



heartwood
UNLIMITED

Mid-rotation Management for Small-scale Plantations

Jon Lambert

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Mid-rotation Management for Small-scale Plantations

Project for the Gippsland Forestry Hub



1. Identify the current **impediments**
2. Overview suitable harvest & haulage **systems**.
3. Identify the available **resource**.
4. Investigate **markets** options.
5. Investigate Government **subsidies**.

Forestry Australia Conference, October 2025



**GIPPSLAND
FORESTRY HUB**
Promoting the Forestry Industry

The Problem

- Victoria has a multitude of small-scale plantations.
- Primarily from historic government grant programs.
- Thinning is difficult to achieve:
 - Contractor issues
 - Market issues
 - Access issues
 - Seasonal challenges
 - Who to contact?
 - Cost



Cost Impacts

- ▶ Tree size = productivity
- ▶ Total volume to be removed
- ▶ Species (bark type)
- ▶ Tree form
- ▶ Stocking (lack of NCT)
- ▶ Terrain
- ▶ Understory vegetation
- ▶ Soil type
- ▶ Forwarding distance
- ▶ Plantation access
- ▶ Thinning system



Harvest Systems

- ▶ Broad range of equipment options internationally
- ▶ Support issues in Australia
- ▶ Australian market is small & predominantly industrial forestry
- ▶ Mid-size equipment best
- ▶ Smaller machines = lower capital but lower productivity
- ▶ Safety factors
- ▶ Difficult to find one machine that suits all terrain and tree types



Haulage Systems

- ▶ Piggy-back trailers & CTI
- ▶ Gippsland expensive
- ▶ Yields are assessed/paid by delivered loads
- ▶ European system assessed via harvest head (or paid up front)
- ▶ Self-loading trucks are the backbone of the European system
- ▶ Australian H&H “hot” system disadvantages small-scale forestry





Self-loading Trucks

Advantages

- Pick up logs from multiple sites
- Pick up when convenient
- Self-unload option
- Not dependent on H&H system
- Variable designs for loaders

Disadvantages

- Safety issues with some self-loaders
- Industry safety acceptance issues
- Extra capital cost
- Loss of load capacity
- Driver rest break issues
- Piggy-back challenges
- Limited advantages for thinning

A faded background image of a tracked harvester operating in a forest. The harvester is positioned diagonally, with its boom and harvesting head visible. The forest consists of many thin, vertical tree trunks. In the top-left corner, there is a solid red arrow pointing to the right. On the left side, there are several thin, dark, curved lines that sweep upwards and to the right.

Other Impacts

- Market Price - major
- Product mix
- Operator skill
- Harvesting head
- Boom type (telescopic or knuckle)
- Tracked or Rubber-tyre
- Relocation Costs (float)

Case Study 1

- Purpose-built v Excavator-based
- Stocking v productivity
- Tree volume v productivity
- Volume v productivity
- Retained-stem damage
- Timed trials
- Blue gum aged 13.5 years



Case Study 2

- Small-scale harvester
- Adapted forwarder
- Multiple sites
- Species comparisons
- Timed trials
- Age range 10-15 years





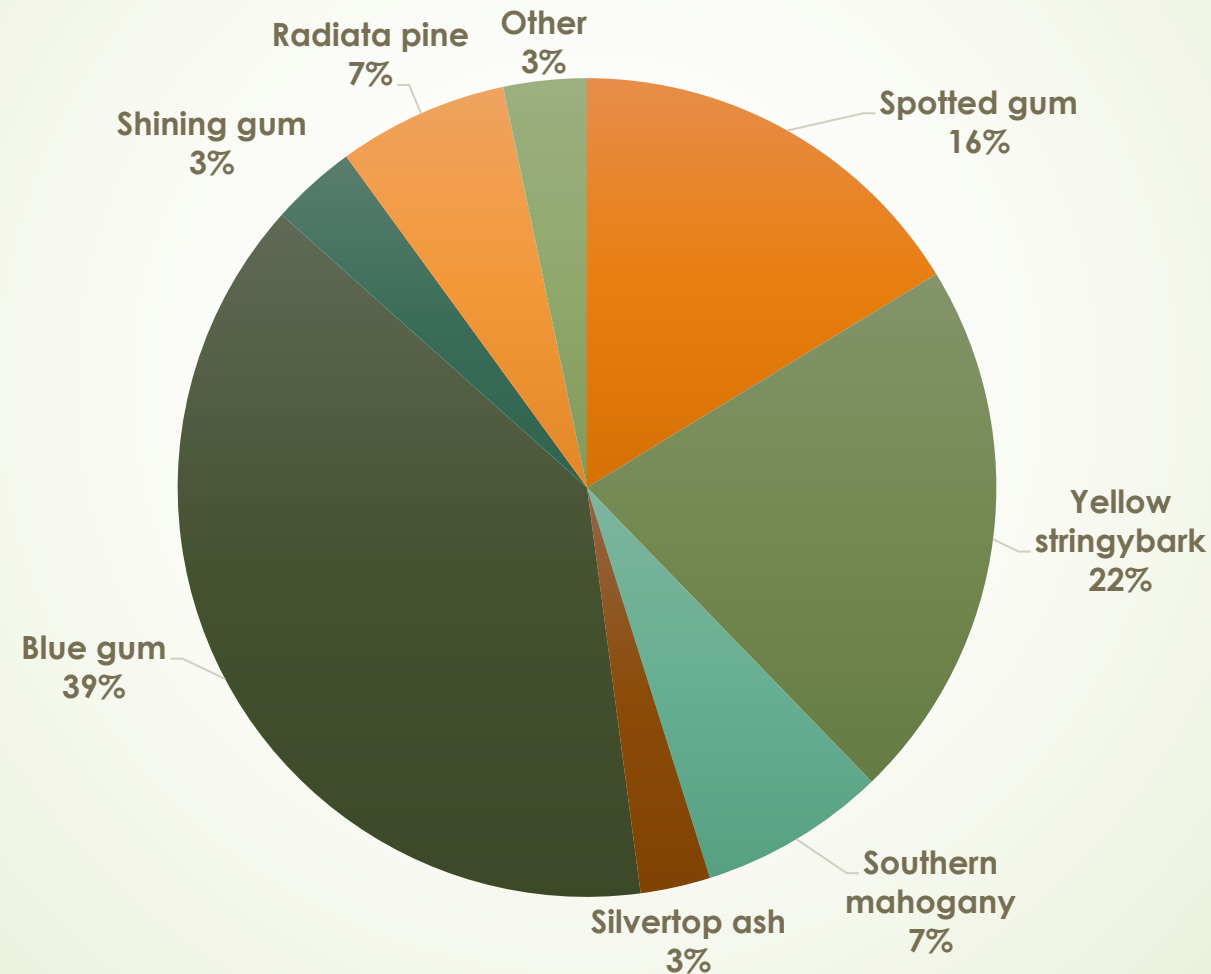
Case Study Learnings

1. Tree volume was the main driver of harvester productivity
2. Purpose-built harvesters were most efficient for thinning
3. Telescopic booms ideal and caused least damage
4. Stringybark debarking reduced productivity (seasonal)
5. Purpose-built forwarder was 7 times more efficient than tractor-adapted
6. Case Study 1 thinning cost range \$26-36 per tonne (purpose-built)
7. Case Study 2 thinning cost range \$80-100 per tonne
8. Despite the high cost it remained cheaper than NCT
9. Mid-sized purpose-built harvesting equipment is most efficient!

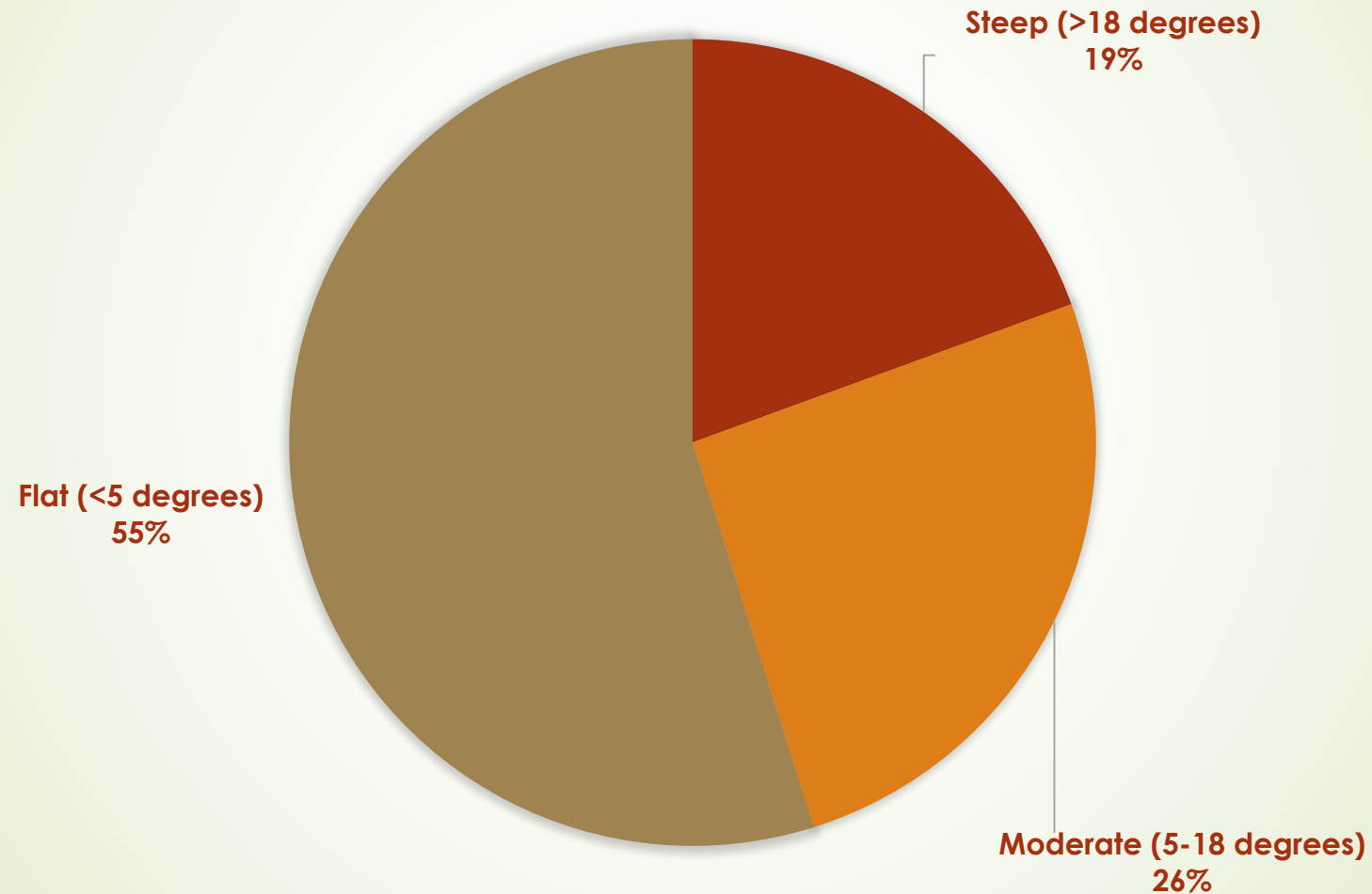
Assessing the Resource - Area

Resource	Total Area (Ha)	Ave. Plantation Size (Ha)	Number of Sites	% 10 Years +
Private Plantations	700	15	40	99%
Heartwood Plantations	1,700	42	41	38%
Total	2,400		81	

Assessing the Resource - Species



Assessing the Resource - Slope



Market Options

- Export hardwood chip markets in Geelong & Eden
- Various firewood markets in Melbourne & Gippsland
- Small pole & post markets (Garden & Playground)
- Softwood markets (limited access)
- Various small hardwood sawlog (limited access)
- Future opportunities for bio-energy & veneer





Subsidies

1. Most forestry around the world is subsidized to some degree
2. Globally, Energy and Agriculture are the most subsidized
3. Subsidies are best used directly at the **initiation** stage
4. Subsidies are best used indirectly (e.g. R&D) at the **acceleration** stage
5. Successful subsidies are no longer required by **maturation** stage
6. Numerous plantation subsidies in the late 90s & early 00s
7. Repeating the cycle in the 2020s
8. Countries like Ireland & Finland using mid-rotation subsidies directly & indirectly

Outcome 1 – Gippsland Thinning Program



- A subsidized hardwood thinning program
- DEECA & Radial Timber Australia
- 20 sites & 400 ha of plantations (10-20 yr)
- Creating ~ 30,000 tonnes of future sawlog
- Export chip, firewood & energy wood

Outcome 2 – Gippsland Thinning Study



- Gippsland Forestry Hub
- Evaluating non-commercial thinning
 - Mechanical systems
 - Manual systems
- Time & motion studies for bioenergy thinning

Gippsland Forestry Hub

gippslandforestryhub.com.au

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Jon Lambert
HEARTWOOD UNLIMITED
www.heartwoodunlimited.com.au
286 Commercial Road
Yarram VIC 3971