

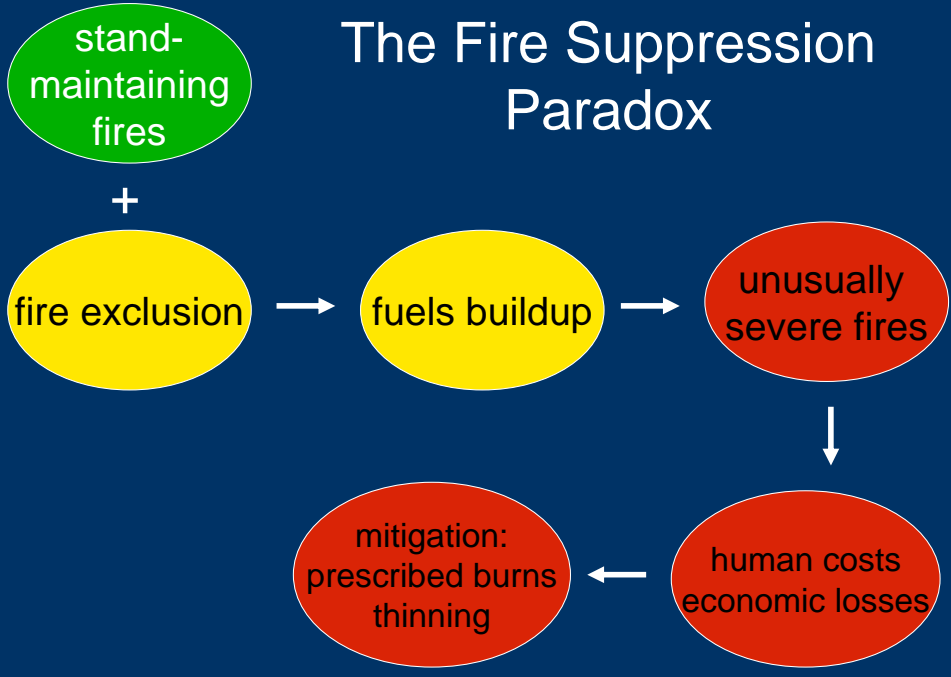
**Mixed-Severity Fire Regimes
in the Montane Forests
of the Southern Rocky Mountain Trench**



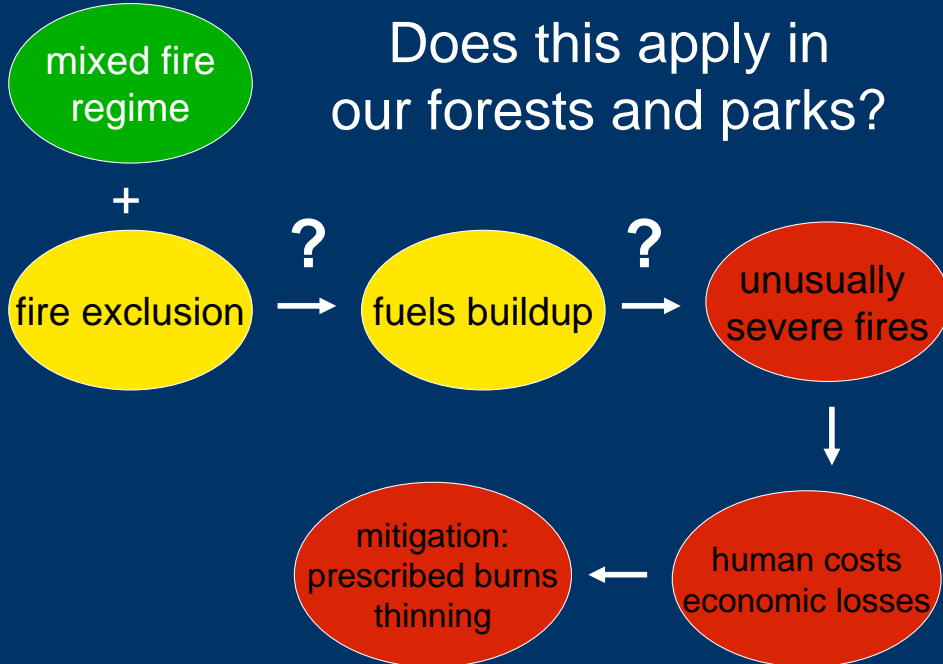
**Lori Daniels & Jed Cochrane, Geography, UBC
Bob Gray, R.W. Gray Consulting**



The Fire Suppression Paradox



Does this apply in our forests and parks?



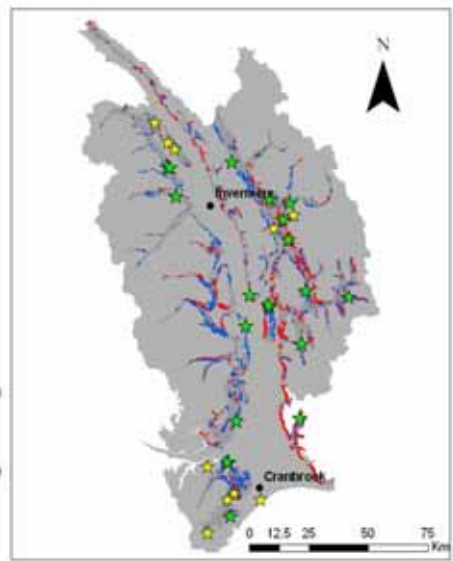
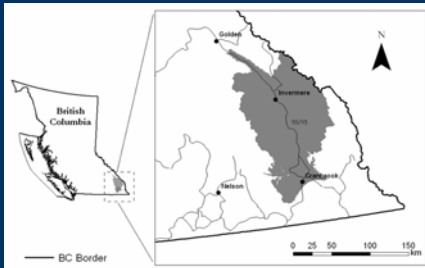
Generalizations need to be replaced by area-specific research to guide effective and efficient ecological restoration

How different are modern vs historic fire regimes in terms of fire frequency and severity?

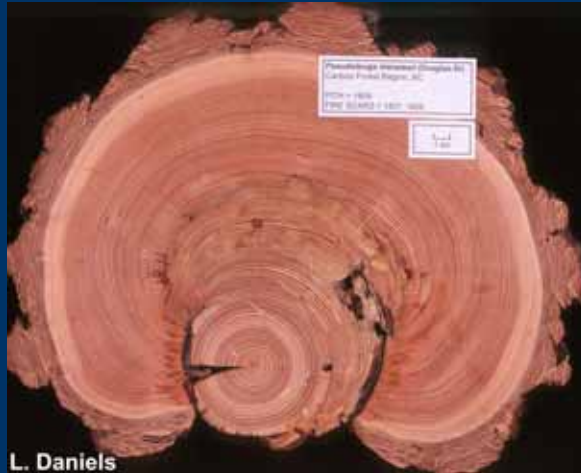
How does climate variation affect fire regimes?

What factors other than fire exclusion may account for high stand densities?

30 Study Sites in Montane Forests with Old-Growth Structures



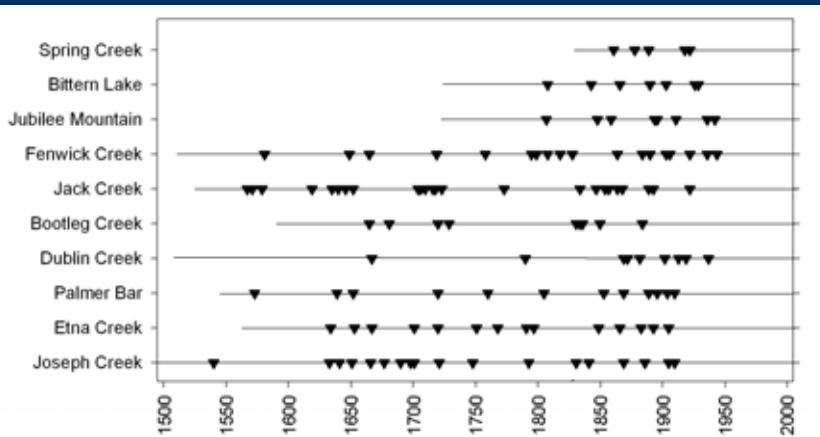
Crossdated Fire Records



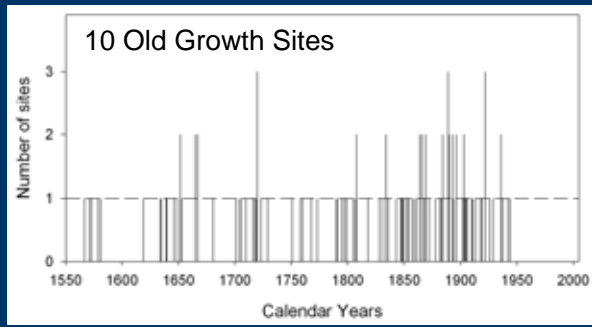
- **Fire records**
 - 30 sites
 - >250 trees
 - >400 scars
- **Return Interval**
 - local scale
 - regional scale

Local-Scale Fire Chronologies

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↓
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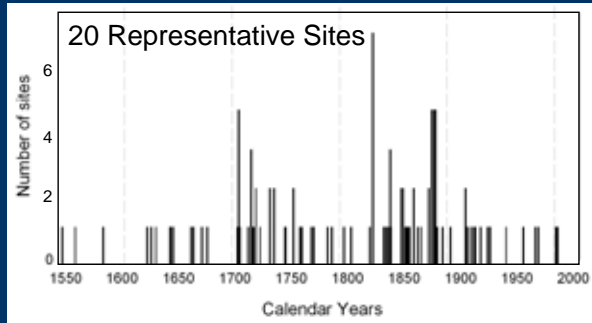


Median fire intervals: 10 to 78 yrs
Interval range: 2 to 138 yrs



Fire Record 1:

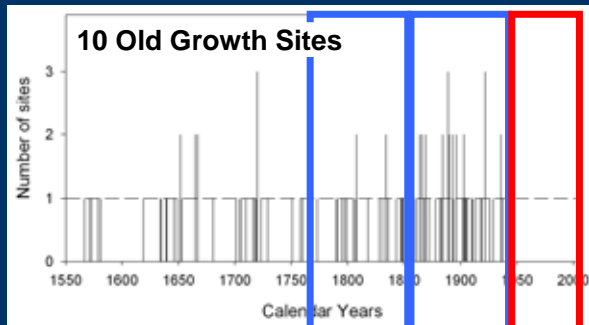
100 disks
295 scars
1540-1944



Fire Record 2:

149 disks
272 scars
1509-2003

Daniels et al. 2007, Cochrane 2007



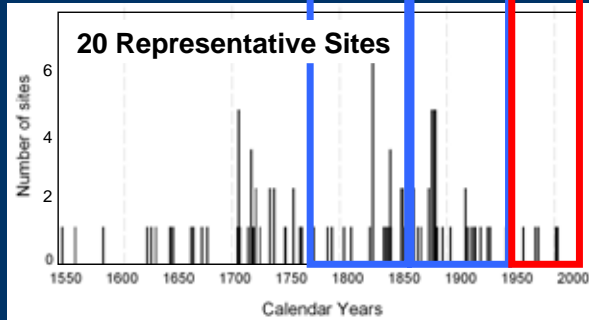
1770-1857: pre-settlement
 1858-1944: settlement
 1945-2006: modern era

1509-1944
 1 fire every 3 years

1945-2006
 Expected c. 20 scars
 Observed 5 scars

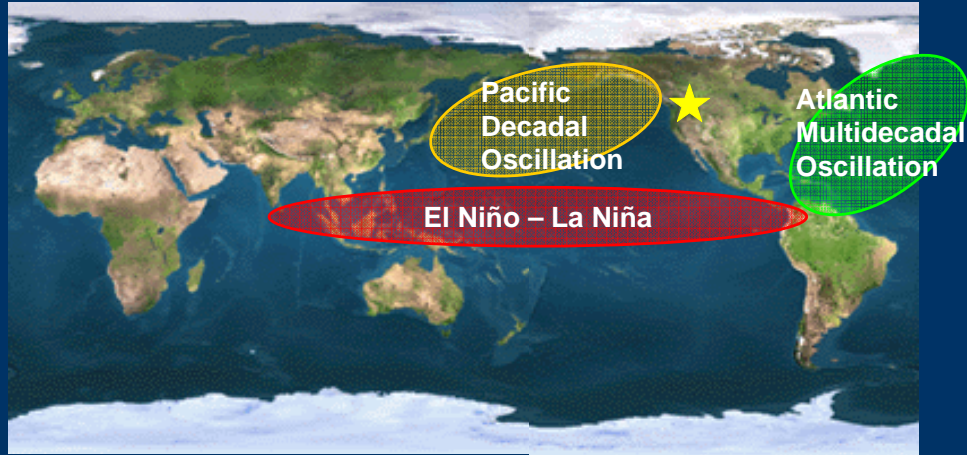
Contributing factors:

- cessation of burning by First Nations
- fire exclusion/suppression
- climate variation



Daniels et al. 2007, Cochrane 2007

Global Climate and the Kootenays



“teleconnections”

Global Climate and Fire

	+AMO	- AMO
+ PDO	El Niño	El Niño La Niña
- PDO	Few fires	La Niña



- 1900-22 – highly susceptible to fire
- 1923-43 – more fires during El Niños
- 1944-66 – less conducive to fire
- Since 1981 – more fires during El Niños (e.g. 2003)

Daniels et al. 2007

Historical Fires in the East Kootenays

- Median fire intervals = 10-78 yrs, range = 2-138yrs
- Current fire-free intervals exceed historical variation at many (but not all) sites
- Climate and humans influence fires
 - global climate influences drought and fires
 - cessation of First Nations fires + fire exclusion
 - fire free period = strong influence of fire suppression



Implications and Questions for Restoration Ecologists...

- Many current forest structures =
natural processes + fire suppression effects

*Where should we thin the forest and prescribe burns...
to restore the ecosystem?
to mitigate to reduce fire risk?
with what frequency? severity?*

Acknowledgements

- Thanks to Brad Gooderham, Janneke Lade, and Brent Watson for assistance
- Funding was provided by Parks Canada, Tembec and Canfor, Forest Investment Account and Forest Science Programs of British Columbia

