
Historic insights to inform the present for the future to break cycles of inappropriate species selection.

The 2023 ANZIF Conference 15-18 October 2023.

October 17, 2023.

Presented by

Braden Jenkin,
Sylva Systems Pty Ltd

Declaration of conflict of interest

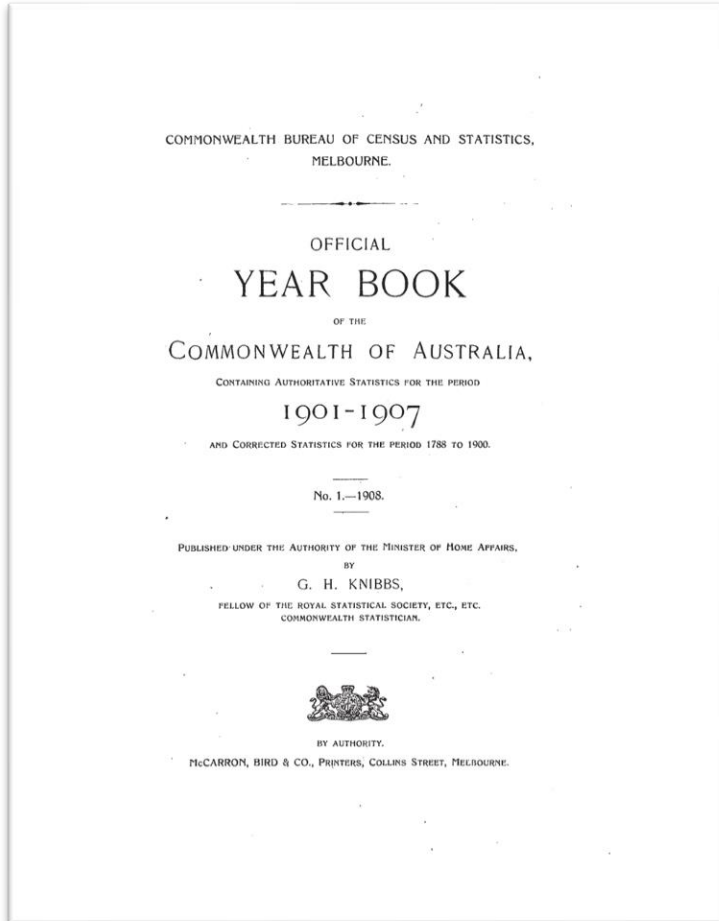
This presentation has been prepared for the conference based on a wide range of information and actual experience. The development and delivery of this presentation is funded entirely by *Sylva Systems*.

I have no pecuniary interests in any outcomes, but I hope you all find some useful messages and insights to take away.

Outline

- ✓ *Introduction & methods*
- ✓ *An obligation & information relied on*
- ✓ *Defining success and failure*
- ✓ *Commencement of the national estate*
- ✓ *Species come and go*
- ✓ *Wood properties*
- ✓ *Lessons and insights*

Introduction and methods



Why? The intent is to break the cycle of inappropriate species selection and promotion.

Information has been collated based on a range of sources.

- Official year books (from 1901).
- National Plantation Inventory data.
- Published documents (online scanned & hardcopy).
- Insights and industry experience.
- Having been involved in the industry since 1981; in roles from births, marriage to death of plantations.

Donoghue v Stevenson [1932]

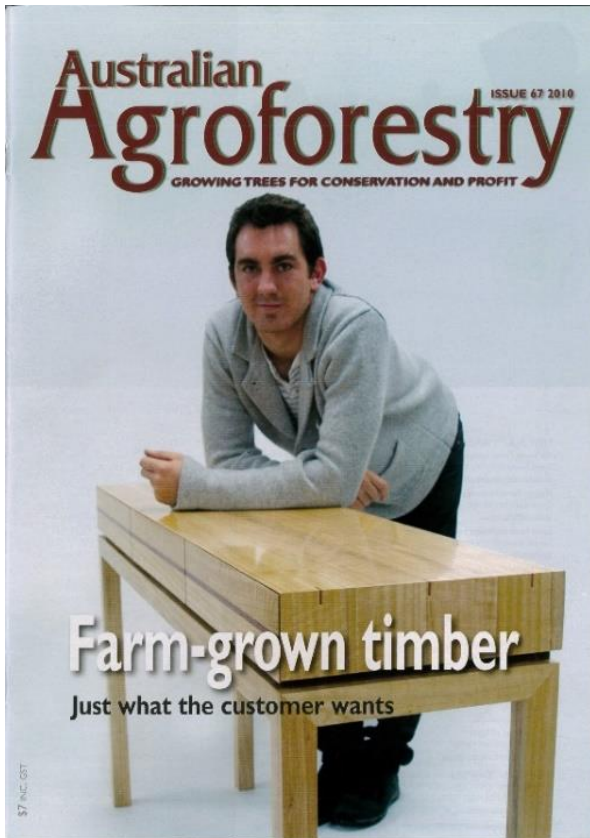
The snail in the bottle case.



'It is strongly recommended that for utilitarian purposes, e.g., production of timber or provision of shelterbelts, the private planter should restrict his choice to species which have been well tested and proven uniformly reliable under conditions prevailing in his particular district' (Ferguson, 1945, p.13).

'It is always wise, if in doubt to, to consult with some one competent to give expert advice' (Ferguson, 1945, p.13).

Expert advice



In an edition of a publication, a divergence of evidence.

- Theory: Researchers claimed 'sawlogs' grown in trials of *E. globulus*, *E. viminalis* and *E. saligna* had a modelled value of \$100/m³ (Washusen *et al.*, 2010, p.10-11).
- Practice: A grower had 200 t of large diameter *E. globulus* logs from a wide spaced, thinned and prune stand. A willing buyer did not exist due to a lack of consumer demand and difficulties in drying and processing (North, 2010, p.14).

The two sites (Bridgetown and Middlesex) were 47.2 km apart in south west WA!

Which evidence do you rely on?

Defining success; refer to the ATO!

For a primary producer to be undertaking a forest operation, the following **are** required:

1. Carrying on a business, and,
2. An **intent to harvest**, and,
3. Logs **to be sold for a profit**, and,
4. Organised in **a business-like manner**, and,
5. Active **management to improve tree growth**.

Growing a proven species should be able to satisfy points 2 & 3; National Plantation Inventory data could be used to define regionally commercial species.

Growing an un-proven species would make the intent to harvest to sell logs for a profit difficult to prove.

To be compliant, a forest operation generates logs and does not transform the logs into next-step products.



Defining failure; a stranded resource

A stranded resource is where you secure a commercial (profitable) harvest.

- Species: Growing a species without a market.
- Distance to market: A stand of trees too far from a market (high haulage costs).
- Tree size: Trees are too small to harvest cost effectively.
- Critical mass: A lack of adequate resource to attract a harvest and/or a processor.

Defining success; it just depends



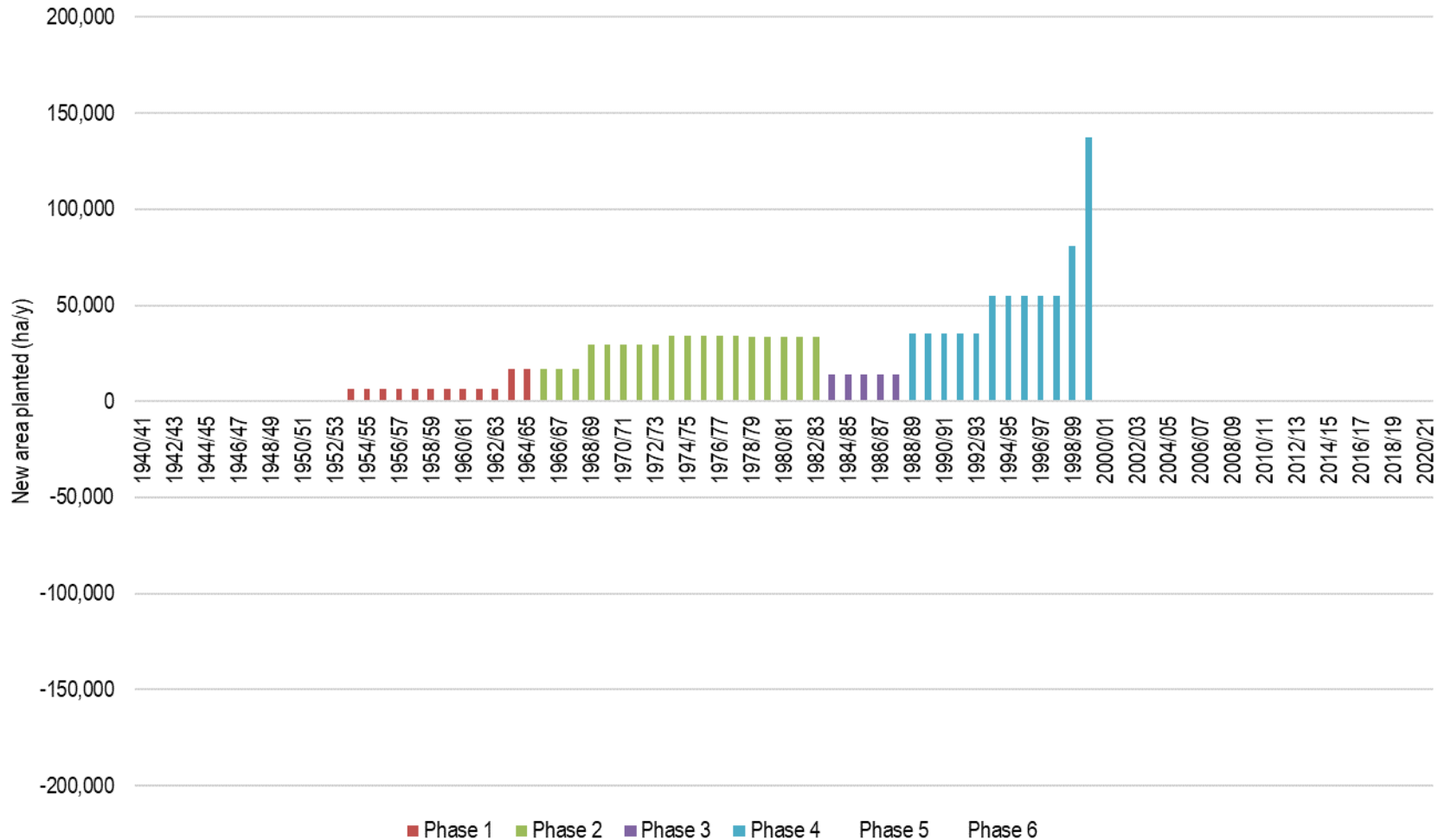
The outcome just depends on the situation.

- Satisfaction: *E. globulus* in proximity to a port in western Victoria (age 15 years).
- Non-commercial: *E. globulus* growing in the Strzelecki Ranges in South Gippsland with good growth but too far from Geelong.
- Short changed: *E. globulus* the Beaufort area of Victoria within economic haul of a port but with poor growth (age 9 years).
- Unsatisfactory: *E. globulus* growing on some sites in East Gippsland with no markets and poor growth.

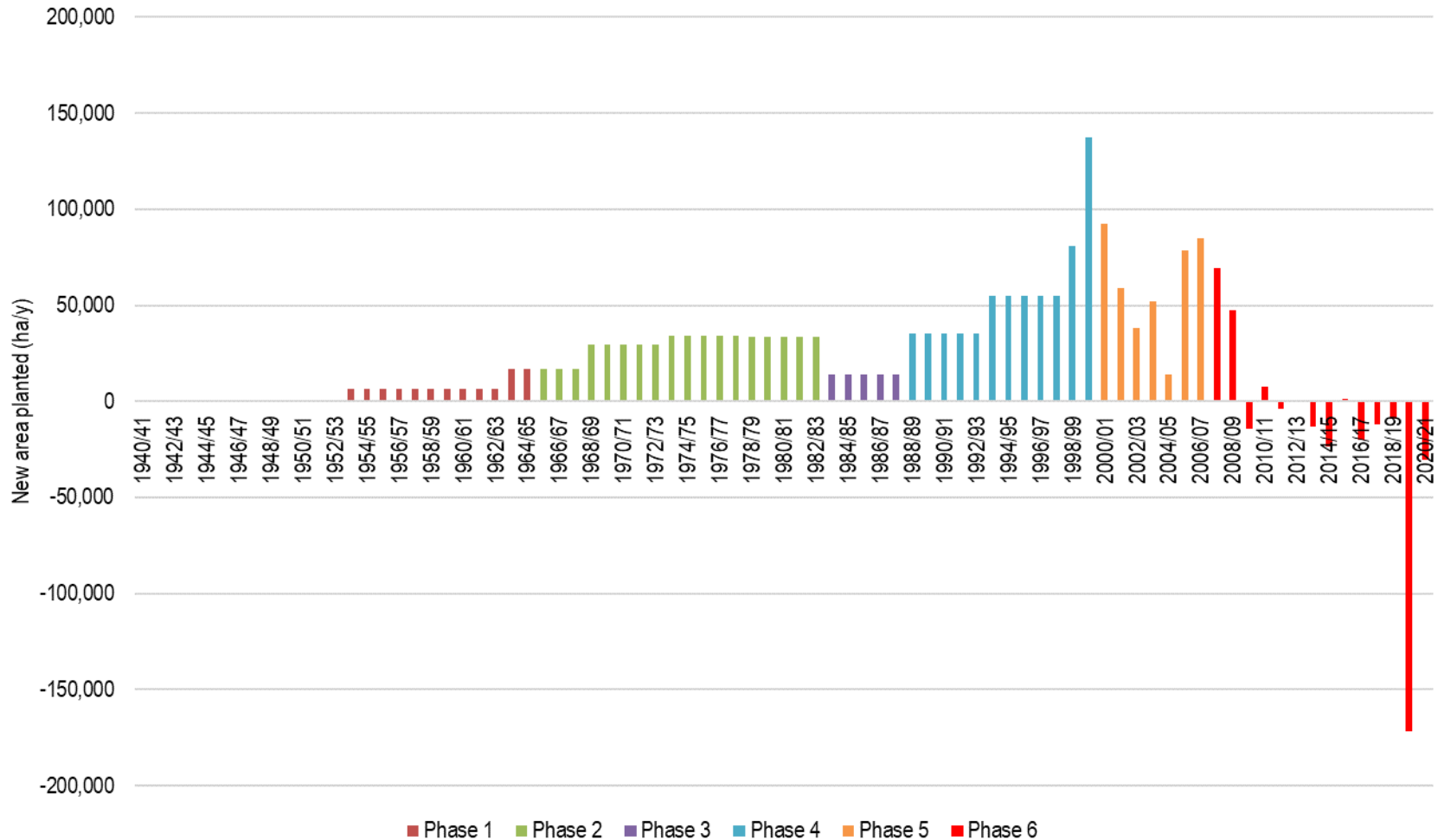
Defining success; it just depends

		Financial outcomes	
		Good returns per unit	Poor or no returns per unit
Physical outcomes	Good productivity	<p><u>Satisfaction:</u></p> <p>An overall good performance; the species planted has grown well and the market price paid is 'good'.</p> <p>For example, <i>E. globulus</i> in proximity to a port in western Victoria.</p>	<p><u>Non-commercial:</u></p> <p>While the species has performed well, a poor stumpage (e.g. too long a haul distance) reduces overall returns, or there is no market for a species.</p> <p>For example, <i>E. globulus</i> growing in the Strzelecki Ranges in South Gippsland with good growth but too far from Geelong.</p>
	Poor productivity	<p><u>Short changed:</u></p> <p>While a market exists and the trees have failed to perform.</p> <p>For example, <i>E. globulus</i> the Beaufort area of Victoria.</p>	<p><u>Unsatisfactory:</u></p> <p>A species fails to perform and there are poor returns per unit and/or no market at all.</p> <p>For example, <i>E. globulus</i> growing on some sites in East Gippsland</p>

National estate development



National estate development



National estate development; < phase 1 Sandalwood

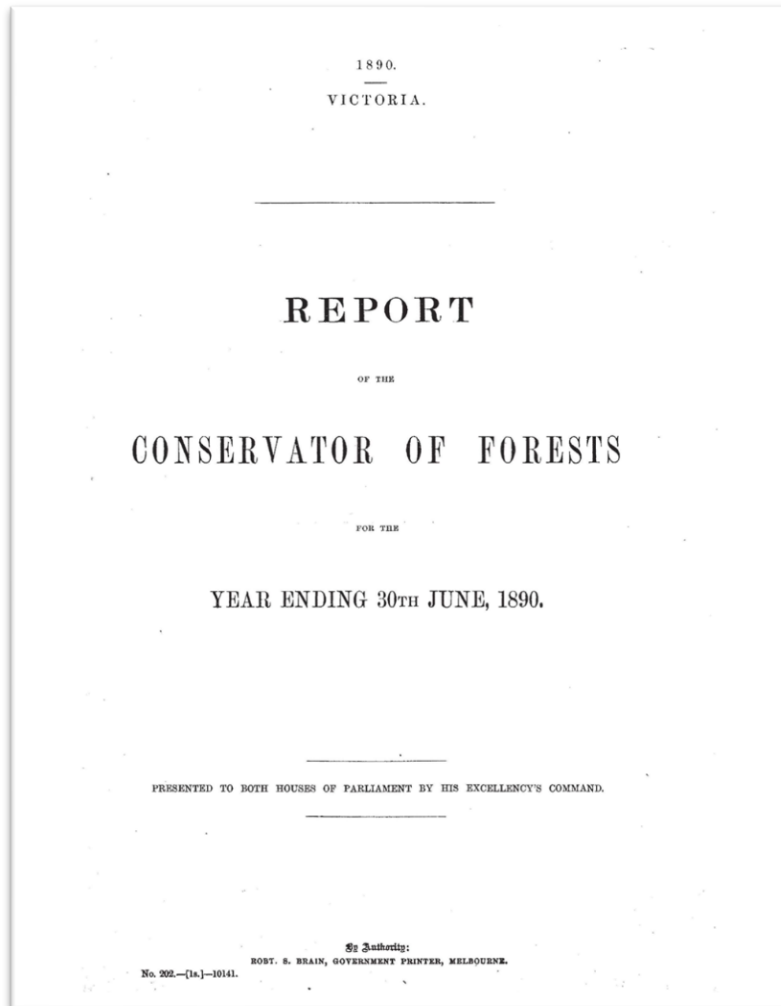


Sandalwood was a significant early export.

- Sandalwood of Western Australia was a very valuable forest product exported since the mid 1800s (Knibbs, 1908, p.381).
- In 1902, 8,174 t of sandalwood (£61,771) was exported with the majority sent to China (Knibbs, 1908, p.385).
- Indigenous sandalwood planted at Meckering in 1908 (Knibbs, 1908, p.379).
- Under the Sandalwood Management Act 1929, ALL sandalwood harvest was controlled by the WA State Govt.
- The 1996 amendment allowed development of *Santalum spicatum* (Australian sandalwood) and *S. album* (Indian sandalwood) plantations.



Phase 1; market pull commences the estate



An 1890 account of species with potential for plantation development in Victoria (Conservator of Forests, 1890, p.12&13):

'Of the 170 species of eucalyptus scientifically described, probably 70 would be found of sufficient cultural importance to warrant planting for industrial purposes, and it is also quite within the bounds of possibility that some 20 or 30 more might be improved by cultivation. It will thus be seen that we have no reason to doubt our capacity for raising or cultivating eucalypts for mining or other purposes when we have so large a range to select from.'

A short list of 13 eucalypt species suitable planting for both mining and industrial pursuits was presented (Conservator of Forests, 1890, p.12&13).

Phase 1; market pull commences the estate

Commencement of the national softwood estate was driven by resource needs.

- A need for softwoods: *'Of the two indigenous coniferous genera Callitris and podocarpus, the latter is of no commercial importance and the former contributes in a very minor degree to the timber economy of the state. It was decided at an early stage that this deficiency would have to be rectified by the establishment of plantations of suitable species, and the earliest plantings, on an experimental scale were undertaken about 1880.'* (Ferguson, 1957, p.22)
- First steps: The first steps to create government plantations in Australia taken in 1870, *'most appropriately, by the State which had the poorest natural resources, South Australia'* (Carver, 1958, p.976).
- First plantings: The first plantations of *P. radiata* occurred in 1876 in South Australia (Rule, 1967, p.118) with the first log processed in 1903 into 28 apple cases (Lewis, 1975, p.24).

Phase 1; market pull commences the estate

Commencement of the national softwood estate was driven by resource needs

- Bull & Ferguson (2006, p.747) concluded that *'resource push innovations were less successful, at least in part, because of their limited relevance to the marketplace'*.
- Bull & Ferguson (2006, p.747) noted that *'it is the market orientation and 'need' for the product which can be of extremely high importance in determining the level of success for the product'*.
- This is an important consideration; it is problematic to focus on making creating a resource in an absence of a targeted market need.

Species dynamics; not set and forget

Species planted have changed over time in response to performance; consider the origins of the WA estate (Carron, 1990, p.14).

'Brown began planting-particularly maritime pine (Pinus pinaster) and wattle on 'the seaside commonage' near Bunbury in 1897. His successor, in his annual report for 1899, was of the view that 'it is well known that the pine timber supplies of the world are reaching a visible termination and that in the future there will be certain market for colonial pine wood'. If similar plantations were established at intervals amongst the barren sandhills of the coastline from Geraldton to Albany 'the pines would self-sow themselves ...and in years to come would form on continuous stretch of forest as in the...French Landes... representing untold wealth to the State'.

P. pinaster in WA was the primary softwood species, and strategically in SA and Victoria but has been mostly replaced by *P. radiata* based on growth performance, processing and wood properties.

Species dynamics; not set and forget

Species planted have changed over time in response to performance and informed by experience.

- *P. radiata* as the main plantation species was noted in 1934 despite testing a wide range of alternative species and that '*considerable prejudice exists against the timber*' (Kessell, 1934, p.44).
- Experimental testing of softwood species in Victoria identified a range of species '*considered worthy of trial plantings on a commercial scale*' (Ferguson, 1965, p.22); *P. radiata*, *P. nigra* var. *laricio*, *P. muricata*, *P. pinaster*, *P. ponderosa*, *P. canariensis*, *Picea sitchensis*, *Pseudotsuga taxifolia* and *Sequoia sempervirens*.
- Ferguson (1965, p.22) noted '*From observations of subsequent growth, it has now been determined that the only species worth persevering with so far as extensive planting is concerned is Pinus radiata which has proved itself adaptable to all sites available, makes rapid growth, is hardy and produces a good quality general utility timber. Many of the areas originally planted with other conifers are now being converted to Pinus radiata.*'

Species dynamics; fit-for-purpose

Building construction is regulated in Australia and materials inputted must be compliant and of proven mechanical attributes; wood properties are fundamental.

- Early work: Timber properties of 21 species were reported on in 1922 after testing by the University of Adelaide included plantation grown *P. insignis* (*P. radiata*), *P. maritima* (*P. pinaster*) and *P. canariensis* (Chapman, 1922, p.3).
- The MGP system: MGP introduced in 1996, following extensive nation-wide in-grade testing of *P. radiata*, *P. pinaster*, *Pinus elliottii* var. *elliottii* and *P. caribaea* to develop MGP grades that are accurate and reliable design properties for structural pine timber.
- Follow-up: A current UniSA NIFPI project NS032 – Characterising Softwood Sawn Products in Australia will establish the physical and mechanical properties of a nationally pooled Australian structural softwood timber sample to validate compliance with AS1720.1-2010: Timber Structures – Design Methods.

You cannot just ‘chuck in another species’ into the mix.....

Species dynamics; not set and forget

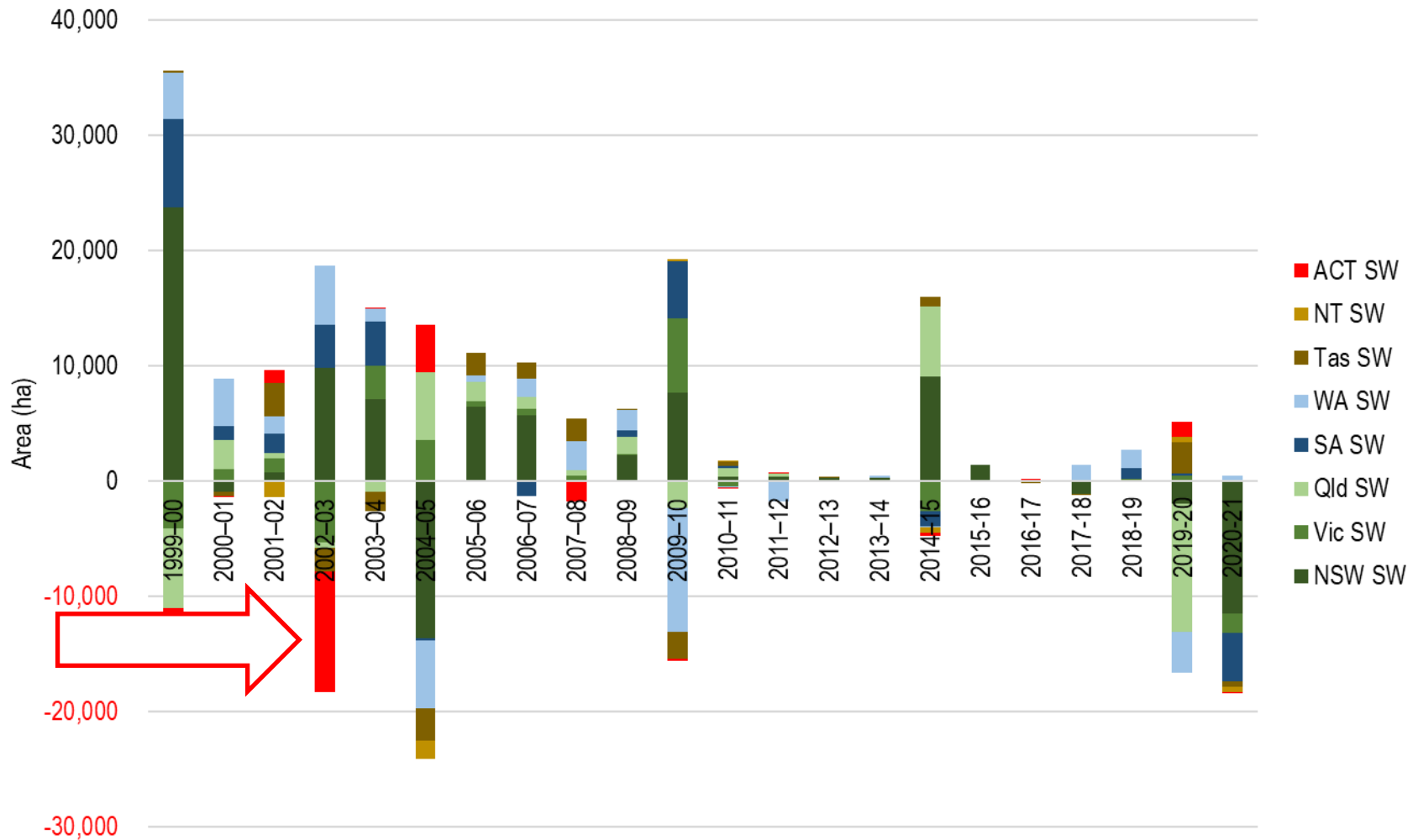


End-market security is a key consideration, particularly for small and bespoke resources.

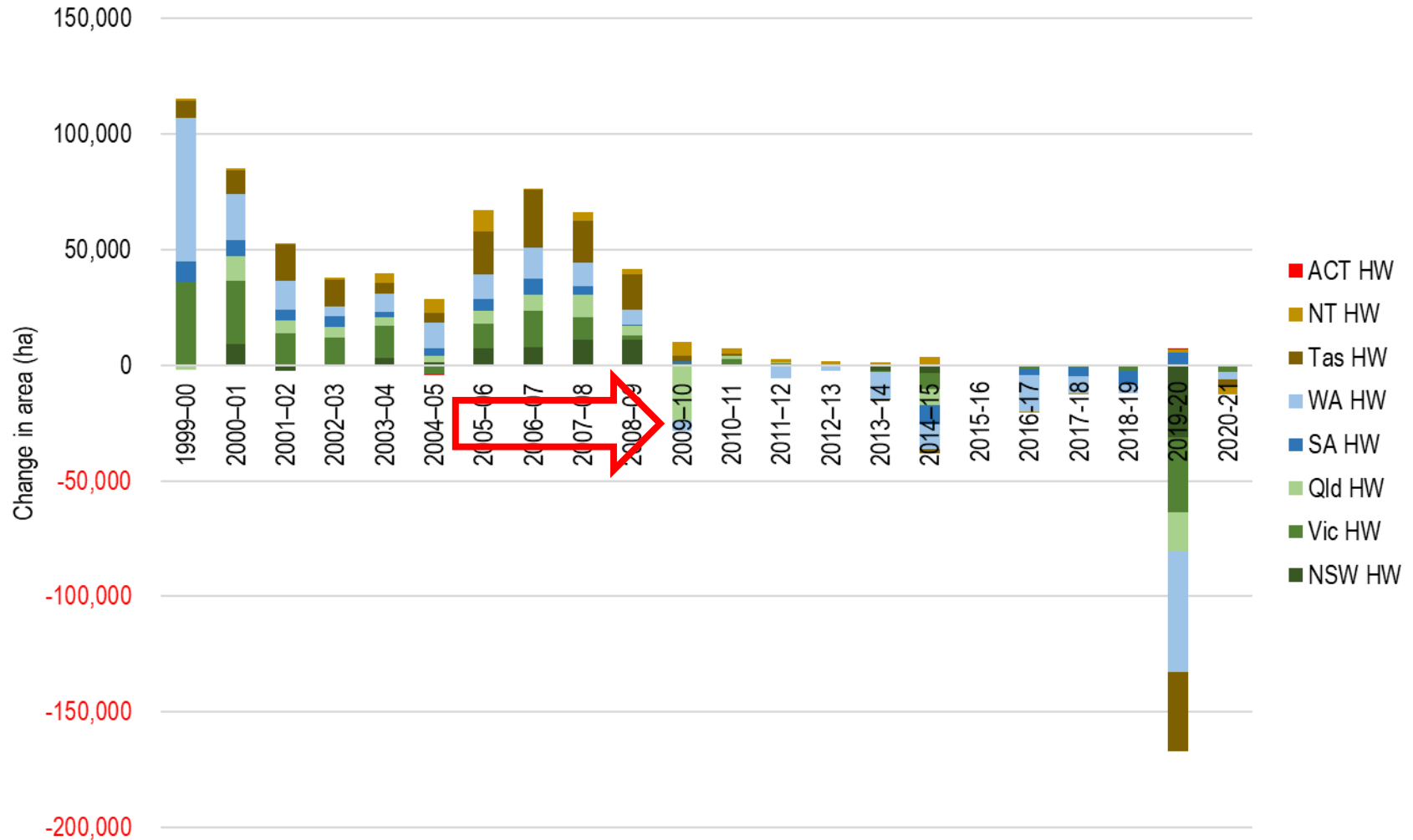
Poplars were a species of interest for a period of time destined for a single market.

- A *Populus nigra* and *P. deltoides* plantation estate was developed in the 1950s and 1960s with the intent to provide logs for peeling to manufacture of matches.
- Local processing aimed to displace imported products
- Poplar rust (*Marssonina* leaf spot disease) hit in 1972.
- Tree breeding and hybrids were used to reduce the impact of disease with the work undertaken by Professor Lyndsay Pryor.
- With a cessation of local match production, this species was of less interest.

The national estate; softwoods phase 5 & 6



The national estate; hardwoods phase 5 & 6



The national estate phase 5 & 6

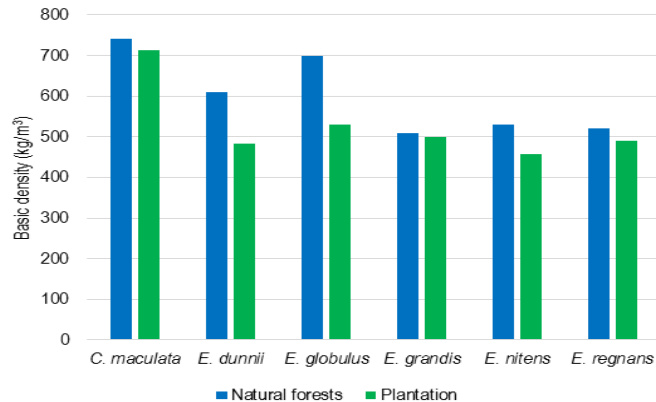


Large-scale operational planting preceded a local information base.

Hardwood plantations expanded into south east Queensland.

- The intent: The MIS sector seeking to expand their offers in the mid 2000's.
- Local experience: There was limited experience in hardwood plantations in the zone.
- Other experience: There was experience from overseas.
- Failure: Poor growth and disease resulted in the estate termination in 2009/10.
- Trials: A summary of local trials prepared in 2011 provided insights and options; still shouldn't plant!

Wood properties; assumed fungibility



(Data from McCarthy et al., 2009, p.43; Harwood et al, 2005, p.14, Table 4; Whiteman, 1997; CSIRO, 2001; Raymond & MacDonald, 1998.)

Transition from natural forests to planted trees does not assume fungibility.

- Wood properties can be different.
- Processing attributes can be different.
- Products can vary

These differences cannot be dismissed, but specific products are possible.

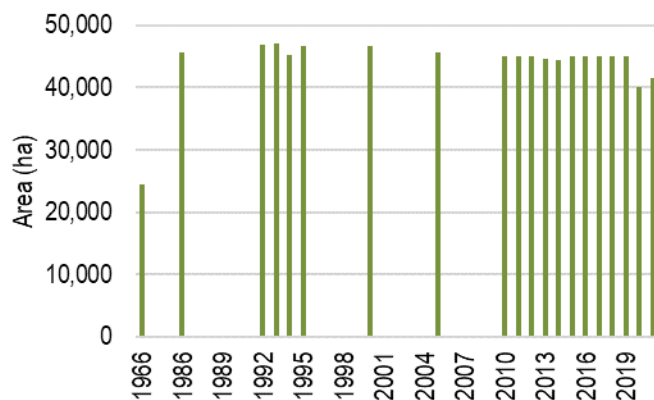


Wood properties; *Araucaria cunninghamii*



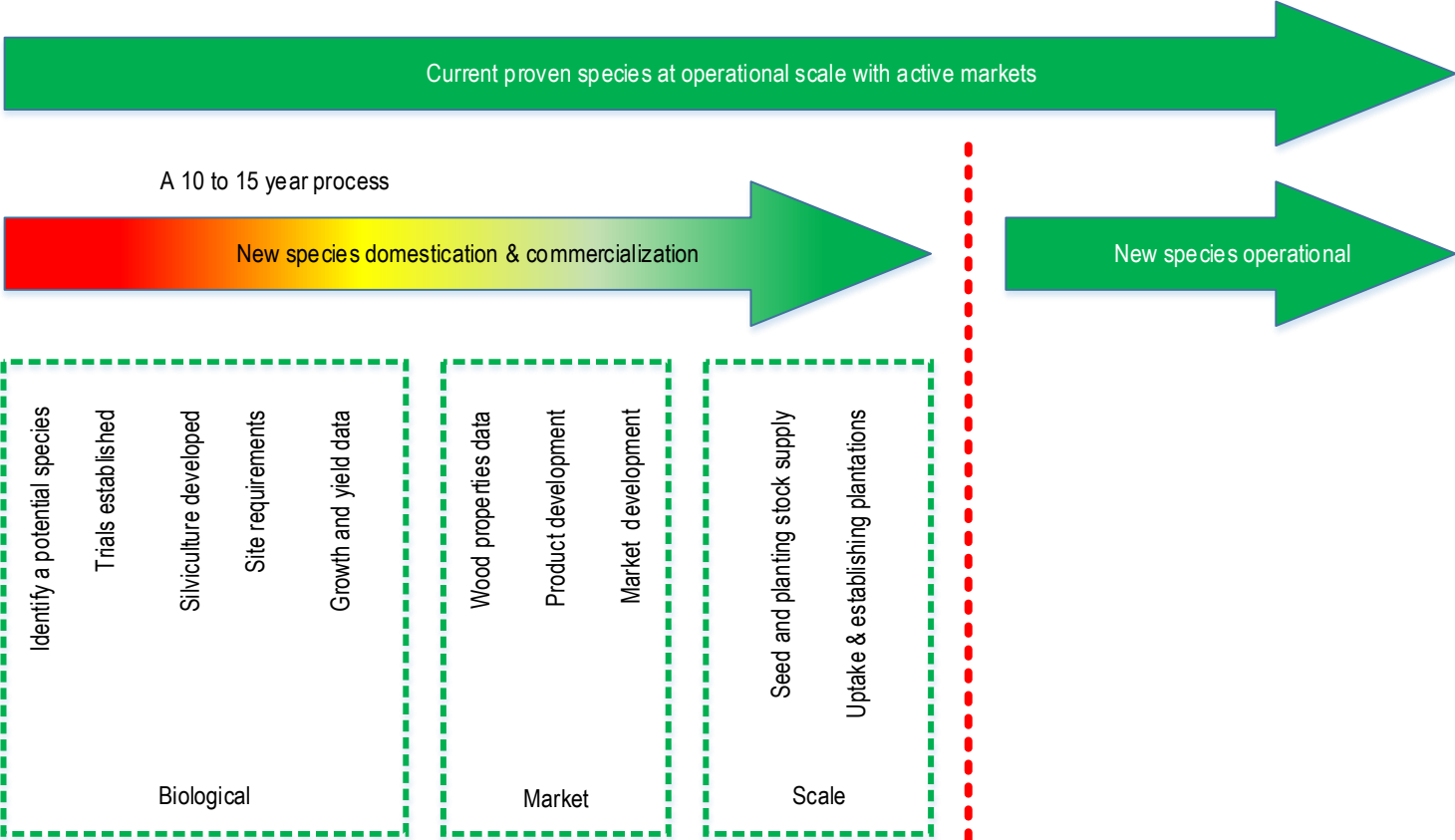
Some planted estates had better wood properties than the natural forest resource; *Araucaria cunninghamii*.

- Decline in hoop pine supply from 'virgin rain forests' (Queensland & northern New South Wales) in 1957 (Carver, 1958, p.976).
- Increase in plantation grown softwood; mainly *P. radiata*, and some plantation-grown hoop pine (Carver, 1958, p.976).
- The wood properties of rapidly-grown Hoop pine are equal to and sometimes superior to those of average wood from virgin forests (Carver, 1958, p.977).



Lessons & insights; species commercialisation

Commence with a market need to ensure a pull and likely success.



Lessons & insights; species experience

		Region	
		Current	Novel
Tree species	Current	<p><u>More of the same:</u></p> <p>The same species as grown and supplied into existing supply chains / markets.</p> <p><u>Requires an ability of markets to take additional resource</u></p>	<p><u>New horizons:</u></p> <p>A proven commercial and accepted species is grown in a new location.</p> <p><u>Requires development of a critical mass with leverage on past species specific experience.</u></p>
	Novel	<p><u>A new kid on the block:</u></p> <p>A new species in a region.</p> <p><u>Exchangeability of species either by direct substitution OR development of a new product using current capacity is required.</u></p>	<p><u>A blue sky pioneer:</u></p> <p>A new species in a new region with nil species experience nor current local processing capacity.</p> <p><u>Requires development of a critical mass and marketing with underlying species knowledge.</u></p>

Lessons & insights

- ✓ Planting commercial species is important from a tax perspective to support intent to harvest for a profit.
- ✓ There is a moral obligation and legal imperative for full disclosure of species status.
- ✓ Species will change with actual experience; narrowing species, reinforced by legal practicalities.
- ✓ Species driven by a need (market pull) are more enduring, until a market evaporates.
- ✓ A single market focus species is at risk; what is the alternative with a market collapse or evaporation?
- ✓ Is it better to deploy new species to extend a region or expand a current species?