Forest Economics in a Dynamic and Changing World
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What makes Mountain Pine Beetle a Tricky Pest?
Optimal harvest when facing a beetle attack in a mixed species forest

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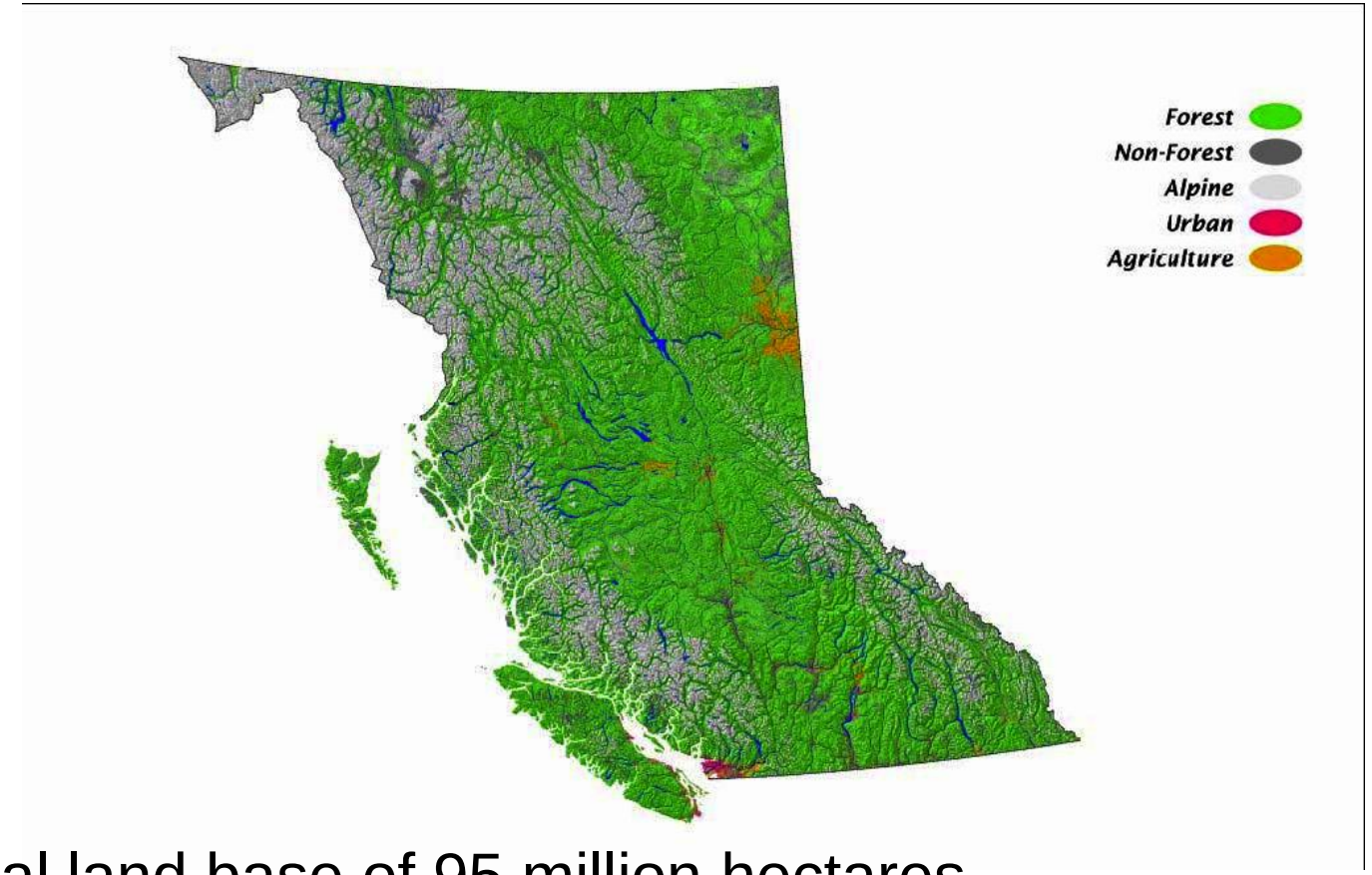
Overview

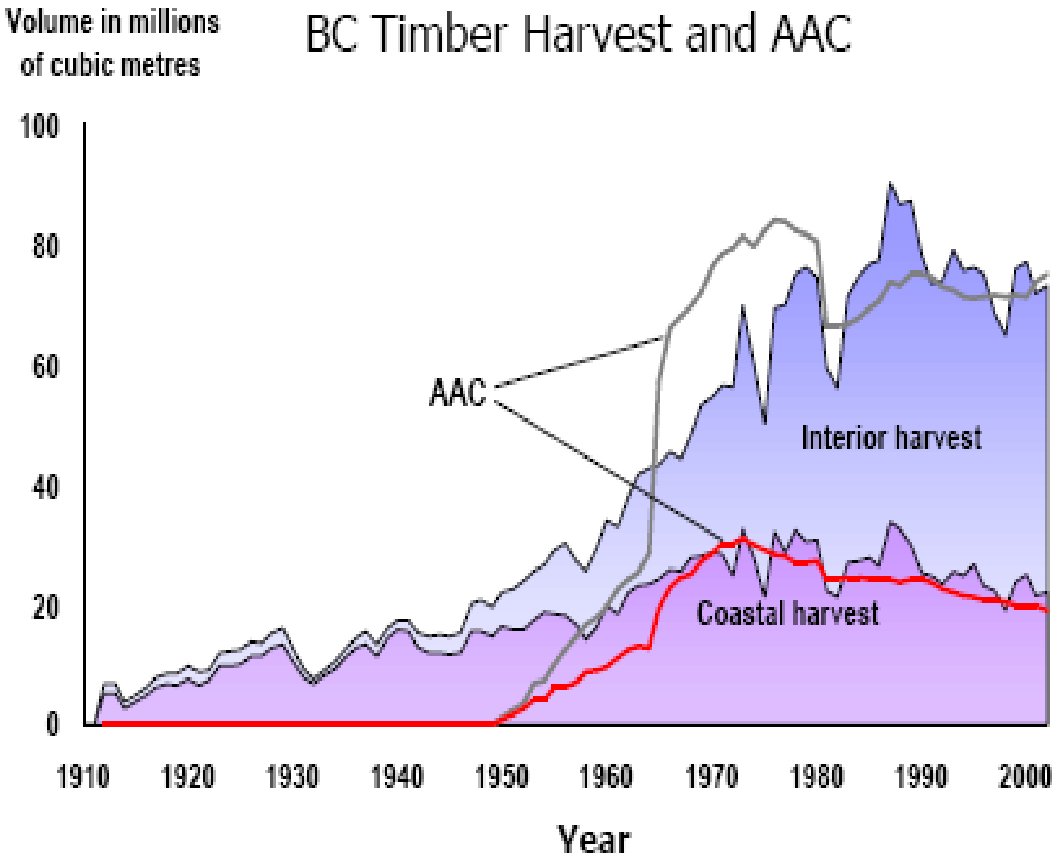
- BC forest management context
- Beetle dynamics
- Model description
- Outcomes
- Conclusion

Forest Land in BC



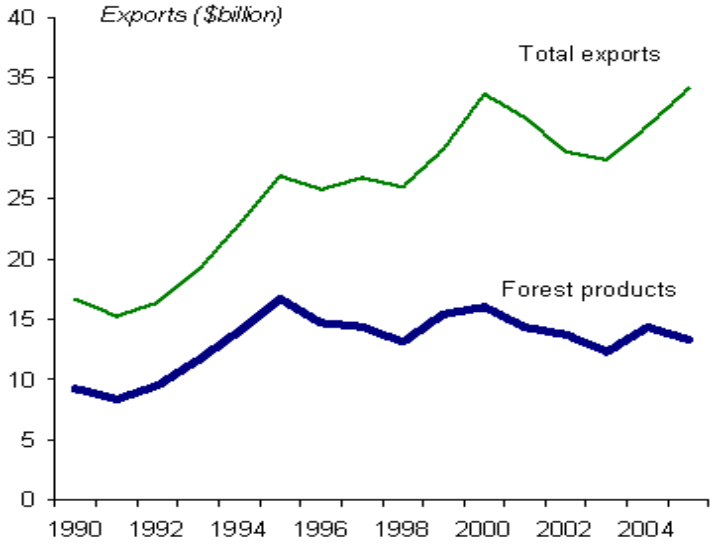
- Total land base of 95 million hectares
  (Larger than France and Germany combined)
- 2/3 is forested
- Half of BC's forest has had little human disturbance
- Harvest of <1% per year

History of AAC in BC



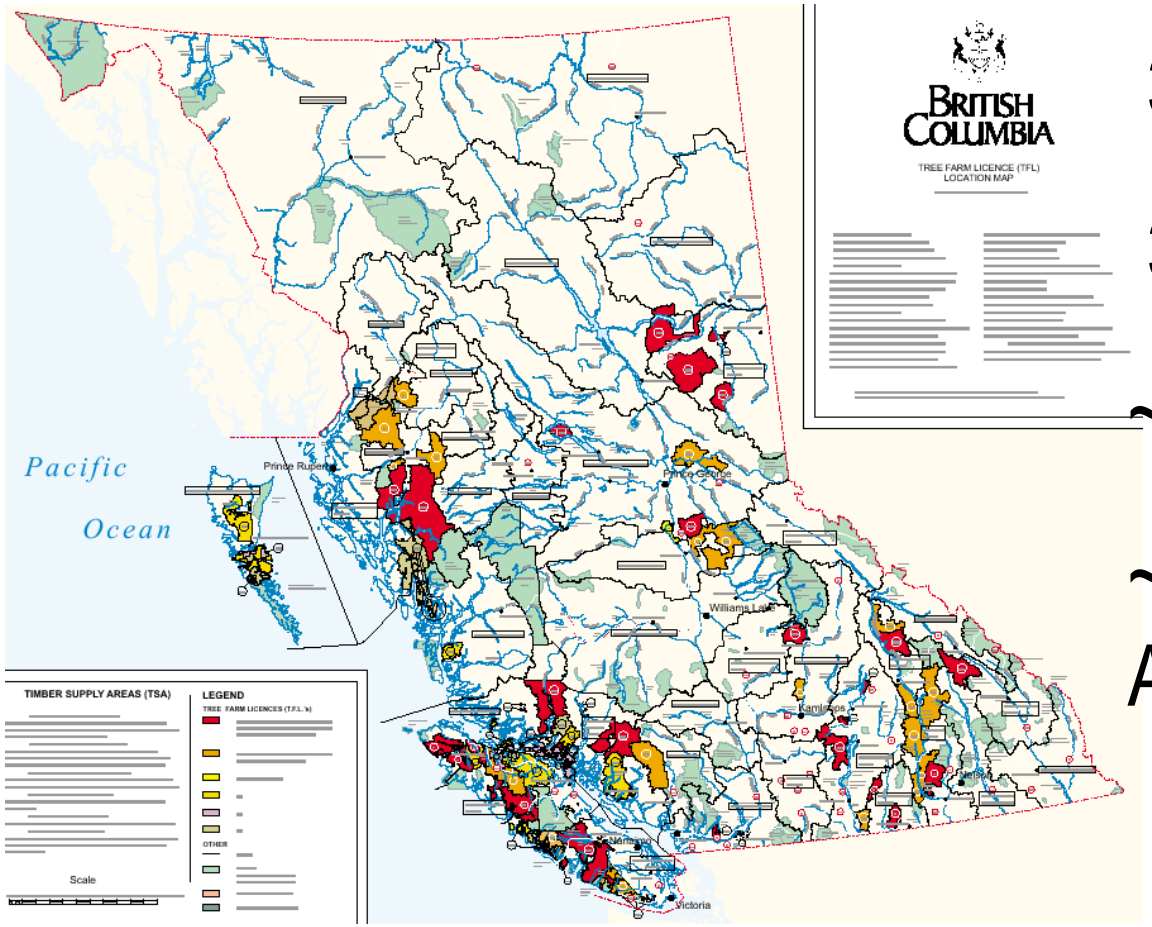
Forestry's Role in BC's Economy

Source: Statistics Canada



Source: BC Stats

Forest Management Units on BC Public Lands:



37 Timber Supply Areas

34 Tree Farm Licences

~800 Woodlot Licences

~10 Community Forest Agreements

Tenure Arrangement

- Government estimates the quota, or allowable annual cut.
- Forestry companies decide where, when and what to cut.

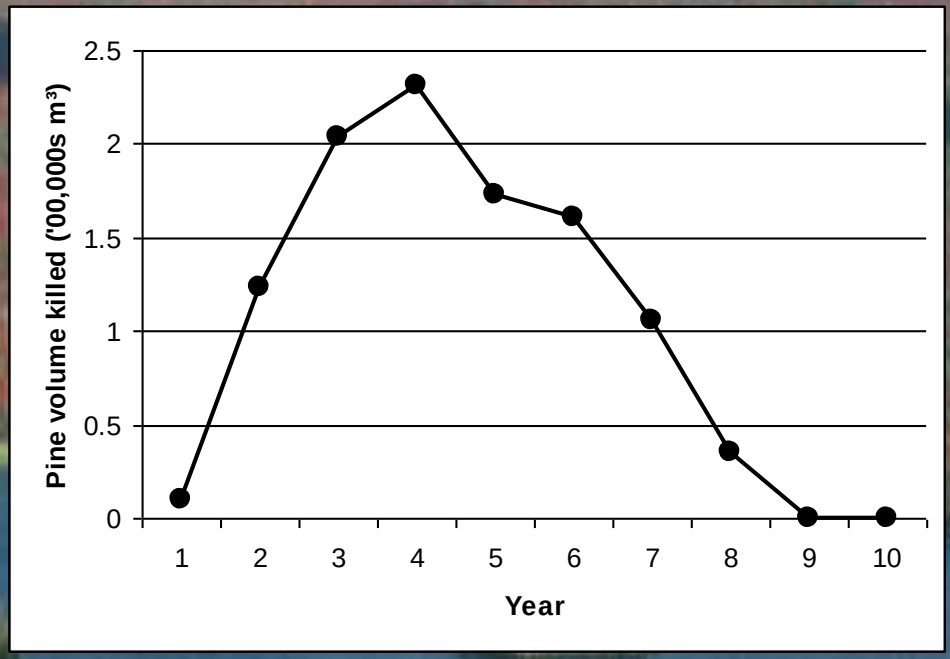
Public Landowner objectives

- Sustained yield
- Revenue to offset public programs
- World class forest industry
- Leader in sustainable forest management practices and multiple resources
- Positively respond to beetle epidemic

Mountain Pine Beetle

- Forest is not homogenous

- Beetle damage is not always complete



Linear Program Formulation

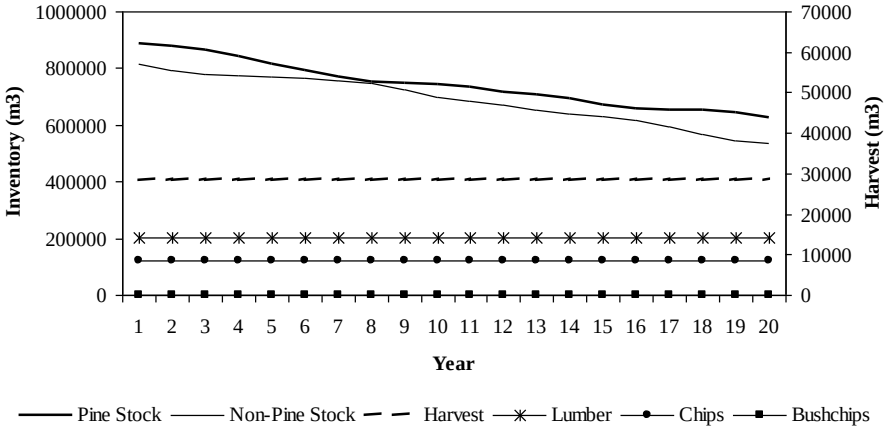
- Objective function –
  - Maximize value of standing timber at year 20 (planning horizon)
- Subject to –
  - Achieving positive annual net revenue
  - Harvest flow condition
  - Minimum harvest level
- Assuming clearcutting / no forest growth

Analysis Scenarios

- Shelf-life (0/5/10 years)
- Products (Lumber/Bushchips)
- Harvest flow (Total/Product)

Baseline without MPB

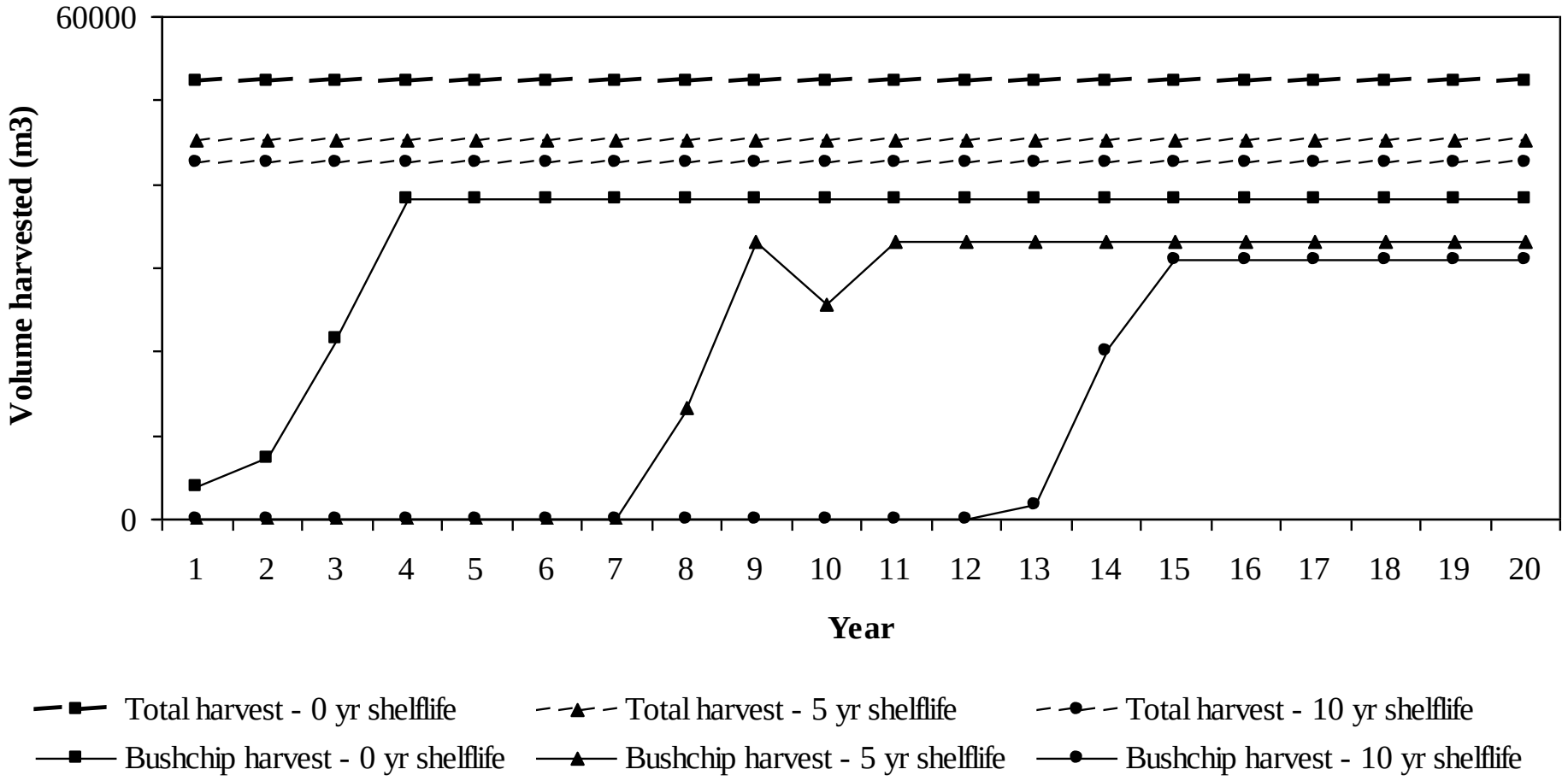
- Terminal value of $34.6 million
- Harvest one third of the forest
- ~50% of the harvest in pine
- ~30,000 cubic metres/year with positive net returns of $~580,000



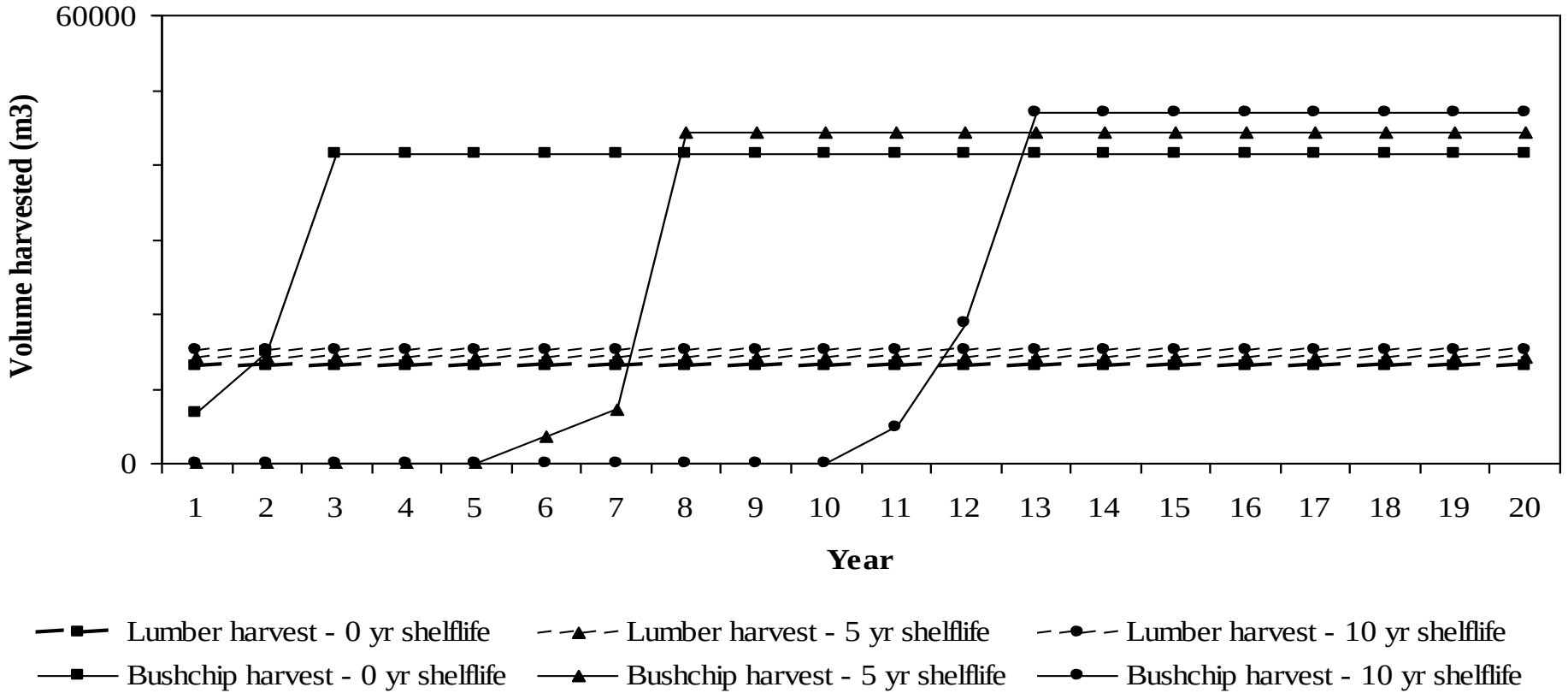
Maximum Terminal Condition

- With no minimum harvest requirement, a terminal condition of $13.47 million regardless of shelflife (40% of the baseline).
- Half of the forest is harvested in 20 years.
- 25% of the pine is not harvested as it is a component of stands that will retain a positive value at the end of the 20 years.

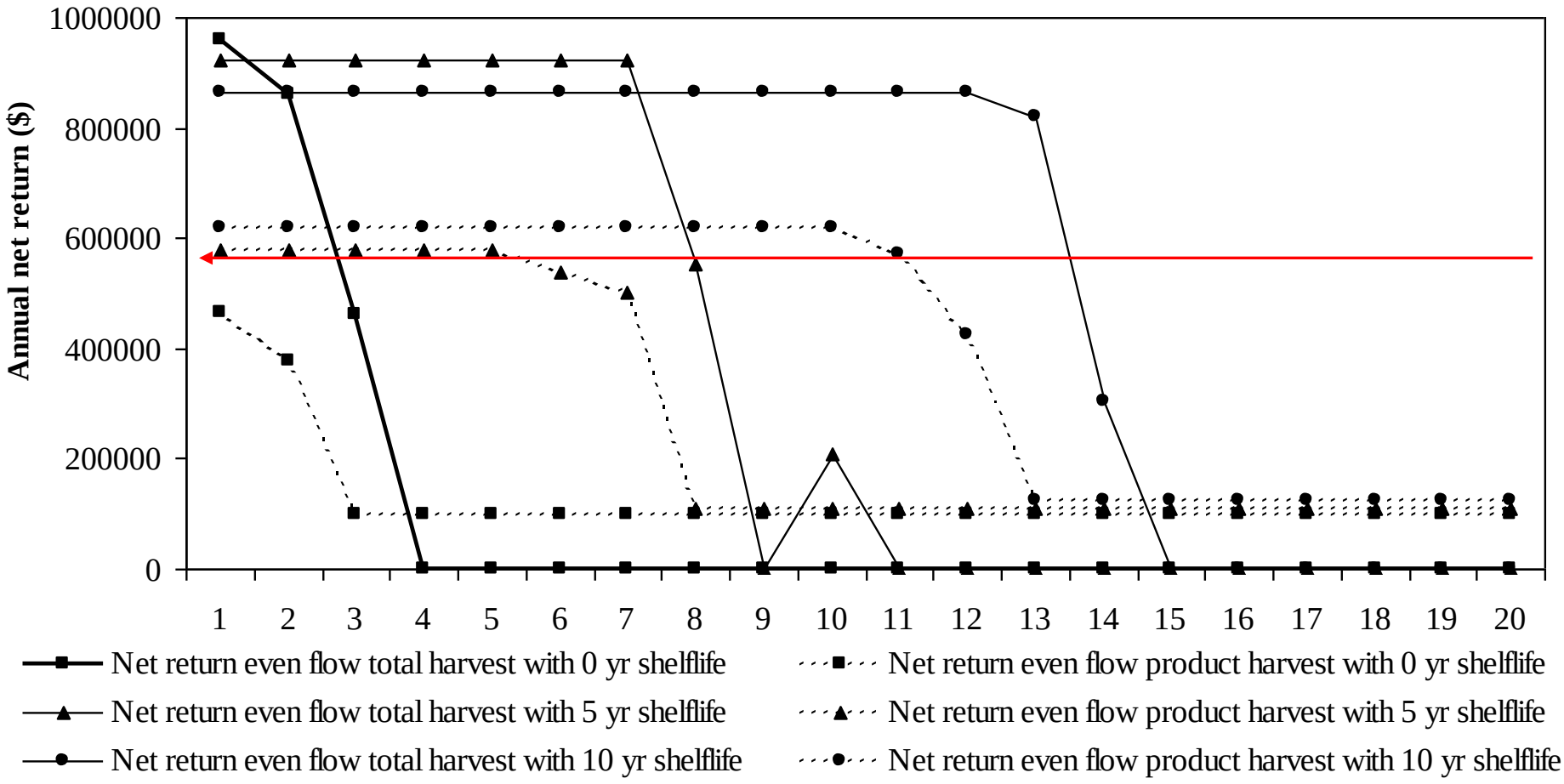
Total Harvest Evenflow



Product Harvest Evenflow



Annual Net Revenue



Conclusions

- Traditional economic objective of maximizing NPV isn't conducive to maintaining future timber supply.
- Uplift is justified
- Forcing product objectives may not be the most economically efficient.
- Lumber production is subsidizing bush chip harvest. Raises questions about the viability of economical biomass generation.

BC Government Options

1. Ensure continuous revenues by mandating product harvests.
2. Manage the harvest more flexibly and prudently distribute the expected short term gains.
3. Do nothing to speedup the harvest of damaged pine and simply reduce the harvest.