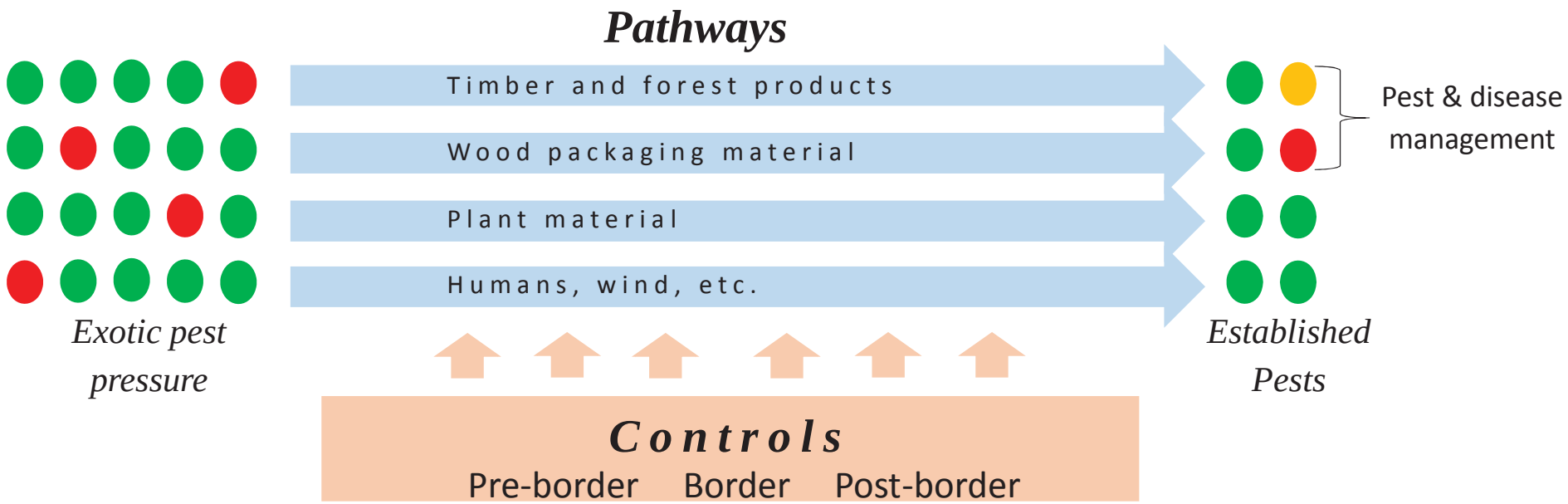
Forest Biosecurity in Australia: risks, costs and responses

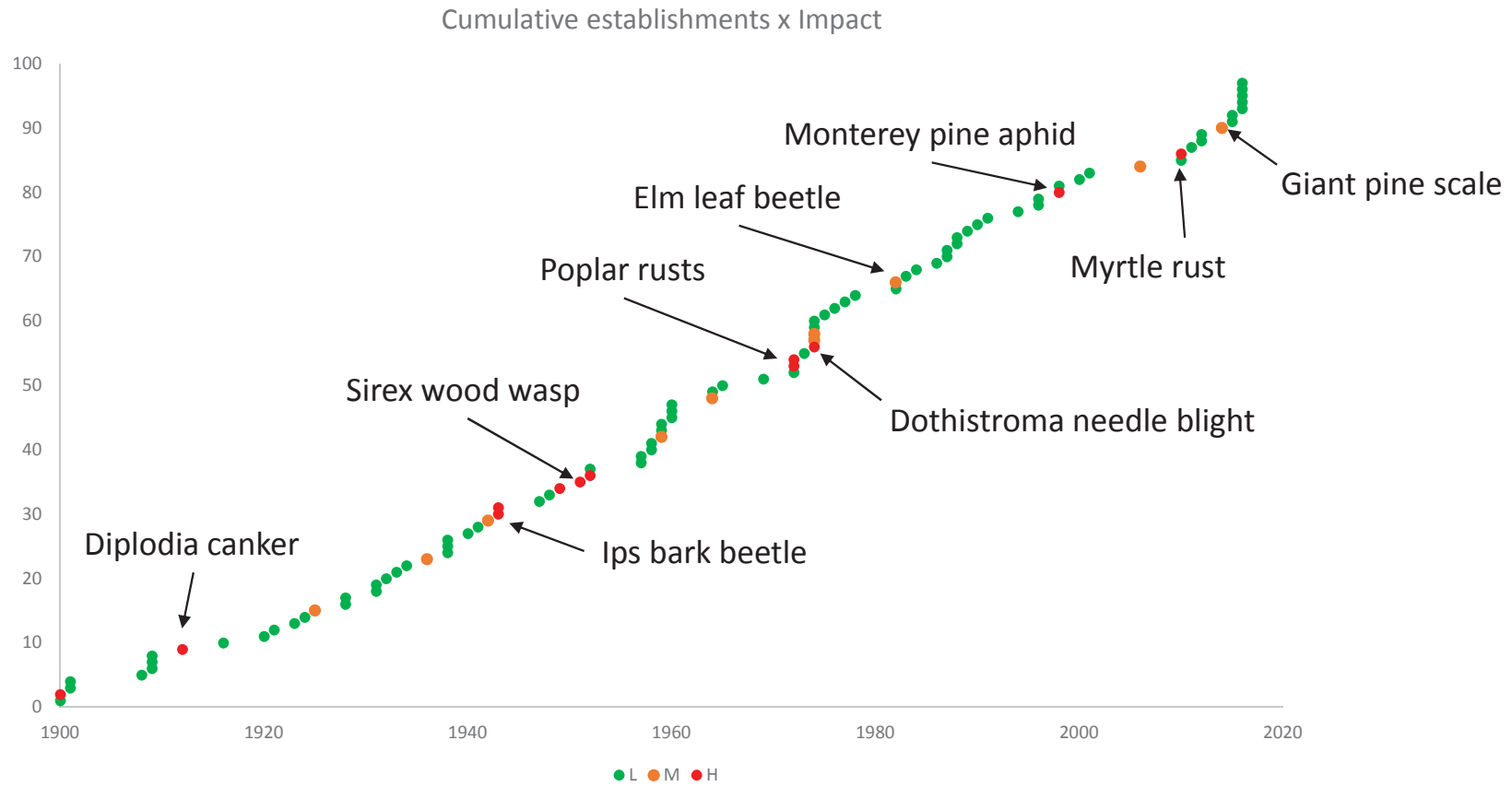
Angus Carnegie

NSW Forest Science

Pest pressure, pathways and control activities

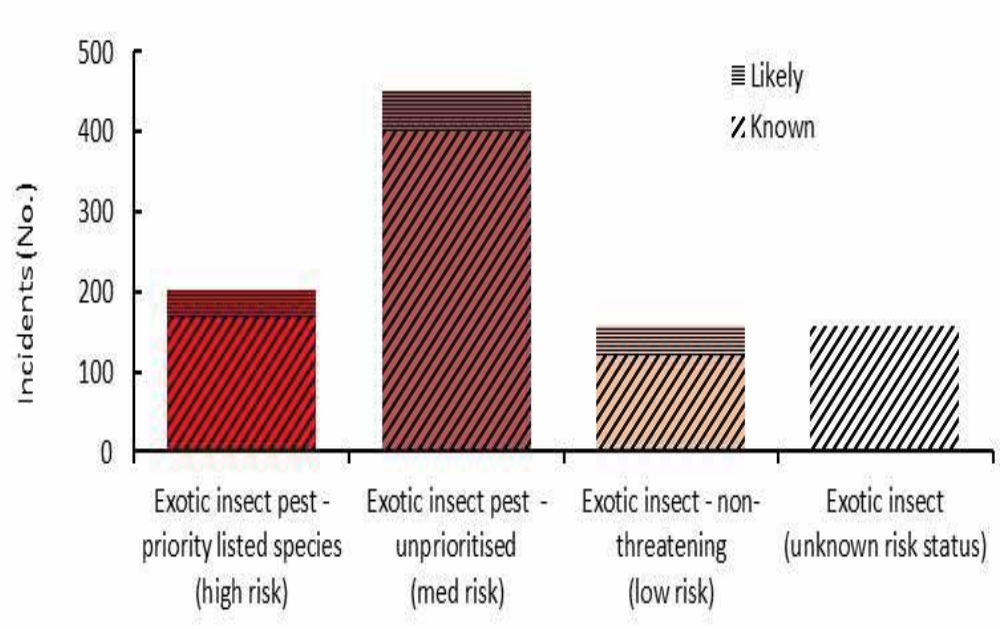


History of incursions

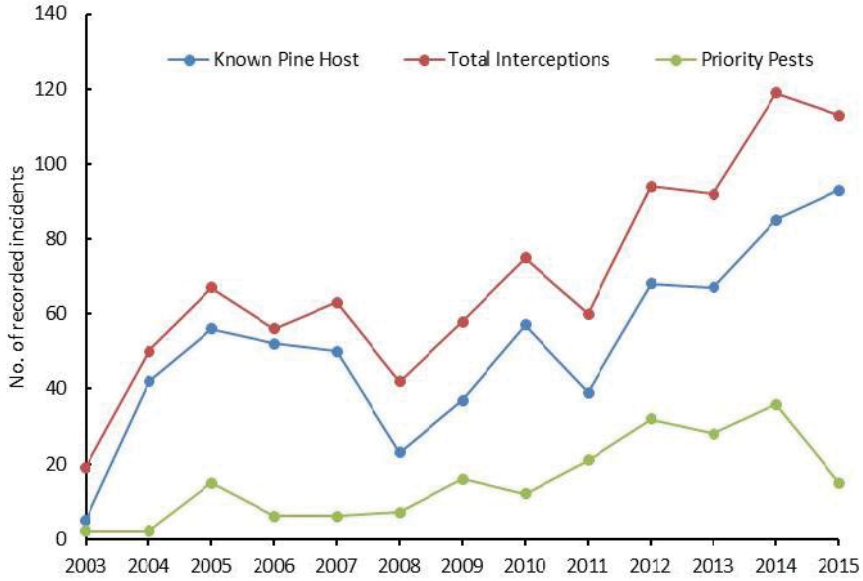


~20% of establishments have caused significant impact

Pest interceptions



Exotic forest pest interceptions 2000–2016

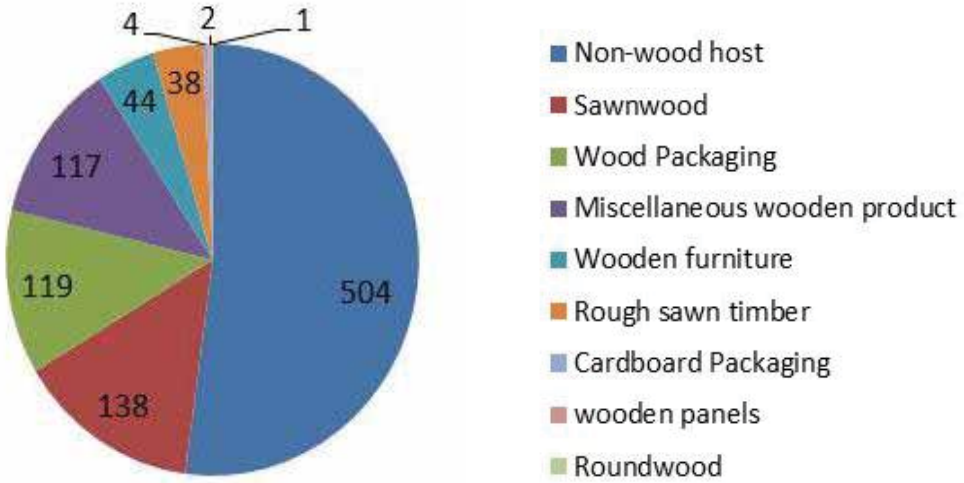


Forest pest interceptions (2003-2015)

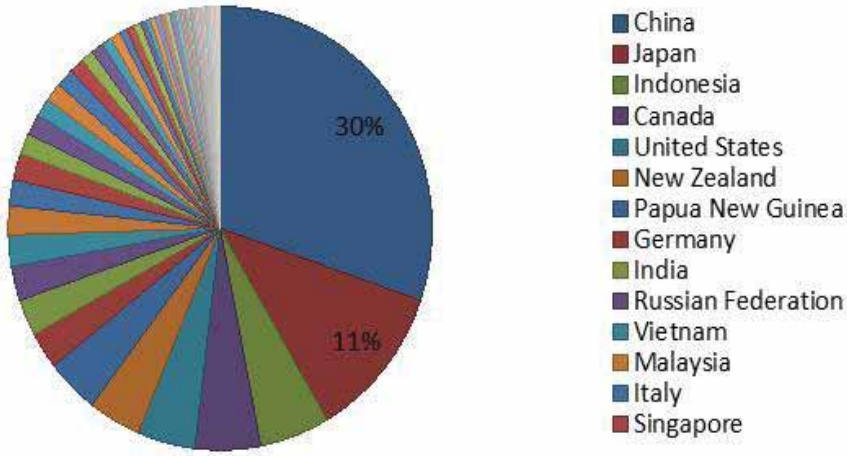
Data source: DAWR (2016)

How they arrived, and where from

- 92% of interceptions arrived by sea



What they were intercepted on

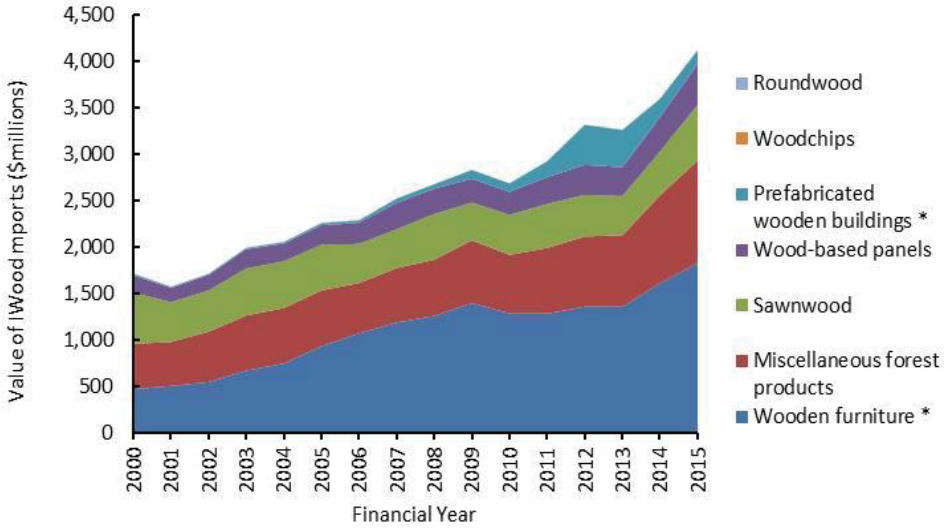


Where they came from

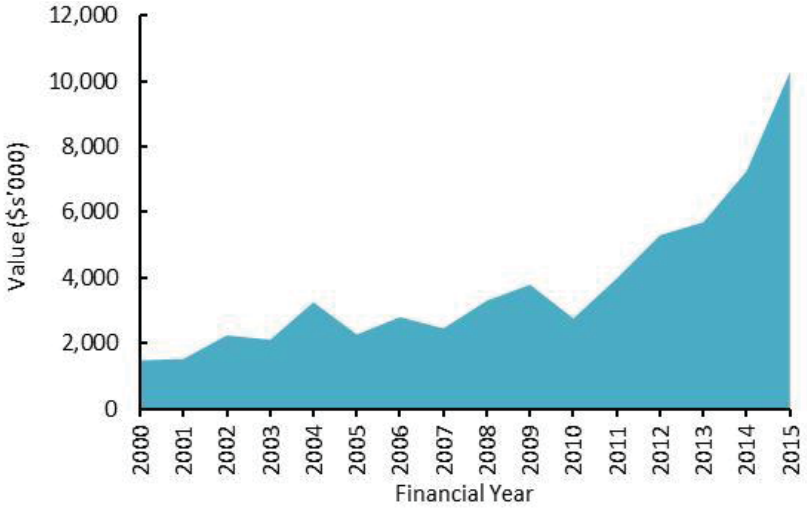
(burnt pine longicorn from New Zealand not included)

Data source: DAWR (2016)

Increasing risk: pathways for pest entry



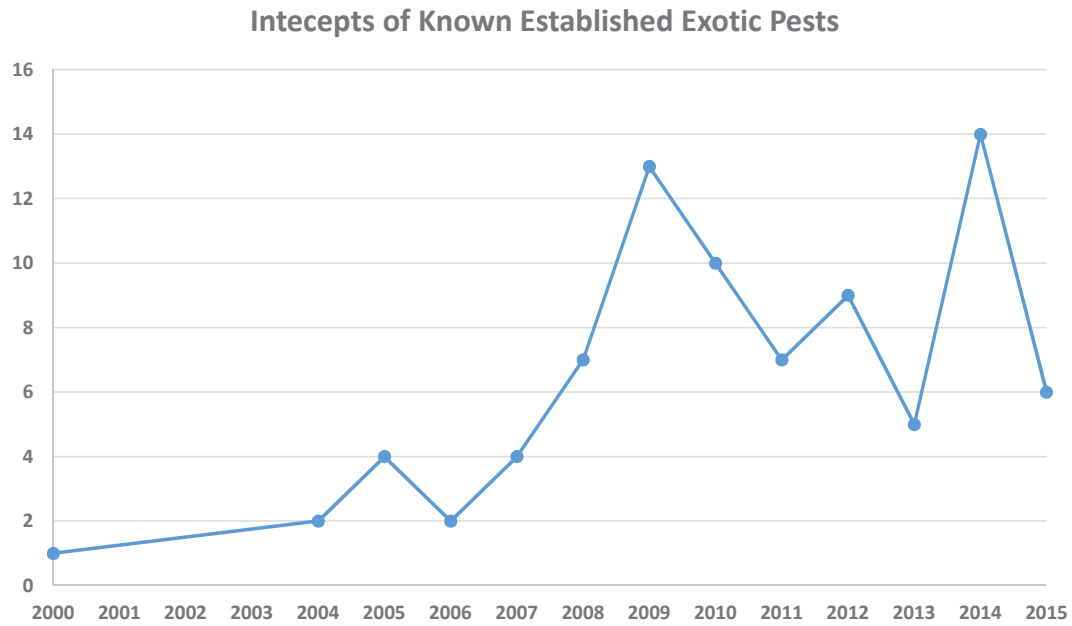
Value of Australian **imported wood products** by year (2000–2015)



Value of Australian imported **packing cases, boxes, crates and drums** by year (2000–2015)

Data source: ABARES (2015)

Interception of pests already established



Hylastes ater, Hylurgus ligniperda, Ips grandicollis, Arhopalus syriacus, A. rusticus, Hylotrupes bajulus, Xyleborus perforans, Sirex noctilio

Data source: DAWR (2016)

Conclusion

- *This work establishes that there is a clear and present — and ongoing and increasing — threat of exotic forest pests arriving and establishing in Australia*

The $cost of exotic pests

- Paucity of analyses of the economic impact of forest pests
  - Sirex wood wasp:
    - Green Triangle outbreak killed 5 million trees costing $10–12 million (Haugen 1990)
    - Approximately $500,000 spent annually on sirex control in Australia (Carnegie & Bashford 2012)
  - Monterey pine aphid:
    - $21 million in lost wood production annually (May 2004)
    - Investment in biological control would return a NPV benefit of $15 million (May 2004)
  - Pine pitch canker:
    - Delaying entry by just two years could result in a benefit of $13 million (Cook & Matheson 2008)

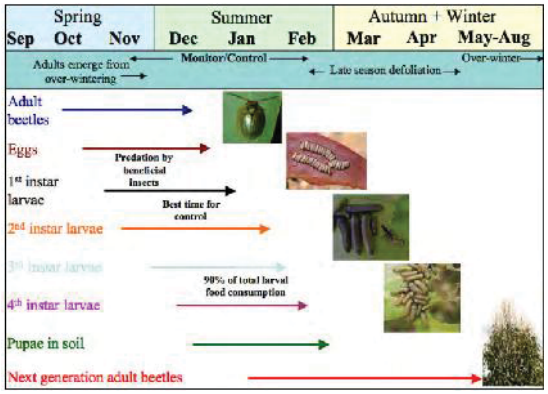
Forest & Wood Products Australia

"…a need to conduct Benefit-Cost Analysis to engage industry and demonstrate the benefits of biosecurity"

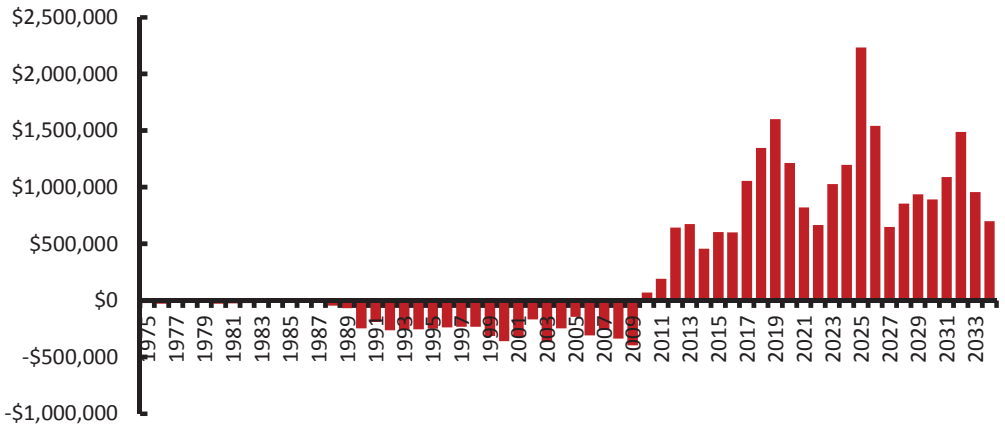
Eucalyptus leaf beetle

- Endemic; herbivorous pest of *Eucalyptus*
- Case study for potential incursion of an herbivorous pest (e.g. gypsy moth)
- Good data from Forestry Tasmania
  - Annual monitoring to identify treatment areas and threshold limits
  - Aerial application of insecticides

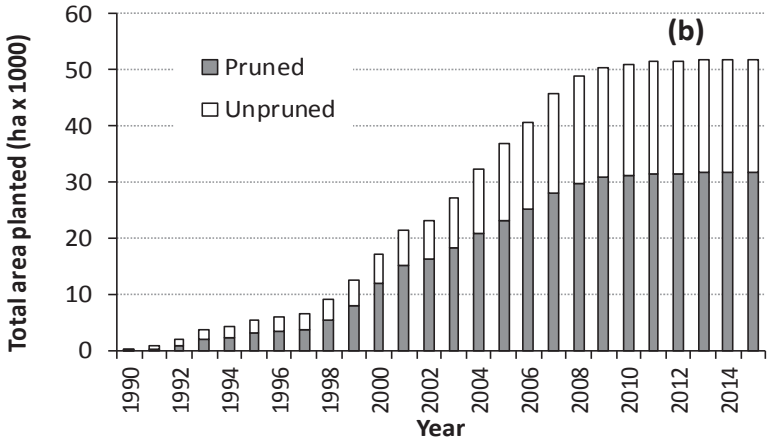

Forestry Tasmania



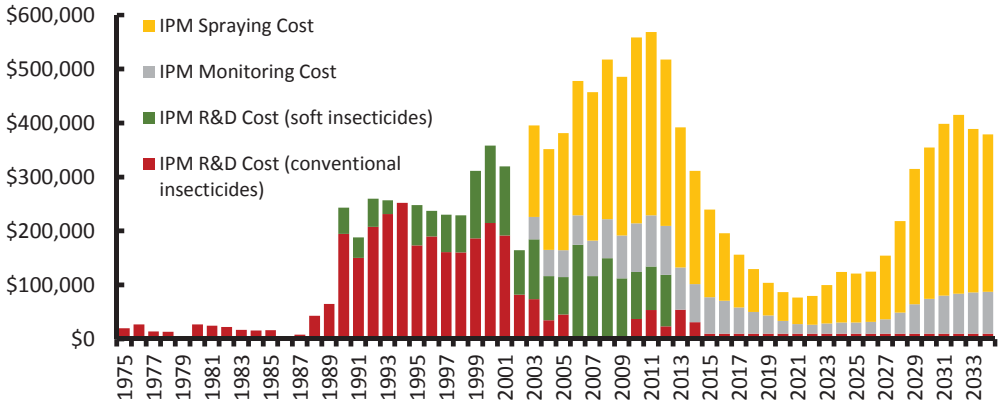
Net cash-flow of costs and benefits of the leaf beetle program ($2015s)



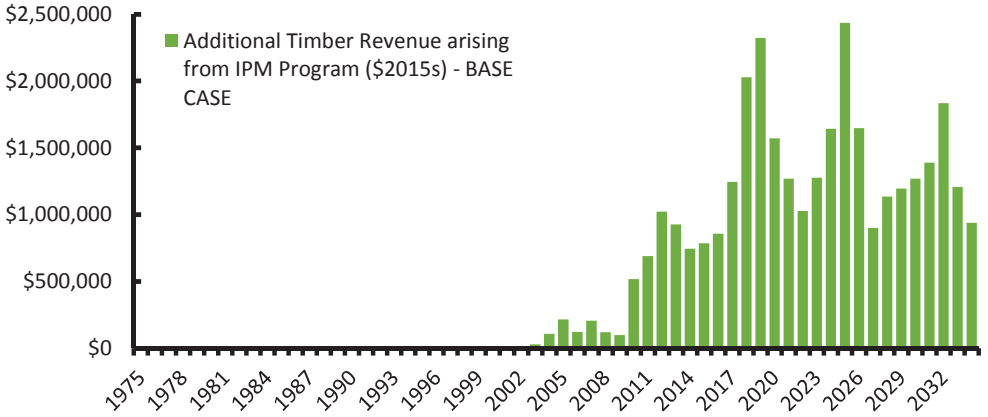
Area of hardwood plantation



Expenditure on leaf beetle research and management by cost category



Modelled value of the additional timber generated

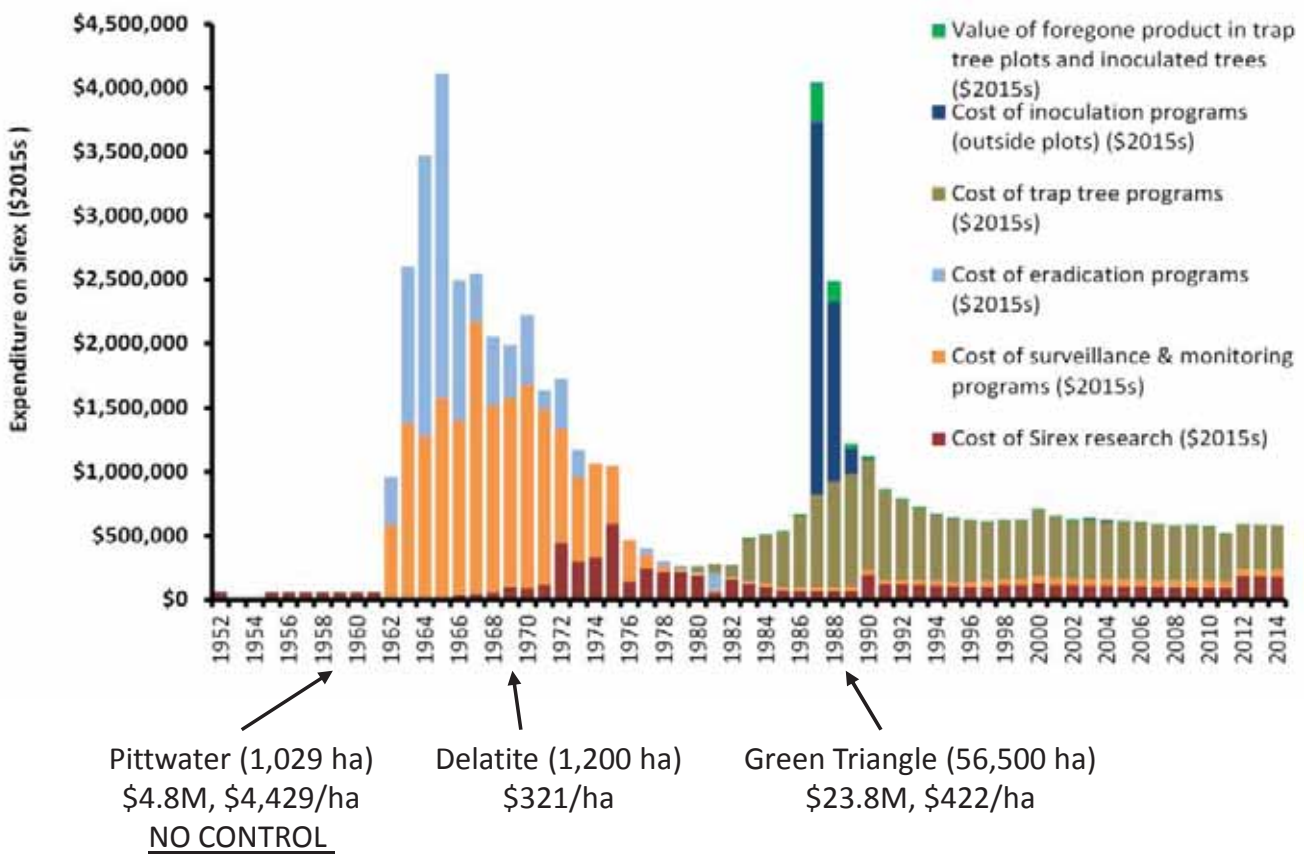


Sirex wood wasp

- Established and spreading since 1952: Tas, Vic, SA, NSW, s-e Qld
- Green Triangle outbreak killed 5 million trees
- National Sirex Strategy: biological control using nematodes and parasitoids, surveillance, monitoring
- National Sirex Coordination Committee & National Sirex Levy

New pests add costs to managing plantations

Expenditure on sirex control in Australia



Pittwater (1,029 ha)
$4.8M, $4,429/ha
NO CONTROL

Delatite (1,200 ha)
$321/ha

Green Triangle (56,500 ha)
$23.8M, $422/ha

Using 1952 as the baseline for discounting, total expenditure on sirex control in Australia had a NPV of $11.8M or $44.78 per hectare

Management costs: $0.72 per ha per year

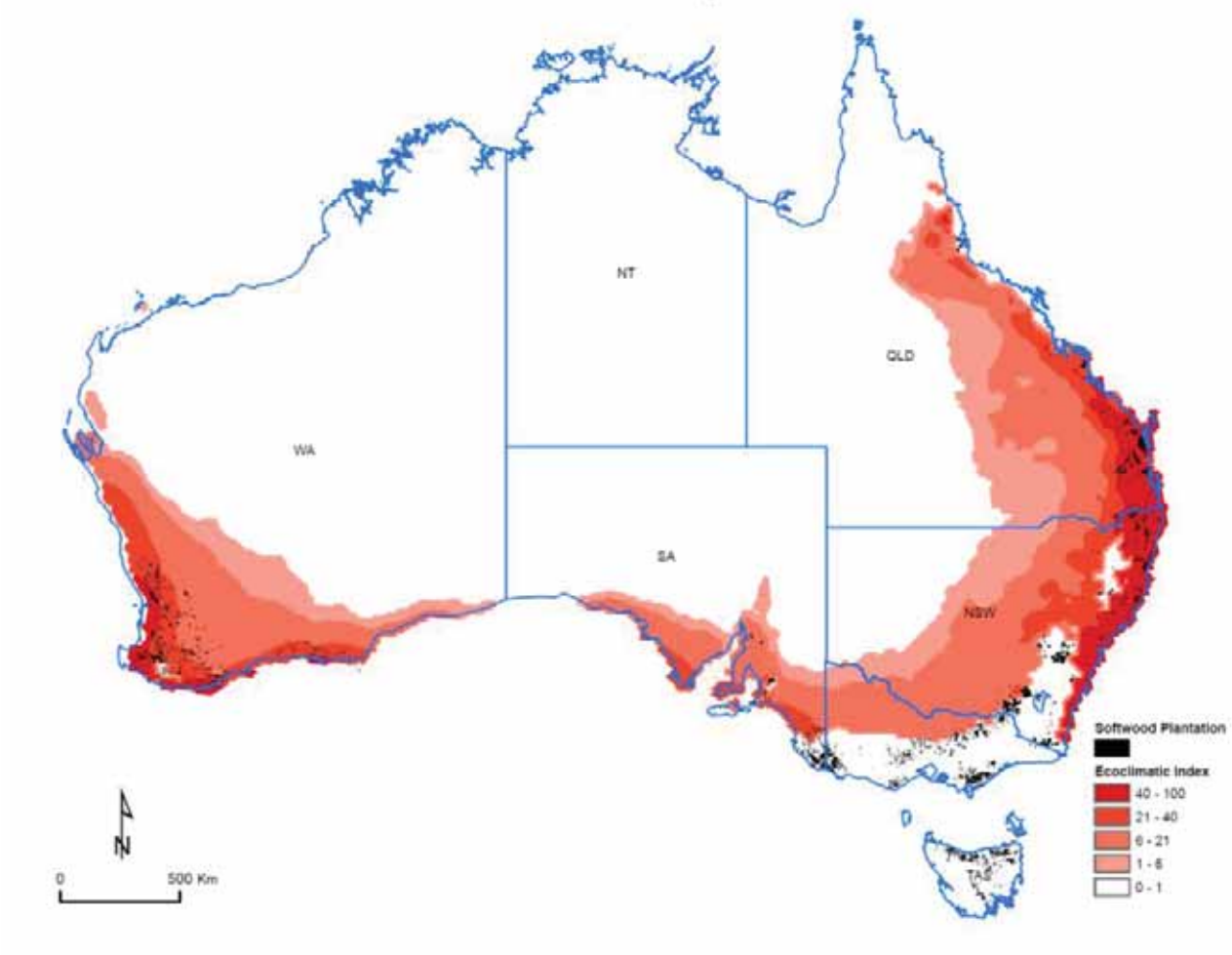
Pine wilt disease

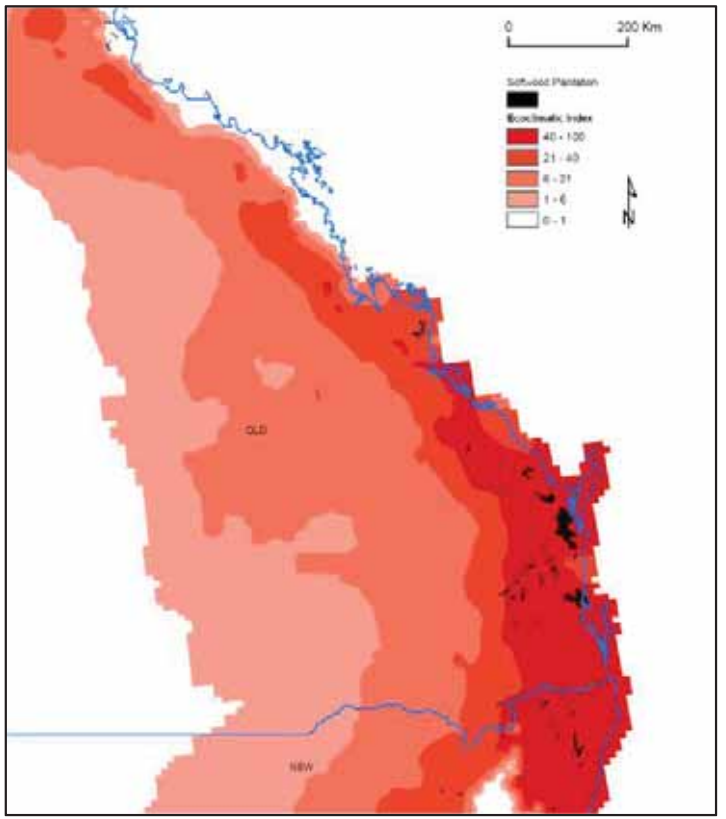
- Pinewood nematode is vectored by Japanese pine sawyer beetle and causes pine wilt disease
  - Native to North America; invaded Japan, China, Korea, Portugal
  - Has killed hundreds of millions of trees
  - Cost tens of million of dollars in control and management

Pest Risk Assessment

ASSUMPTION	VALIDITY
Likelihood of arrival of pinewood nematode and vectors	
Monochamus alternatus and Bursaphelenchus xylophilus have a **high** chance of arriving in Australia	Interception records reveal both are regularly intercepted at Australian ports; literature indicates both are intercepted regularly at international ports, including New Zealand. ISPM-15 not effective at negating the chance of these species arriving in SWPM.
Likelihood of establishment of pinewood nematode and vectors	
Bursaphelenchus xylophilus has a **medium** chance of establishing in Australia	Unequivocal evidence, with three recent examples of a Bursaphelenchus sp. establishing in port surrounds (Melbourne, Brisbane, Sydney). Secondary vectors of Bursaphelenchus (Arhopalus spp.) are established in Australia
Monochamus alternatus has a **negligible** chance of establishing in Australia	No previous evidence of Monochamus species having successfully invaded new countries. Although probable that primary vectors of Bursaphelenchus spp. incursions (above) were Monochamus, none established.
Likelihood of spread of pinewood nematode and vectors	
Likely spread of pinewood nematode in Australia, assuming M. alternatus established, is **medium**	Pinus species common as amenity trees throughout urban and peri-urban environments; all species in Australia known hosts of pinewood nematode, and likely to be stressed and thus attractive to vectors. These would act as “stepping stones” to commercial plantations, which similarly have susceptible species often under water and heat stress. CLIMEX modelling indicates south-east Queensland and north-east NSW, and south-west WA, highly suitable climate for pinewood nematode and M. alternatus.
Likelihood of significant impact to coniferous plantations	
Likelihood of significant impact to commercial plantations is **medium**	Pinus species planted in Australia likely to be resistant or only mildly susceptible to pine wilt disease. Ambiguity though over how these species retain this resistance when planted outside their native range in areas where drought and heat stress are common.

CLIMEX model: predicted distribution

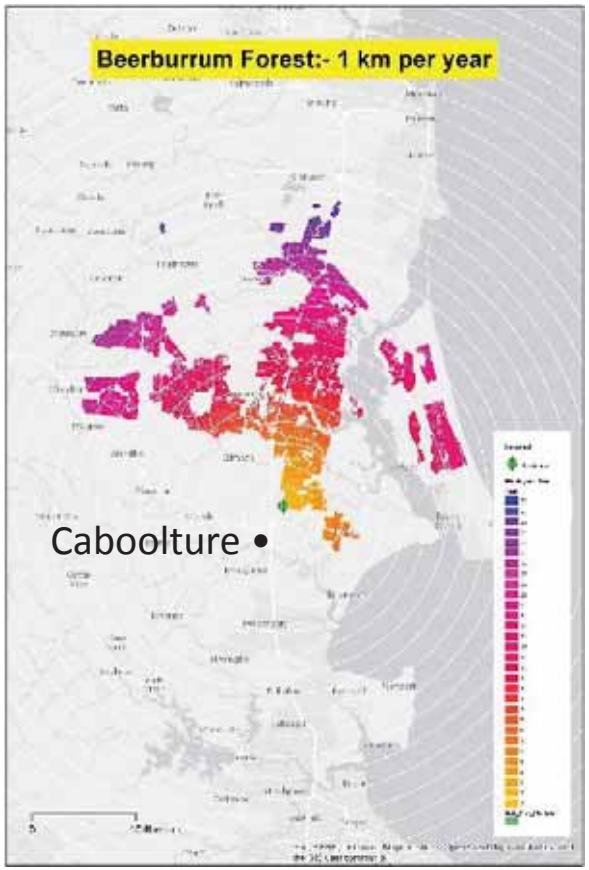




Incursion scenario

- Japanese pine sawyer beetle with pinewood nematode arrives in SWP material at Brisbane
  - Transported to Caboolture
  - Escapes into amenity trees and Beerburrum plantation
- Spreads 1 km/y or 2 km/y
- 10%, 20%, 40% mortality over 30-year period
- Accidentally transported to Tuan-Toolara plantation

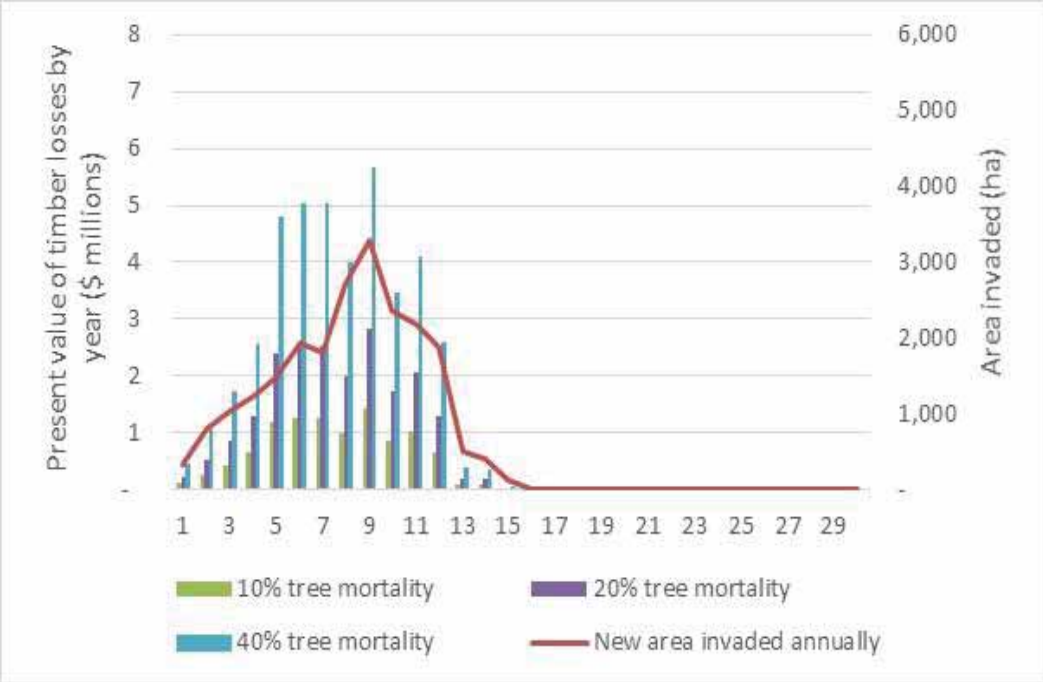
Tuan-Toolara



Brisbane, QLD

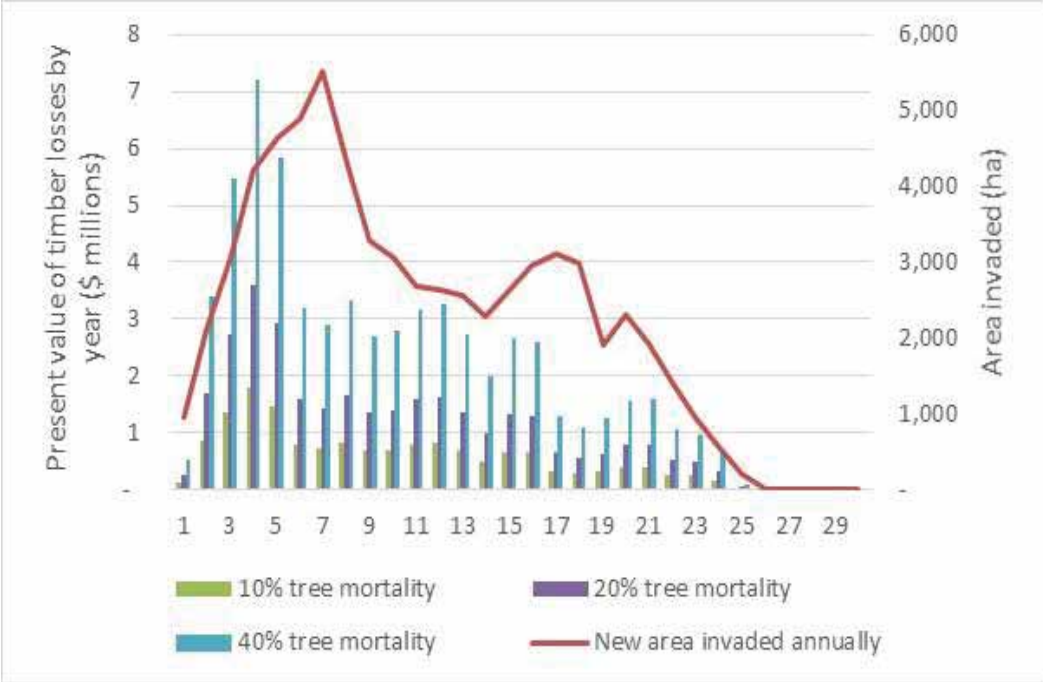
Economic impact of pine wilt disease

Beerburrum 2km/y spread rate



22,000 ha

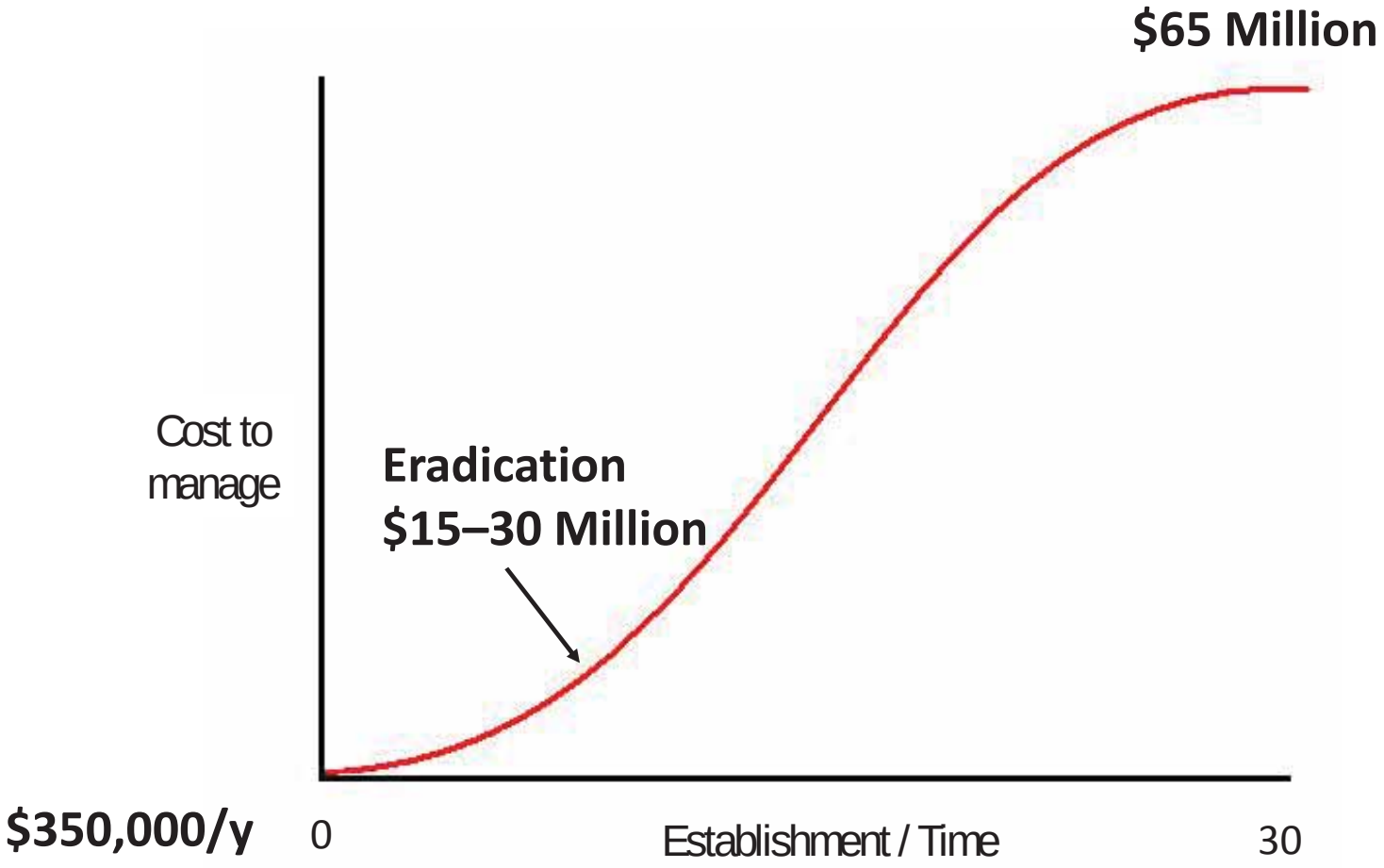
Tuan-Toolara 2 km/y spread rate



67,000 ha

Cost:Benefit of biosecurity

- The sum of the present value of annual damage costs over the 30-year simulation, when tree mortality is 20%:
  - **$65 Million** (1 km/y)
  - **$106 Million** (2 km/y)
- Given that arrival of pine wilt disease is not a certain event, *expected* present value of damage costs are more appropriate for biosecurity policy analysis.
  - 5% chance of establishment, 1 km/y spread, 20% mortality: **$6.9 Million**
- The total cost of eradication if detected early in the plantation; destroying all hosts in 5 km radius, including wildlings; is **$30 Million** (includes lost timber revenues of mature plantation)
- *Economically efficient to spend up to **$350,000/y** on biosecurity to keep pine wilt disease from establishing in south-east Queensland*


$65 Million
Cost to manage
Eradication
$15–30 Million
$350,000/y
0
Establishment / Time
30

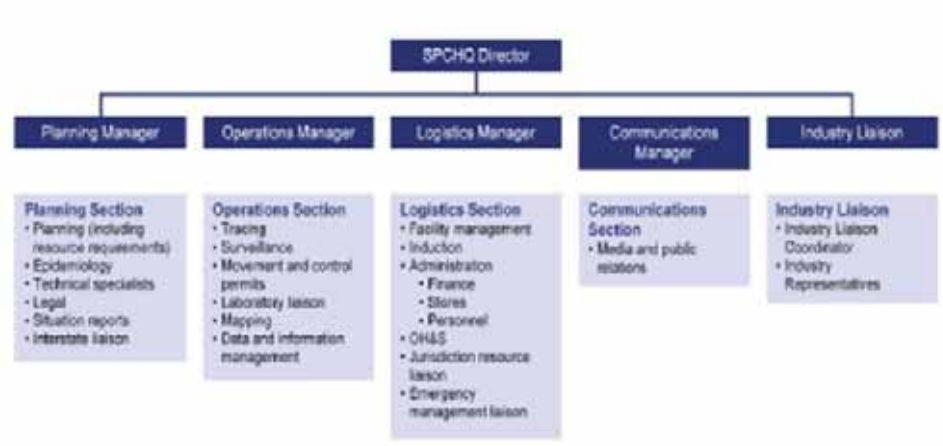
Conclusion

- *Exotic pests that establish in Australia result in added costs to the forest industry*
- *The case studies have demonstrated the potential benefits of efficient spending on biosecurity activities*

Emergency Responses

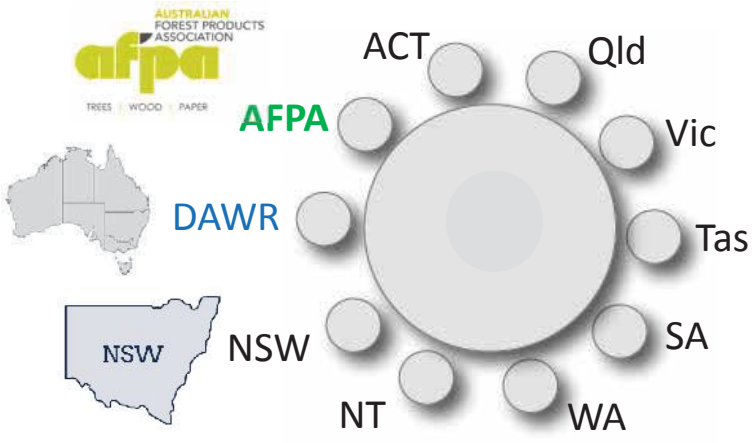
Emergency response procedures

- Emergency Plant Pest Response Deed (the Deed)
  - Provides the framework for managing Exotic Plant Pest (EPP) incursions
  - Cost-sharing (Government:Industry)
- PlantPlan
  - Operational template for responding to incursions
  - Operations structure



Decision makers

- Consultative Committee on Emergency Plant Pests (CCEPP)
  - Chief Plant Health Managers + Affected industry representative
  - “technical feasibility of eradication”
- National Management Group (NMG)
  - Senior Biosecurity Bureaucrats + CEO affected industry body
  - Final decision; approves budget



Confidentiality: hindrance to transparency and progress

NOTE: Please treat all information provided as CONFIDENTIAL, in line with requirements set out in the EPPRD.

Dear CCEPP members and observers and PHC members,

In relation to the CCEPP 1 [redacted] teleconference held on **19 August 2016**, please find attached:

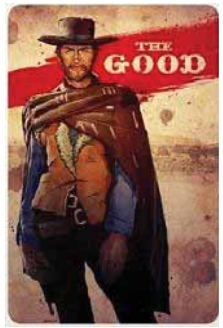
- Advice from SDQMA, provided as a result of Action 1.1 of the Outcomes and Actions from the teleconference, and
- The Final Outcomes and Actions.

Please note that the Chair modified ToR 1 for the SDQMA advice so that it would better reflect what he interpreted was the original intent of the CCEPP request.

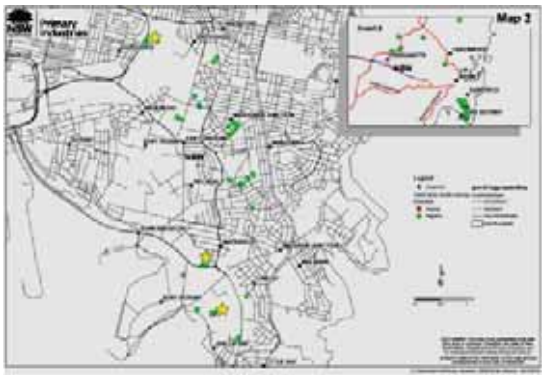
Kind Regards,

- States and Commonwealth can consult broadly, as fall under Confidentiality Agreement
- More ambiguous for industry representative, including with State technical experts and growers

Japanese pine sawyer and Asian longhorn beetle



- Exit holes detected by importer at Port Botany (Sydney)
  - Pallets of building material imported from China
  - Detected at all major Australian ports
- Port warehouse & pallets fumigated; traps set at Ports
- States set traps outside ports; conduct host-tree surveillance
- Awareness campaign
  - Forest industry takes notice
- No further beetle detections; no nematodes detected
  - Not an incursion



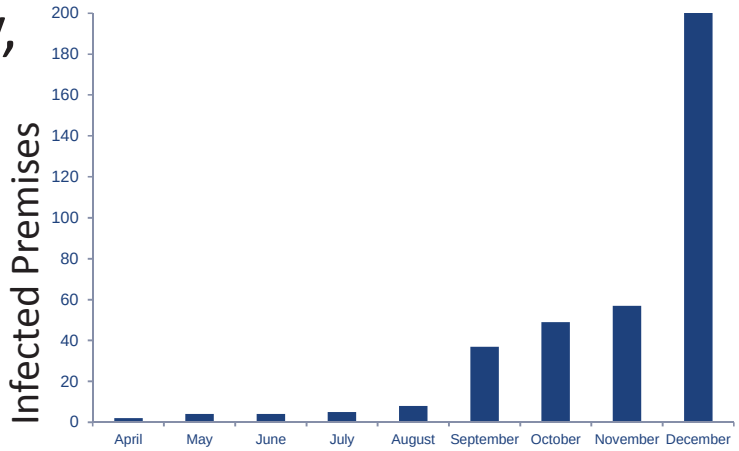
do it again…

- Process worked well
- Mostly driven by forest health technical experts in States
  - Lack of forestry expertise within state-based biosecurity agencies
- Needs “formal” collaboration with DAWR border surveillance staff
  - Confidentiality issues from DAWR

- *Raised awareness and need for forest biosecurity surveillance (HRSS)*

Myrtle rust

- Detected by cut flower grower and reported to NSW DPI
- Emergency Plant Pest Response Deed kicks in
  - Lasts for 1 week; then determine not technically feasible to eradicate
- Ongoing surveillance reveals minimal spread
- Emergency Response re-starts, but now too late
- Criticism* from forest industry, nursery industry, Plant Biosecurity CRC, APPS, +
- Dint to government-industry relationship



* http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Environment_and_Communications/biosecurity

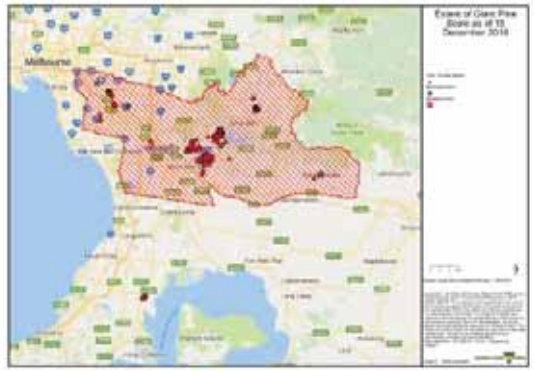
do it again…

- Hit it hard!
  - More thorough surveillance to determine distribution (allow 1 month)
  - Adequately resourced (both numbers and expertise)
  - Start eradicating (plant destruction) straight-away
- Rip-up the Contingency Plan
  - Parts of it ignored
  - *Need flexibility*
  - Preparedness Plans
- But, accept that within 2–3 weeks could find it far and wide

- *Industry learnt that they can't totally rely on Government; need to get involved*

Giant pine scale

- Detected in Melbourne and Adelaide
- Categorisation process (Government:Industry cost sharing):
  - Industry wanted amenity and public-good value of pine trees recognised
- Emergency Response decision:
  - Confidentiality hindered transparency and decision making; made it hard for industry to determine cost:benefit of eradication
- Insecticide did not work
  - Scientific Advisory Panel convened to find out why
    - Determined wrong insecticide; currently none effective
- Industry ask why this was not determined at out-set!
  - Problems dealing with a “new”/unknown pest



http://agriculture.vic.gov.au/agriculture/;

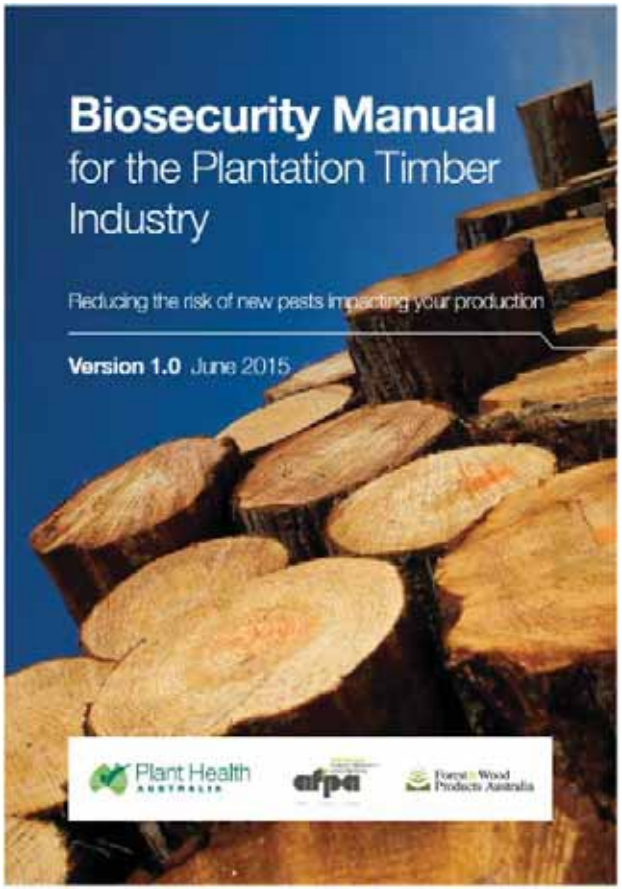
do it again…

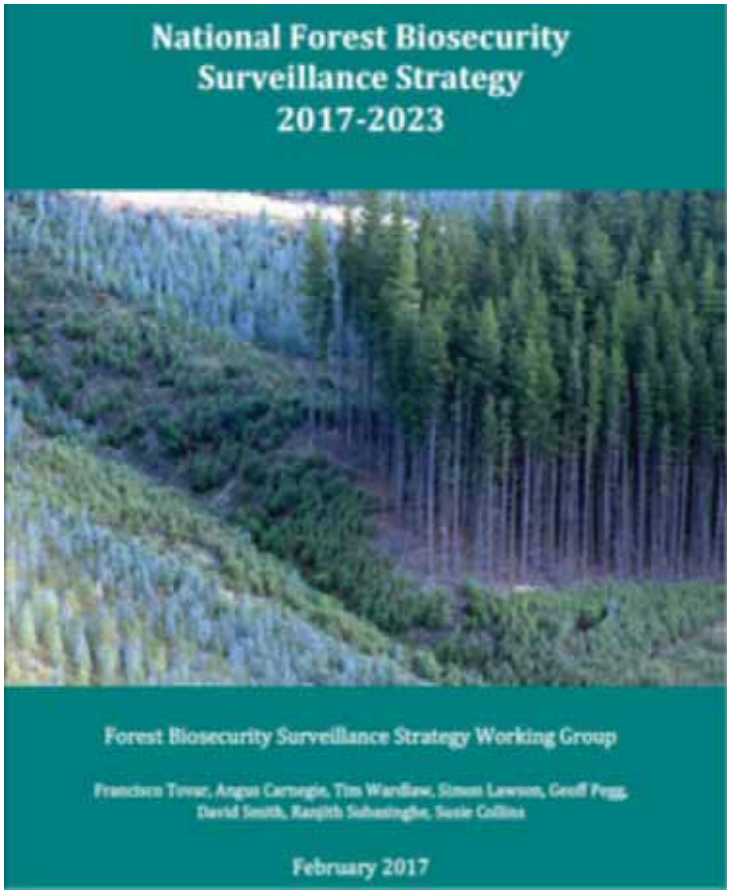
- Ensure broader technical input at early stages of response
  - Response Plan developed by lead State agricultural agency
- Don’t allow government to rush you

- Increase transparency around government management costs

- *Industry impression is that they were taken for a ride*
- *Government needs to handle criticism better*
- *Unknowns when dealing with a new pest*

Are we prepared for the next one?…





Vision: To have a nationally coordinated forest pest surveillance system that is integrated with the broader plant biosecurity system, is supported by all stakeholders and provides effective resource protection for Australia's forests, environment and communities.

Strategic goals

- Provide forest biosecurity leadership and coordination
- Engage with stakeholders in forest biosecurity
- Improve capability and capacity in forest biosecurity to support surveillance
- Reduce the risks of establishment of exotic forest pests into Australia
- Integrate surveillance efforts and information to support forest biosecurity

➡ ***Projects to achieve goals and objectives…***

Acknowledgments

Forest & Wood Products Australia

- HQPlantations
- Forestry Corporation of NSW
- GTFP (Andrew More)
- ForestrySA (Mike Powell)
- Forestry Tasmania

FOREST OWNERS ASSOCIATION

Ministry for Primary Industries
Manatū Ahu Matua

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- Tim Wardlaw, Forestry Tasmania
- Nick Cameron & Matt Nagel, NSW Forest Science