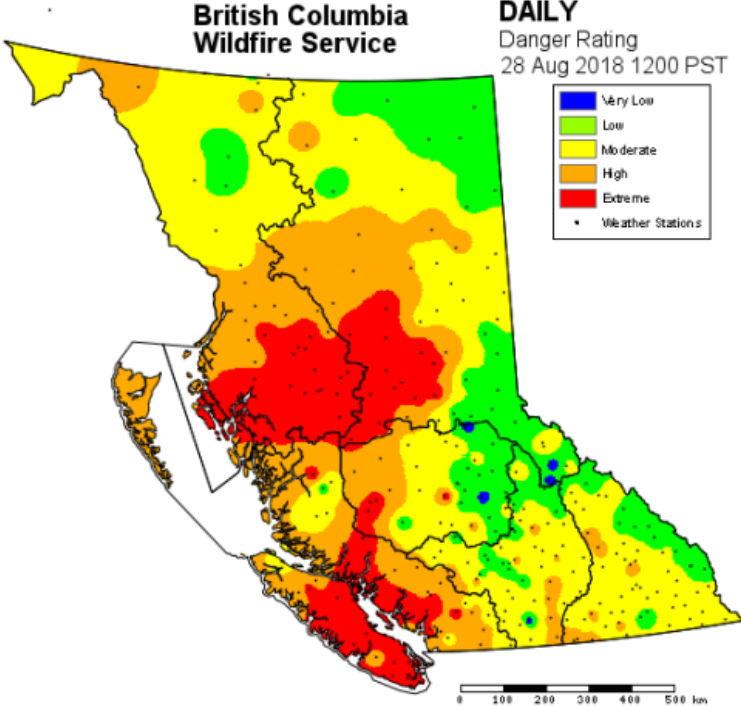
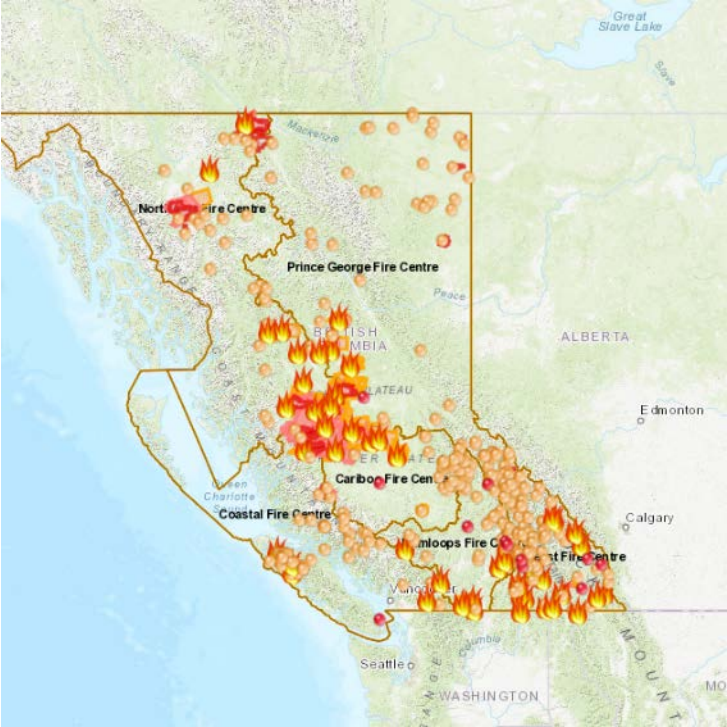


OUTLOOK

- The recent mountain pine beetle outbreak is a direct result of synergy between a warming environment and wildfire suppression
- Synergy has facilitated:
 - Altered C dynamics, potential feedback to CC
 - Rapid range expansion and invasion of naïve forest types
 - Eastward spread ongoing, boreal jack pine colonized, eastern pines at significant risk
- Major impact on fibre supply
 - Short term increase
 - Medium term major decrease

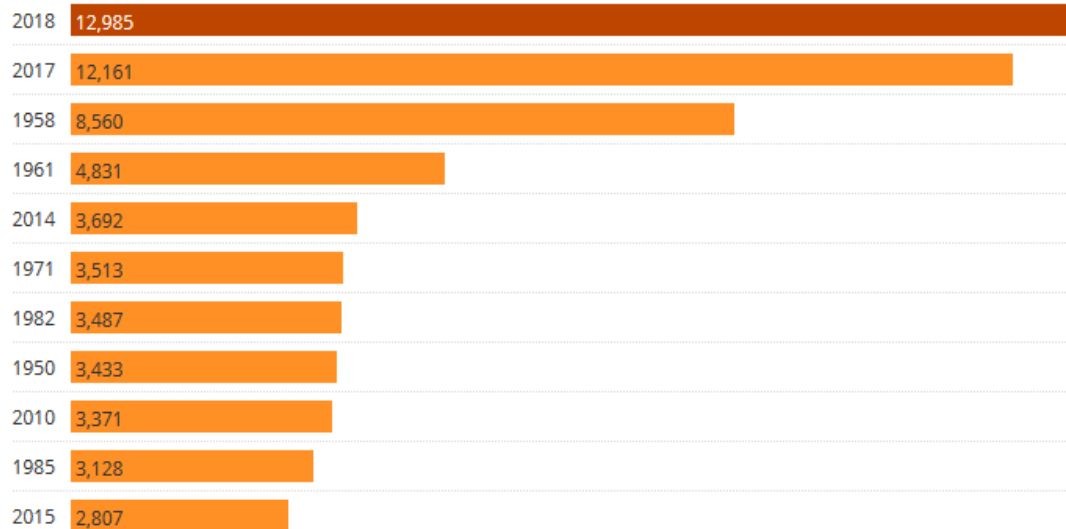


IS THIS THE NEW NORMAL FOR WESTERN CANADA?



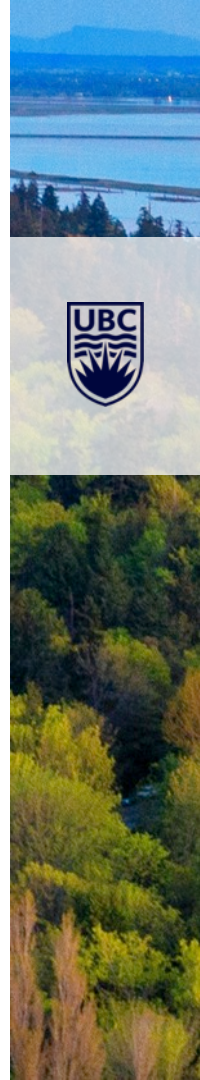
TOP 10 FIRE SEASONS IN BC SINCE 1950

Chart shows number of square kilometres burned in wildfires each season. Does not include false alarms, nuisance fires or training fires.



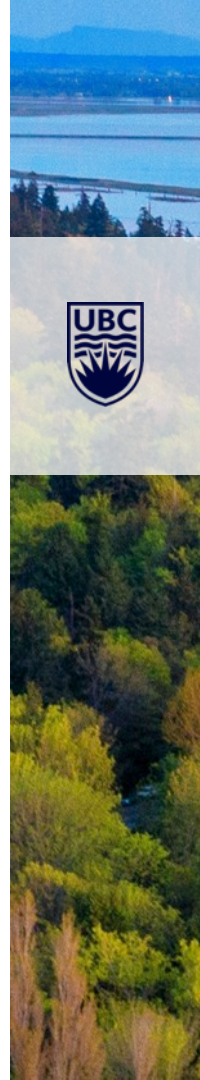
2018 data is current as of Aug. 29

Chart: Bethany Lindsay, CBC News • Source: [B.C. Wildfire Service](#)

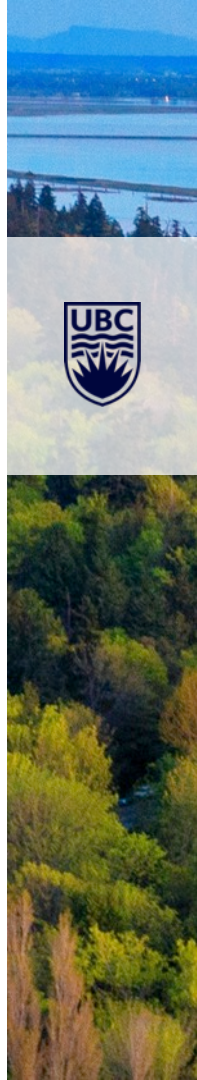
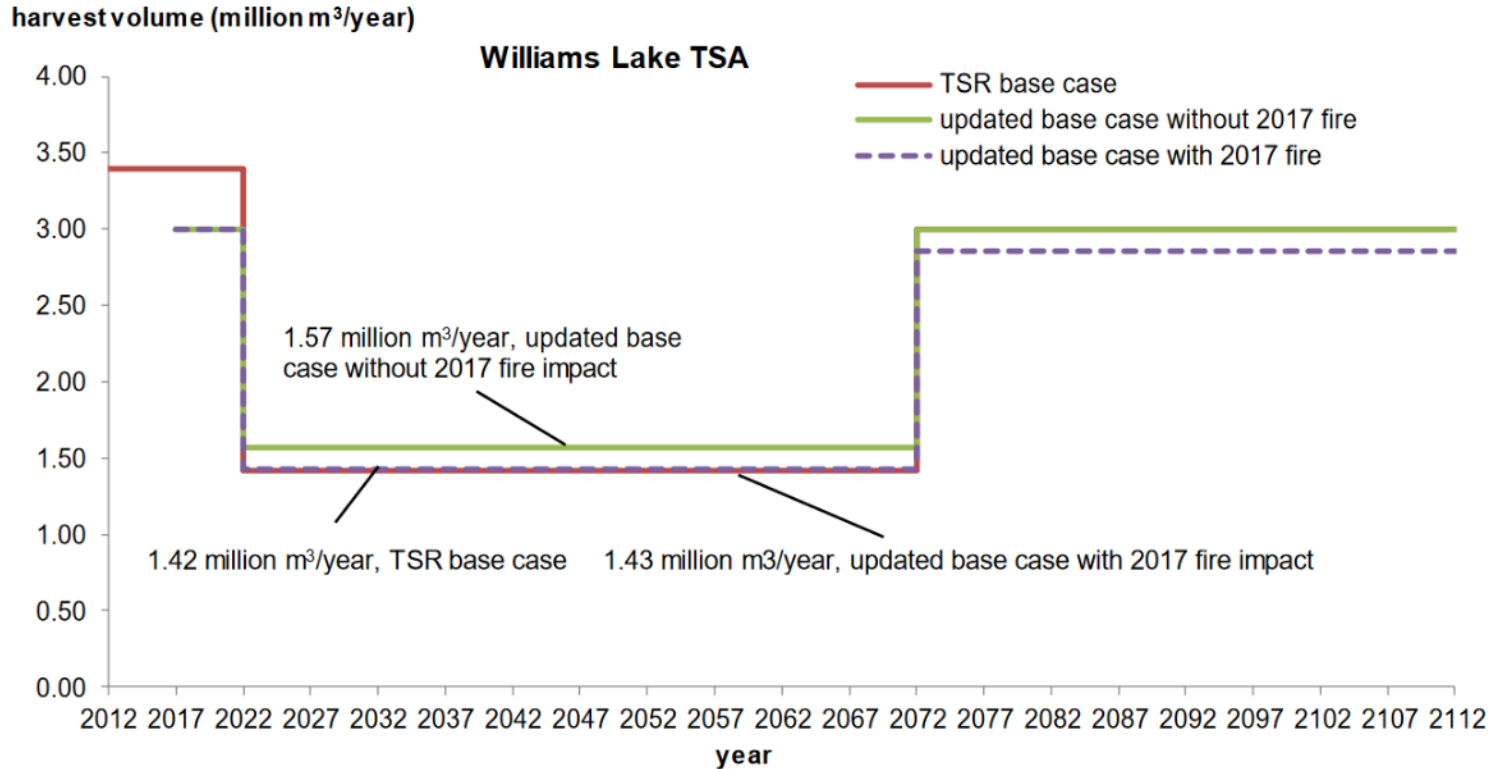


IMPACT OF WILDFIRES

Wildfire Annual Averages across Canada (10 years)	BC 2017/2018	
Number of Fires	7000	1351 (2017) 1470 (Aug. 2018)
Hectares burned	2.7 million	2.7 million in BC alone
Suppression Costs	\$800 million	\$563 million (2017)
Value of Timber Burned	\$5.4 billion	56 million m ³ burned (2017)
People evacuated	70,000	70,000
Communities Evacuated	20	
CO ₂ released	~500 million tonnes	
Extreme events	Ft McMurray 2016 (\$9 billion in losses) Slave Lake 2011 (\$750 million in losses) 2017/2018 fire seasons in BC	



FIBRE SUPPLY IMPACTS

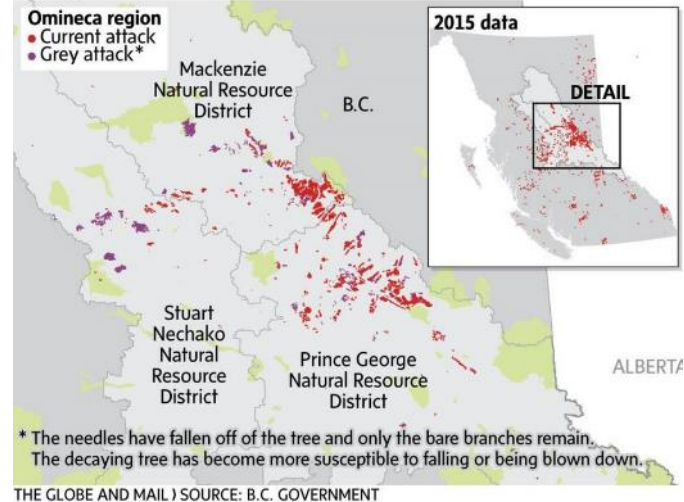


OTHER INSECT PESTS AFFECTING SUPPLY

Spruce beetle:

- Typically 2 year life-cycle
- Recent weather patterns, including warm springs, dry summers, warm winters and windstorms (resulting in more tree blowdowns) have contributed to the current increase in spruce beetle populations in this region.
- Challenging ID (after 13-15 month)
- In 2017 spruce beetles have been found in over 500,000 hectares of forest throughout the province (7,500 ha in 2013, 156,000 ha in 2016)
- Further impact on fibre supply with expected short term increase to limit outbreak

B.C. spruce beetle overview



OTHER INSECT PESTS AFFECTING SUPPLY

Spruce budworm

- Outbreaks of eastern spruce budworm occur regularly in the boreal, Great Lakes and Acadian forest regions of Canada
- Outbreaks of eastern spruce budworm occur regularly in the boreal, Great Lakes and Acadian forest regions of Canada
- Populations of spruce budworm in Quebec have increased steadily since 2006, reaching about 2.6 million hectares in 2013. This outbreak started unusually far north, on the north shore of the St. Lawrence River and north of Lac St-Jean.

7 Facts on SPRUCE BUDWORM

- 1 Spruce budworm is a native insect and the most serious pest affecting the forests of eastern Canada.
Source: Healthy Forest Partnership
- 2 Spruce budworm outbreaks occur every 30 to 40 years and last several years.
Source: Healthy Forest Partnership
- 3 A severe outbreak can kill **↑90% of mature balsam fir** and **↑50% of mature spruce trees**.
Source: Healthy Forest Partnership
- 4 Outbreaks can last **10 years** and take **6 years** to kill a tree.
Source: Healthy Forest Partnership
- 5 In 2018, the GoC announced **\$74.5M** to protect Atlantic forests from harmful forest pests.
- 6 In 2017, the GoC announced **\$50M** to support reforestation in Quebec.
- 7 In 2014, the GoC announced **\$18M** to fight the spruce budworm spread in eastern Canada and Quebec.

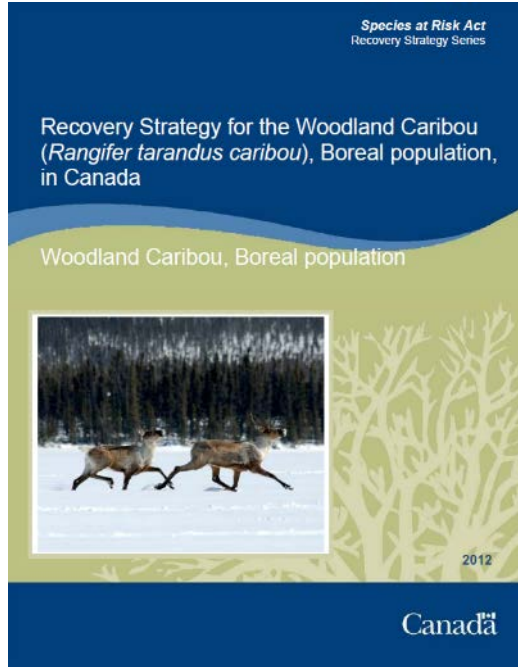
Canada

Source: Natural Resources Canada



POTENTIAL IMPACTS ON CANADIAN WOOD SUPPLY

SAR (CARIBOU) CONSERVATION



Proposed action:

- For boreal caribou ranges with $< 65\%$ undisturbed habitat:
 - Restoration of disturbed habitat to a minimum of 65% undisturbed habitat will be necessary.
- For boreal caribou ranges with $\geq 65\%$ undisturbed habitat:
 - Maintenance of a minimum of 65% undisturbed habitat will be necessary.
- “500 m buffer to mapped anthropogenic features”
- “Coordinated actions to reclaim boreal caribou habitat through restoration efforts”

Reduction in population size of $> 30\%$ over three caribou generations (approximately 20 years)



POTENTIAL IMPACTS ON CANADIAN WOOD SUPPLY

Boreal Caribou Populations across Canada

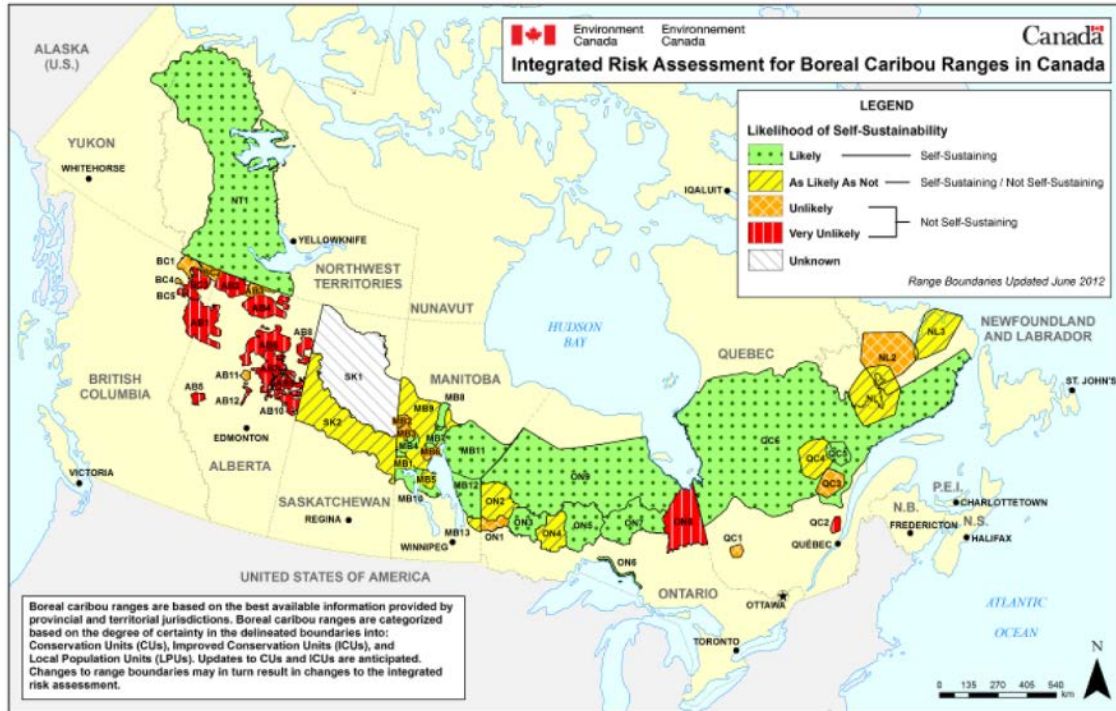
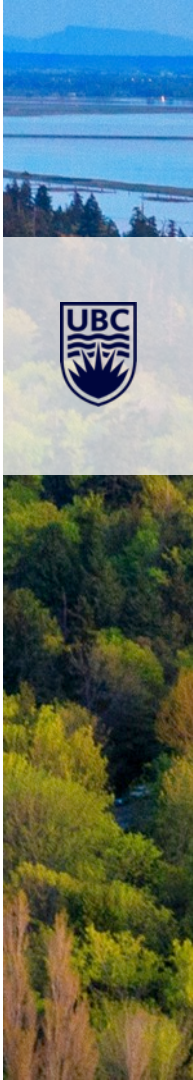
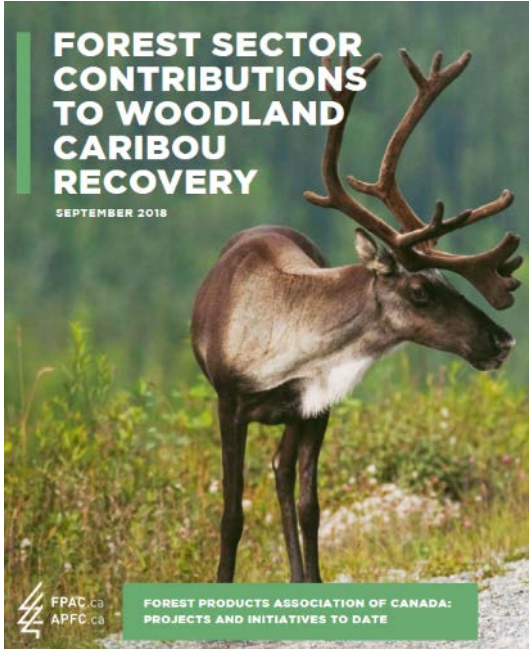


Figure 3. Integrated risk assessment for boreal caribou ranges in Canada, reflecting the capacity of each range to maintain a self-sustaining local population of boreal caribou.

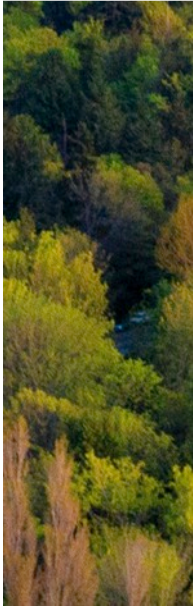


POTENTIAL IMPACTS ON CANADIAN WOOD SUPPLY - CARIBOU



Ongoing debate:

- Proposed actions would eliminate large areas of the timber harvesting landbase
- Need for science based decision making
- Need for regional flexibility
- Assessment of socio-economic impacts
- Need for innovative approaches to landscape level planning



POTENTIAL IMPACTS ON CANADIAN WOOD SUPPLY - TENURE



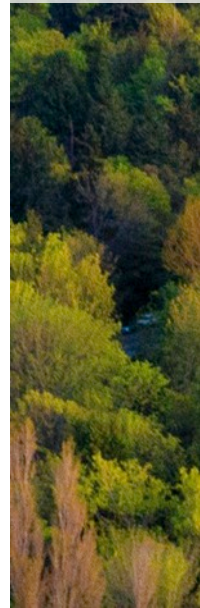
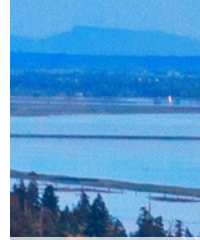
Photo credit: Friends of the Nemaiah Valley



Photo credit: BC Community Forest Association

This ruling of Aboriginal title confers rights including:

- the right to decide how the land will be used;
- the right to economic benefit of the land;
- the right to pro-actively use and manage the land.

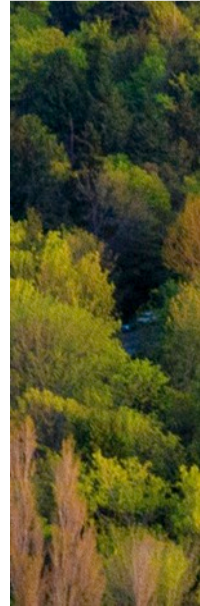
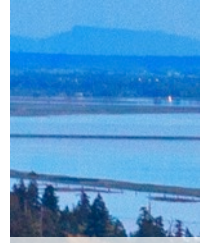


SOLUTIONS TO MAINTAIN FIBRE SUPPLY IN CANADA

- Diversification of industry
- Holistic approaches to forest management that account for the new realities/values of a more diverse landscape
- Better utilization of existing resources
 - Standing timber
 - Harvest residues
- Investment in Research & Development to improve:
 - Improve knowledge about the forest
 - Adapt forest practices to the new climate reality
 - Improved inventory information
 - Landscape level approach to forest management
- Modern innovative harvesting & transport systems
- Rethinking how we manage for wildland fire
 - More prescribed burning on the landscape
 - Fuel reduction as an opportunity for fibre supply



Management Practices for Integrated Harvest Operations in British Columbia



SOLUTIONS TO MAINTAIN FIBRE SUPPLY IN CANADA

FPIinnovations  Steep Slope Initiative

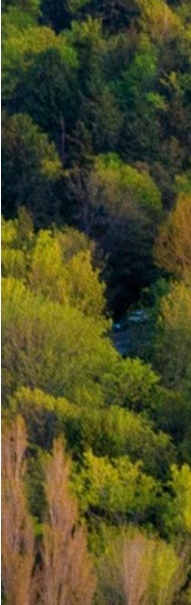


FPIinnovations  |  | 

WINCH-ASSIST HARVESTER:

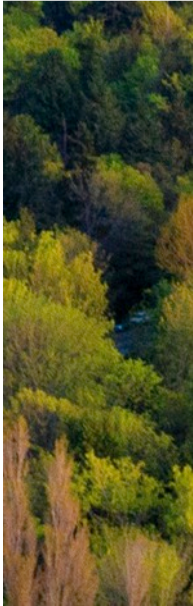
BEST PRACTICE MANUAL

SPECIAL PUBLICATION SP-533



SOLUTIONS TO MAINTAIN FIBRE SUPPLY IN CANADA

FPInnovations  Forestry 4.0 Initiative



CANADA IS KNOWN AS THE LAND OF FORESTS



Canada:

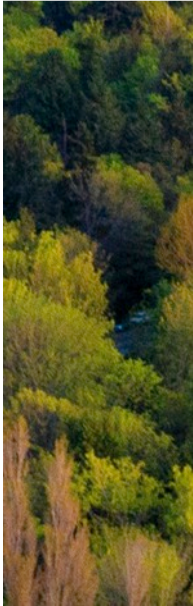
- 400 million ha forest land
 - 90% Provincial & Territorial
 - 6% private land
 - 2% Aboriginal
 - 2% Federal
- 161 million m³/a annual cut
- 779,577 ha harvested

British Columbia:

- 60 million ha forest land
- One of the largest public forests on earth
- Only 5% private ownership
- 10% protected areas
- 68 million m³/a annual cut
- 192,615 ha harvested

Sweden:

- 21 million ha forest land
 - 81% private
 - 19% public
- 82 million m³/a annual cut





THE UNIVERSITY OF BRITISH COLUMBIA

THANK YOU

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