Carbon Pools in a *Eucalyptus pilularis* (Blackbutt) Regrowth Forest Managed for Production or Conservation

Daniel St Merryn Payne

Australian National University

Canberra, Australia

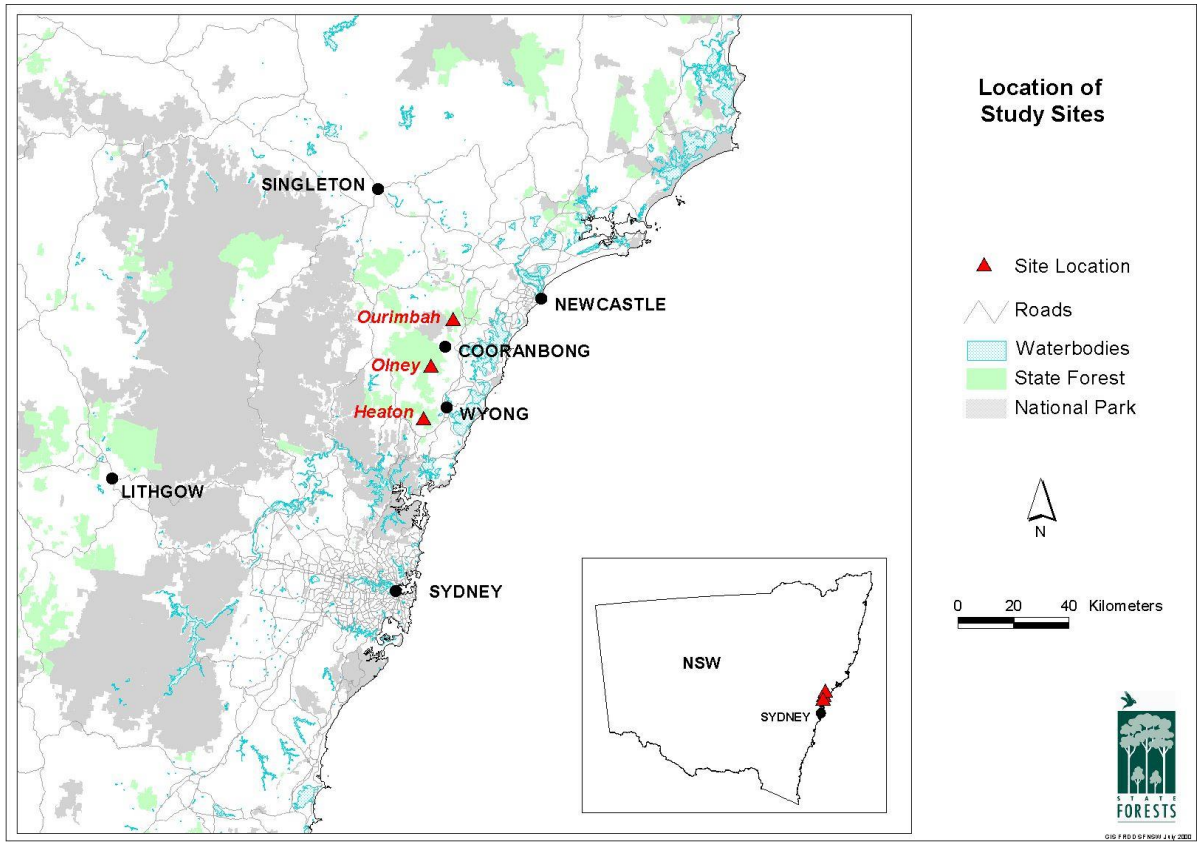
Rationale

- Kyoto Protocol Article 3.4
  - Native forest management (harvesting, fire)

Objectives

- Assess and measure the carbon pools in a forest ecosystem
- Predict the effect of different management regimes on the carbon pools

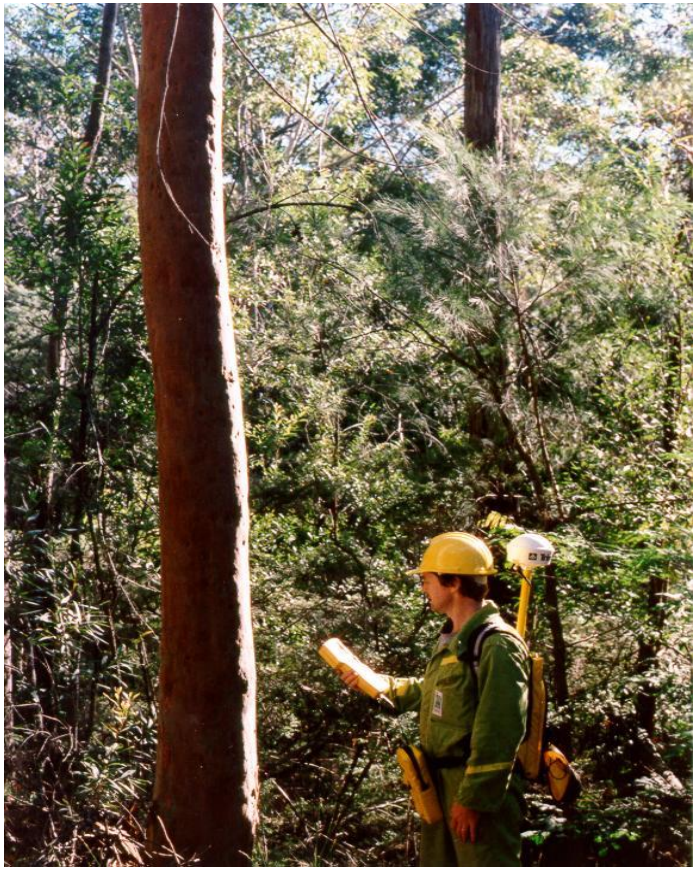
Study Area

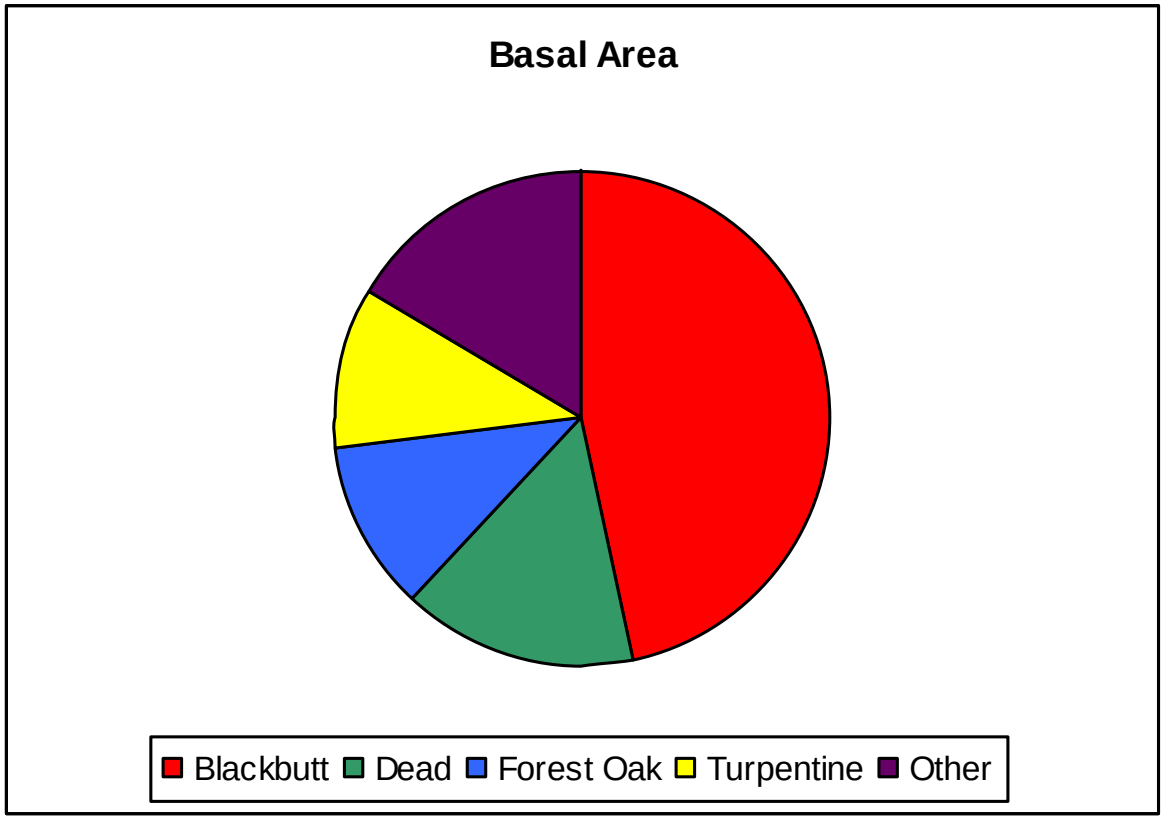


- Ourimbah State Forest (SFNSW)
- Blackbutt dominant overstorey
- 2 Ha Plot, 1 Ha harvested

Data collection

- Overstorey: Forest inventory
  - DBH, height, stem quality





Data Collection cont.

- Overstorey: destructive sampling
  - 10 Blackbutts
- Allometric equation development

Data collection cont.

- Understorey: stratified by understorey type
  - 12 2m * 2m plots

Data Collection cont.

- Litter and dead material
  - Same 2m*2m plot

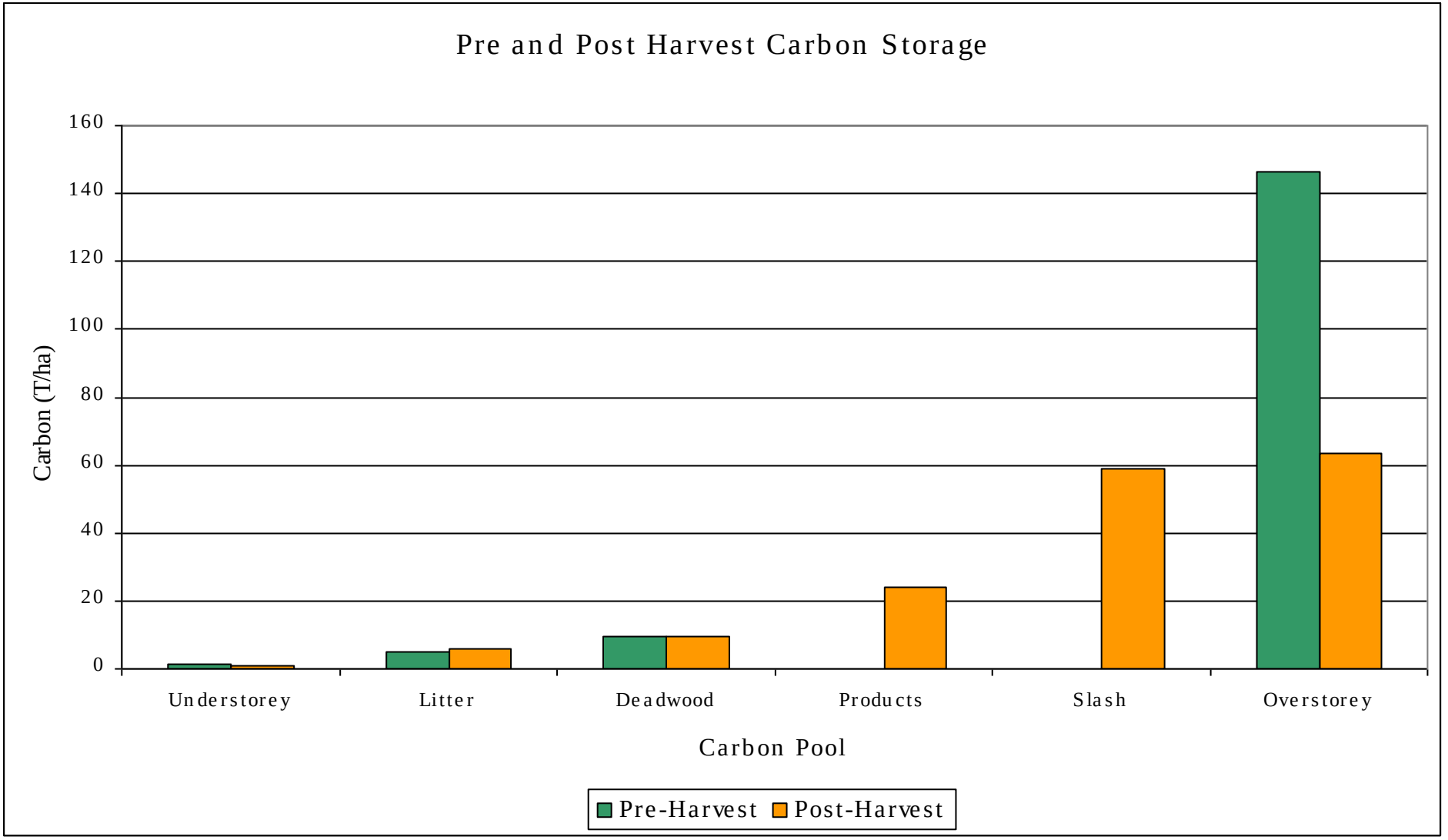
Data Collection cont.

- Timber Products measured at harvest

Data Collection cont.

- Post harvest assessment
  - Forest inventory
  - Visual assessment of understorey

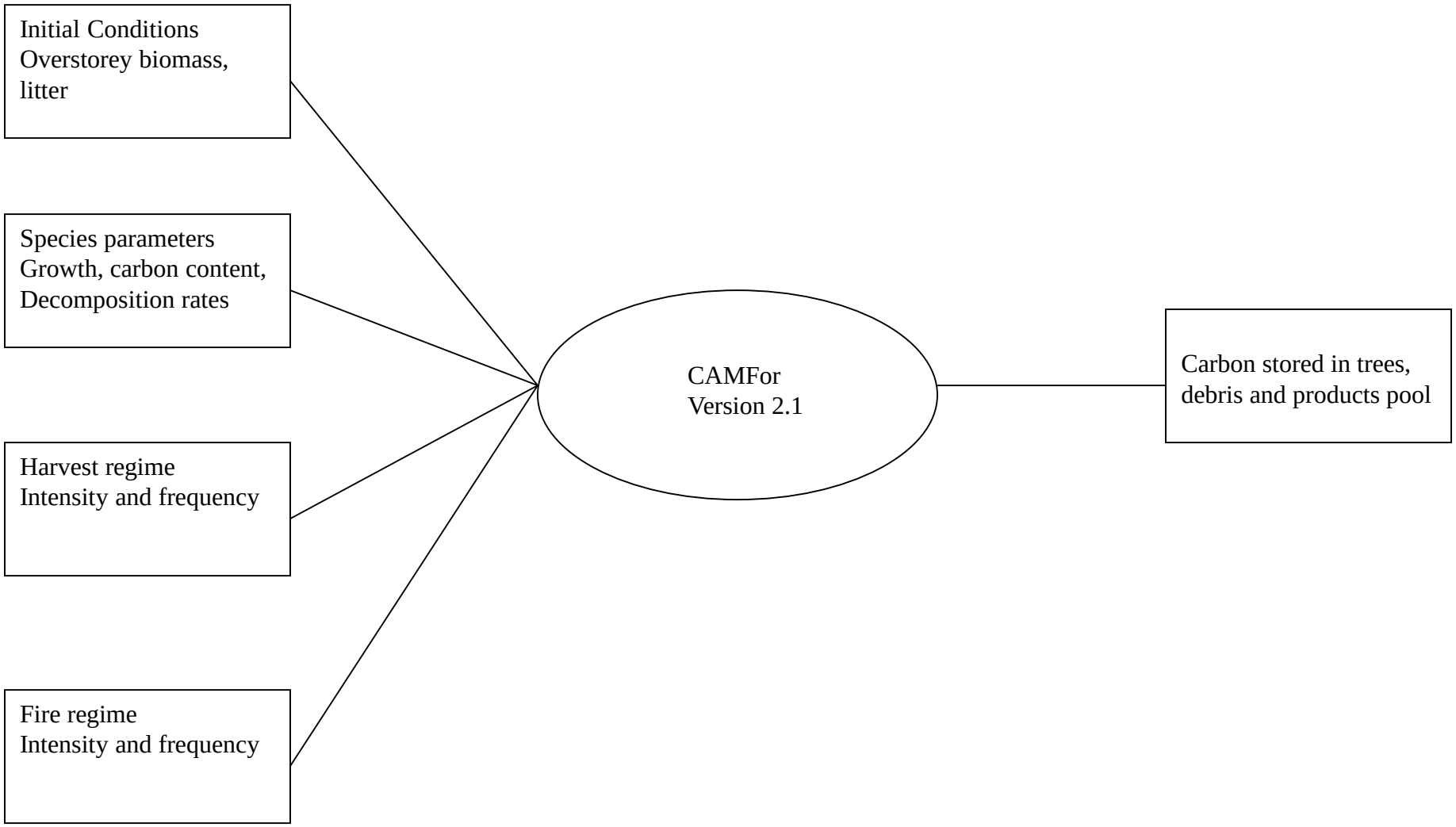
Results:Actual carbon pools



Modelling management options CAMFor

- 2 hypothetical management regimes
  - Production management
    - Harvesting, fire
  - Conservation management
    - Fire
- Inputs from actual carbon pool assessment and literature search

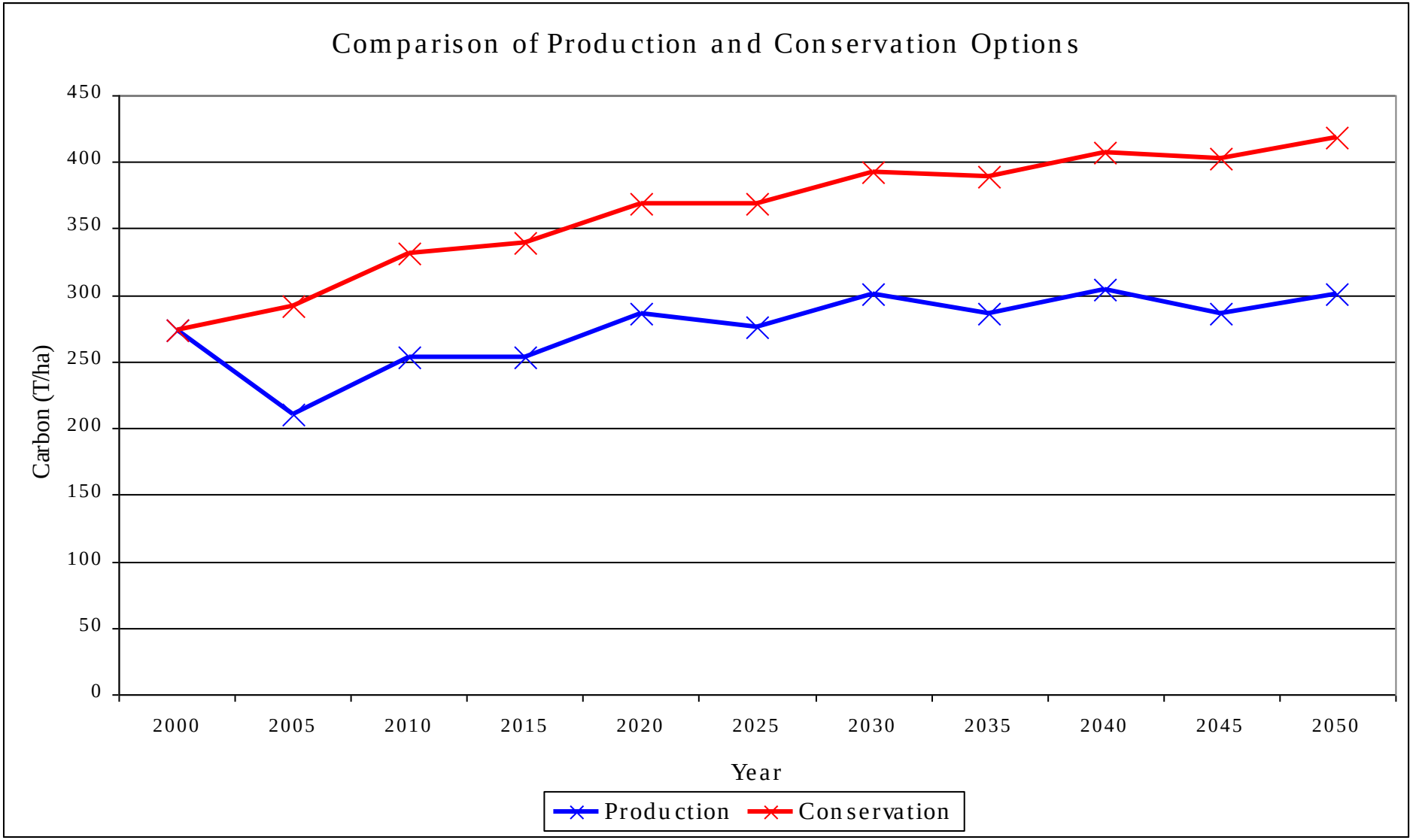
CAMFor


Initial Conditions
Overstorey biomass, litter
Species parameters
Growth, carbon content, Decomposition rates
Harvest regime
Intensity and frequency
Fire regime
Intensity and frequency
CAMFor
Version 2.1
Carbon stored in trees, debris and products pool

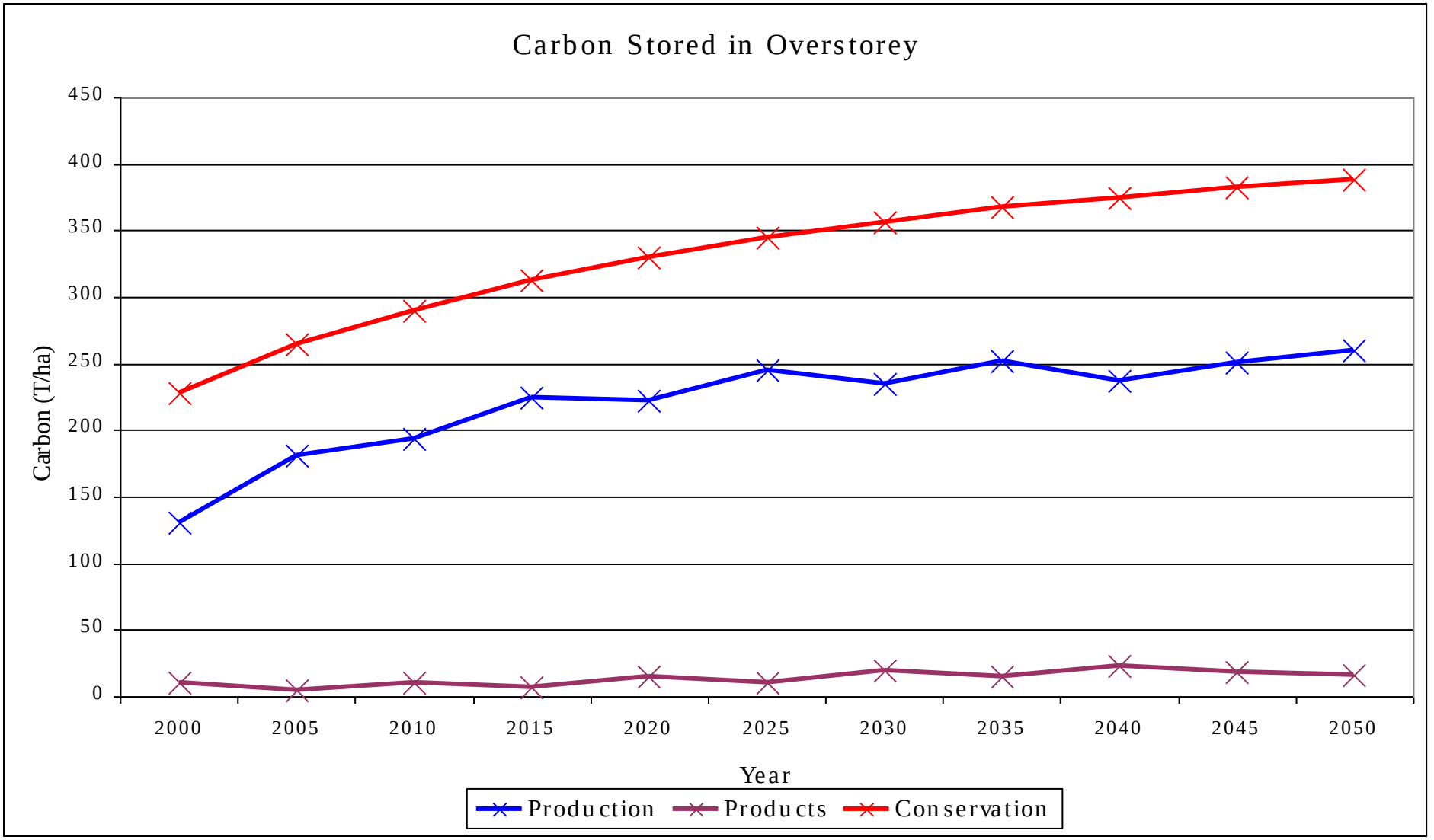
Optimal Regimes

- Production option (50 years):
  - harvest 2000 and every 10 years
  - Low intensity fire in 2002 and every 2 years after harvest
- Conservation option (50 years):
  - Low intensity fire in 2002 and every 10 years after

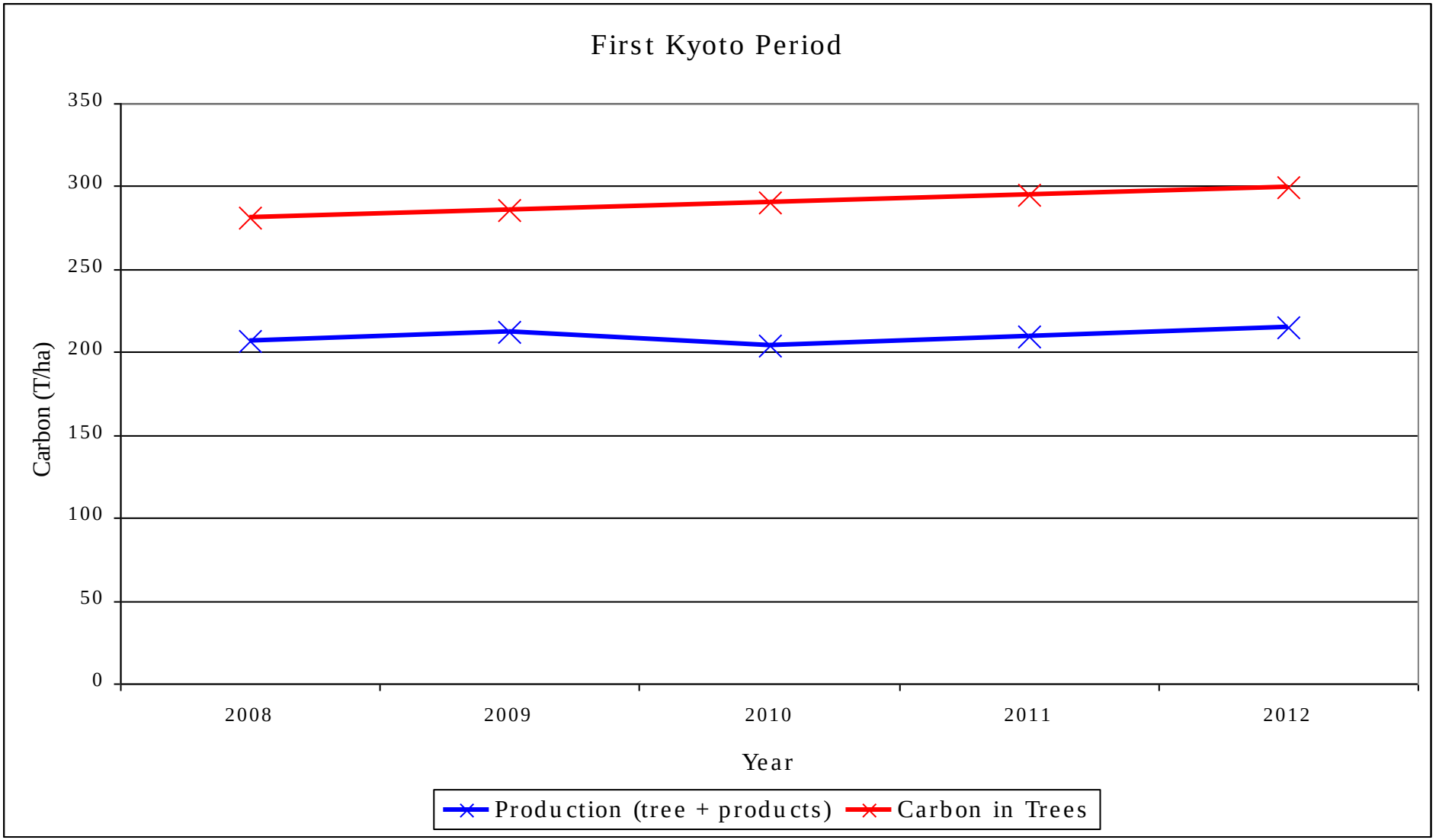
Results


Comparison of Production and Conservation Options
Carbon (T/ha)
450
400
350
300
250
200
150
100
50
0
2000
2005
2010
2015
2020
2025
2030
2035
2040
2045
2050
Year
Production
Conservation

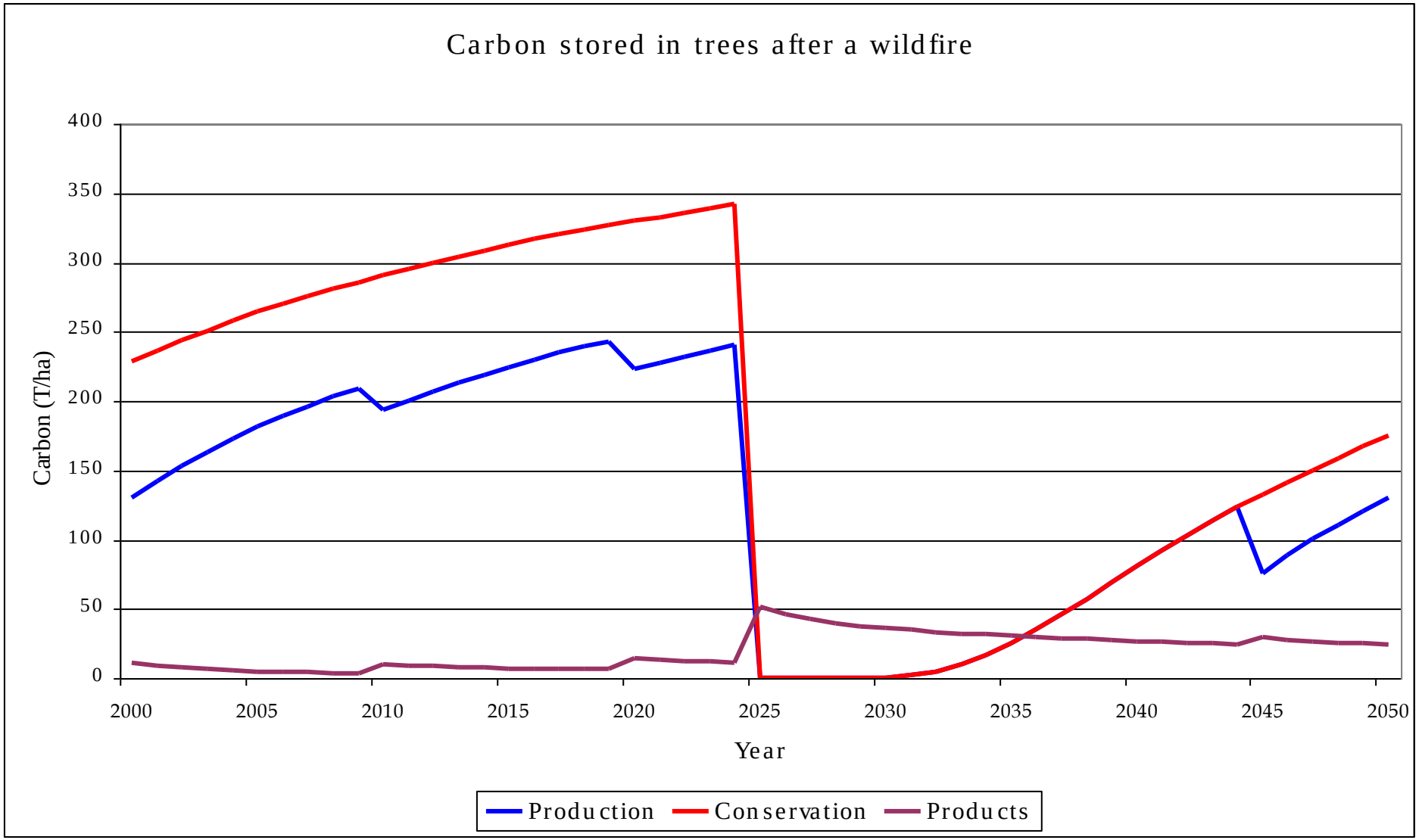
Results cont.



Results cont.



Results cont.



Modelling conclusions

- Overstorey important carbon storage pool
  - Production versus Conservation
- Type of timber products
  - Decay rate
- Effect of wildfire

Summary

- Cost and time constraints for data collection
  - Refine data collection methods
  - Allometric equations
- Soil pool not measured
- Debris post-harvest: product?