

# Cultivated Leucaena in northern Australia

Three questions...

1. How much Leucaena is in northern Australia?
2. Where is it viable in northern Australia?
3. What are the potential financial benefits?

Redlands vs other varieties



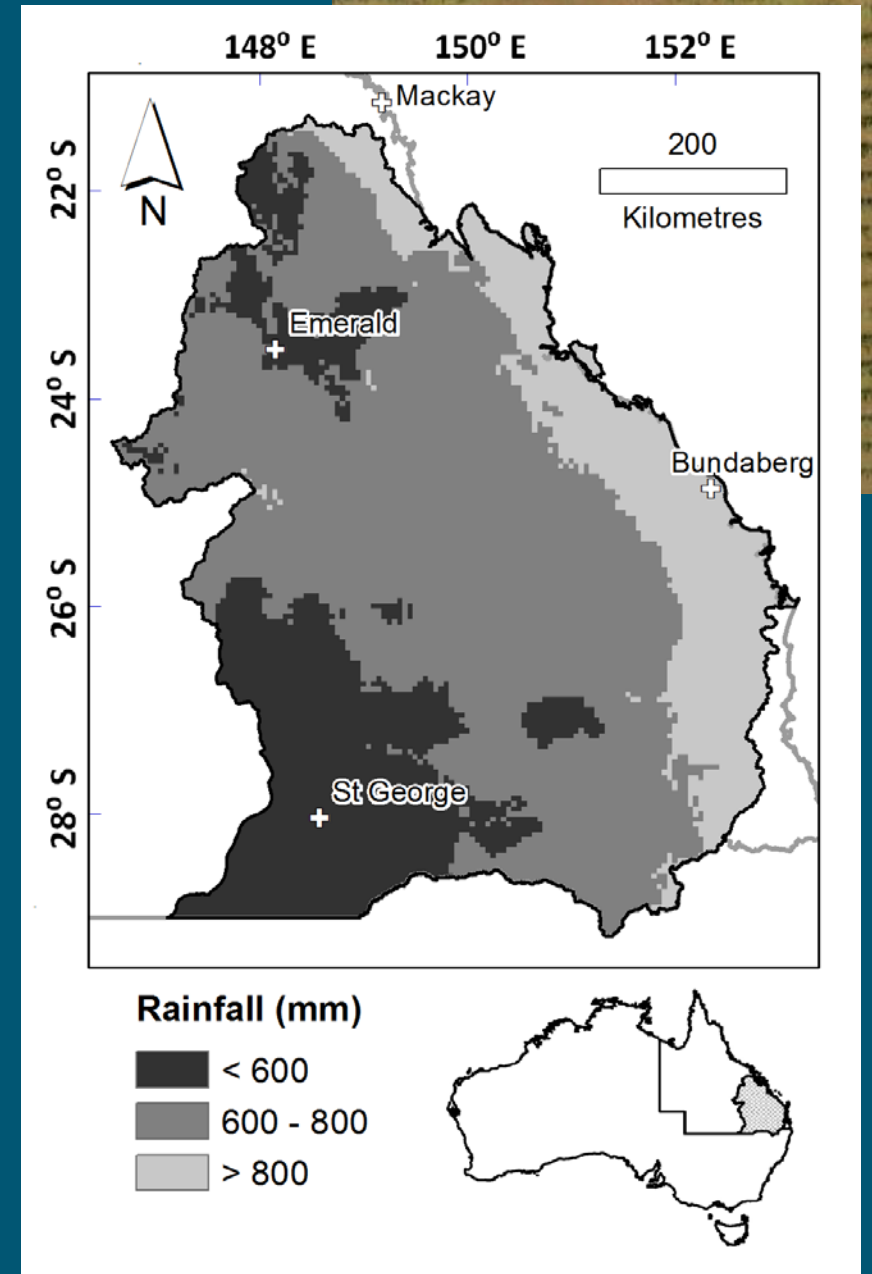
# How much Leucaena?

Leucaena is easy to detect in high-res imagery  
5-12m inter-row, often double drills

Beutel et al (2018)

- surveyed 350,000 km<sup>2</sup> 'heartland'
- 12,561 sites
- 900 -1550 km<sup>2</sup>

Could we expand on this?



# How much *Leucaena*?

Sampling was extended to ...

## *Area A*

Old sites, new imagery (n=4721)

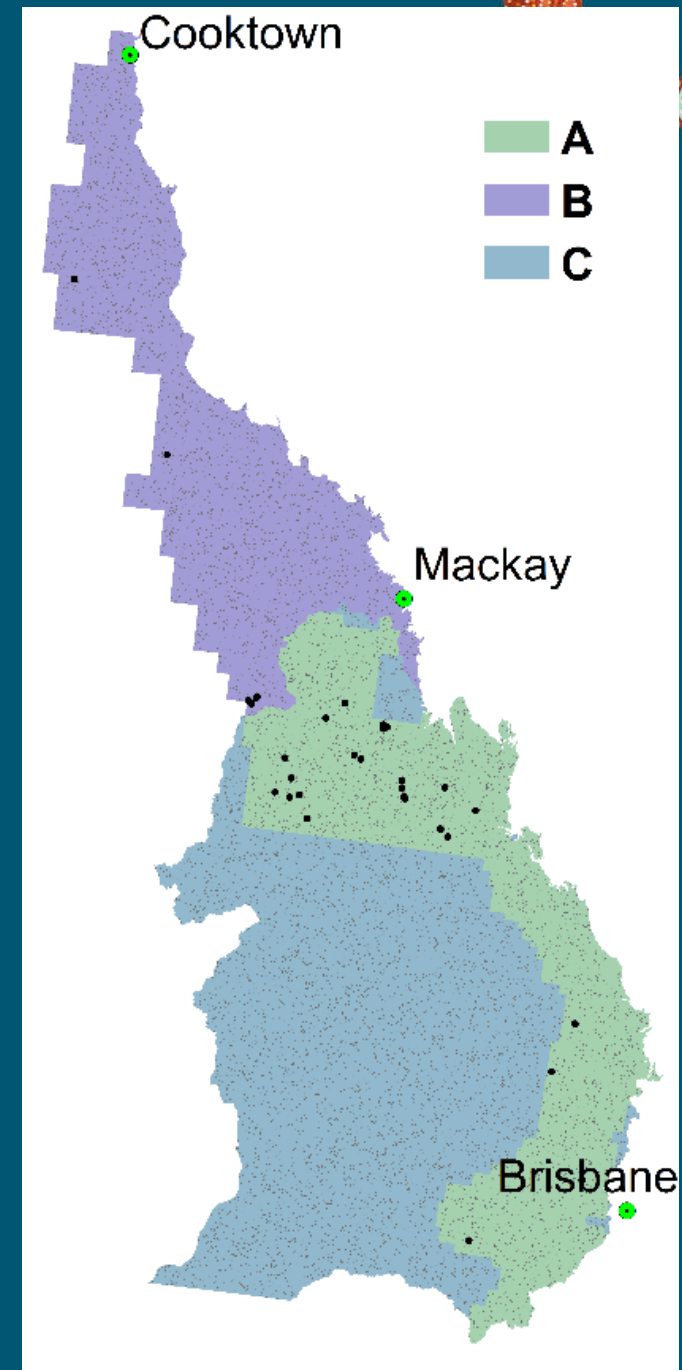
Estimated 210 - 480 km<sup>2</sup>

60 km<sup>2</sup> increase

## *Area B*

New quads with available imagery (n=4322)

Estimated 0 - 150 km<sup>2</sup>



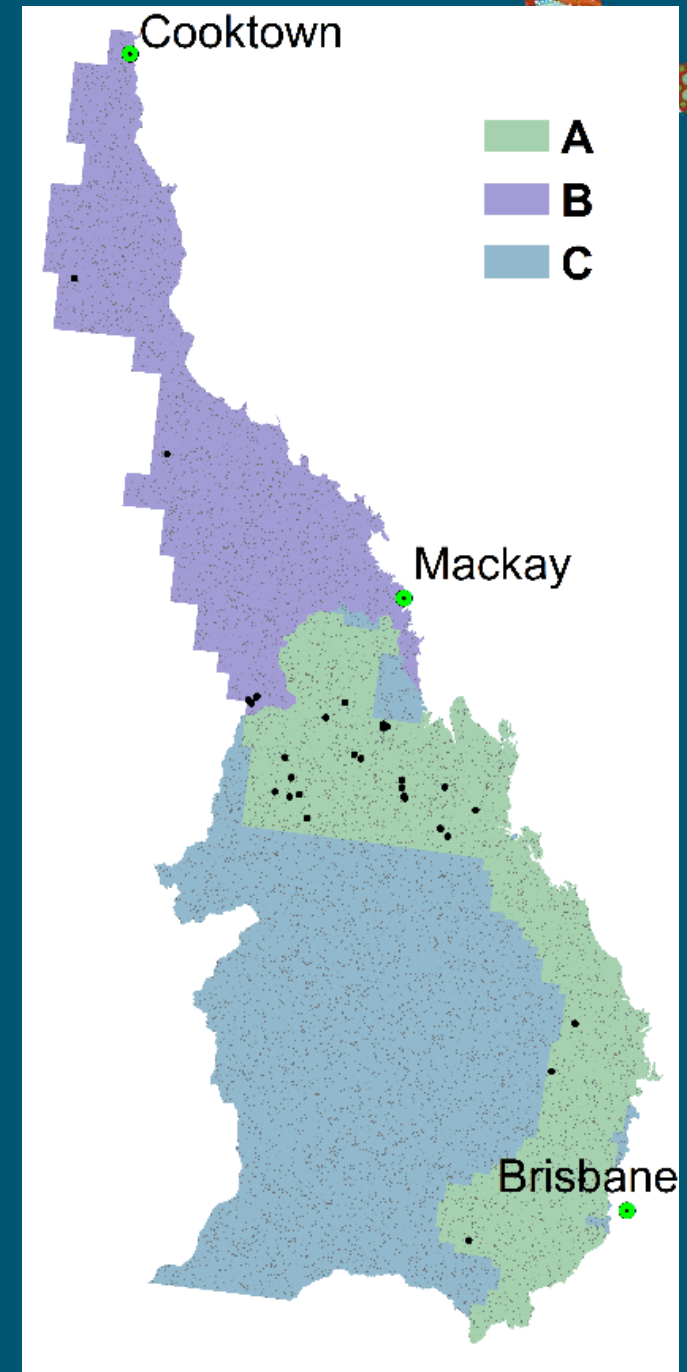
# How much *Leucaena*?

Total estimated area = 1000 - 1700 km<sup>2</sup>

The monitoring system works

Fitzroy dominant, very little in the tropics

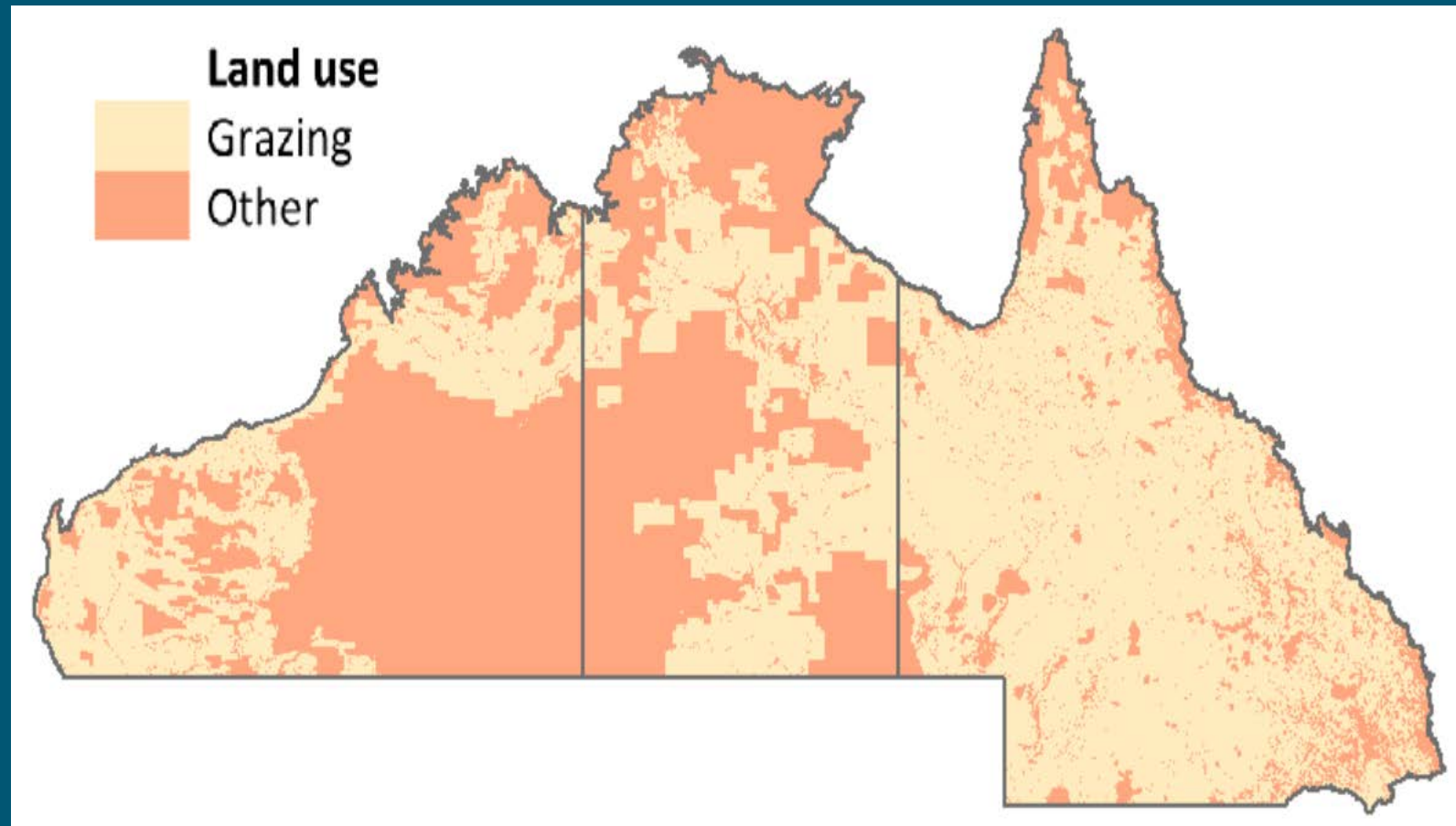
Very limited coverage in NT and WA



# Potential distribution?

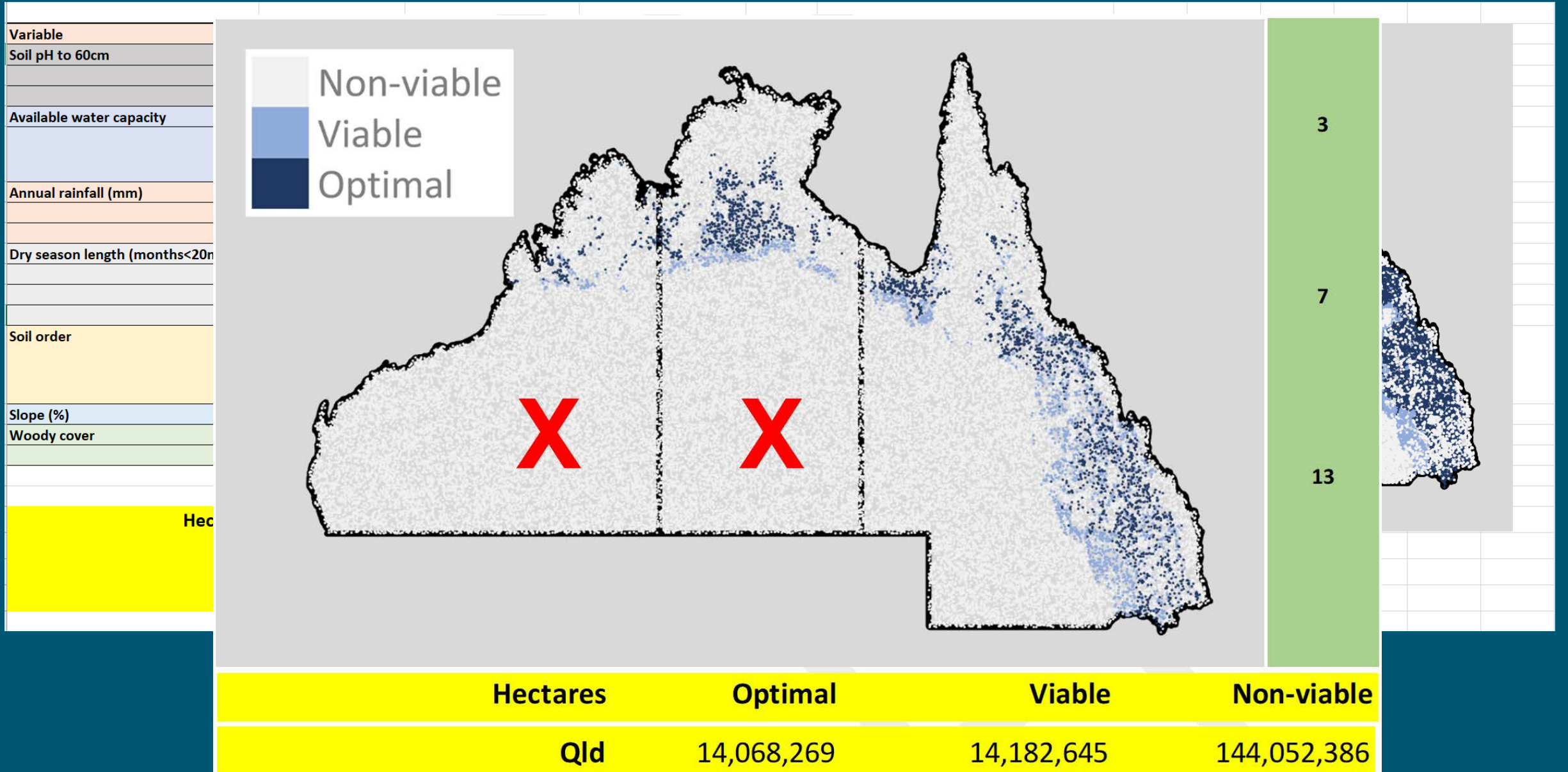
Where and how much?

What difference will cv Redlands make?

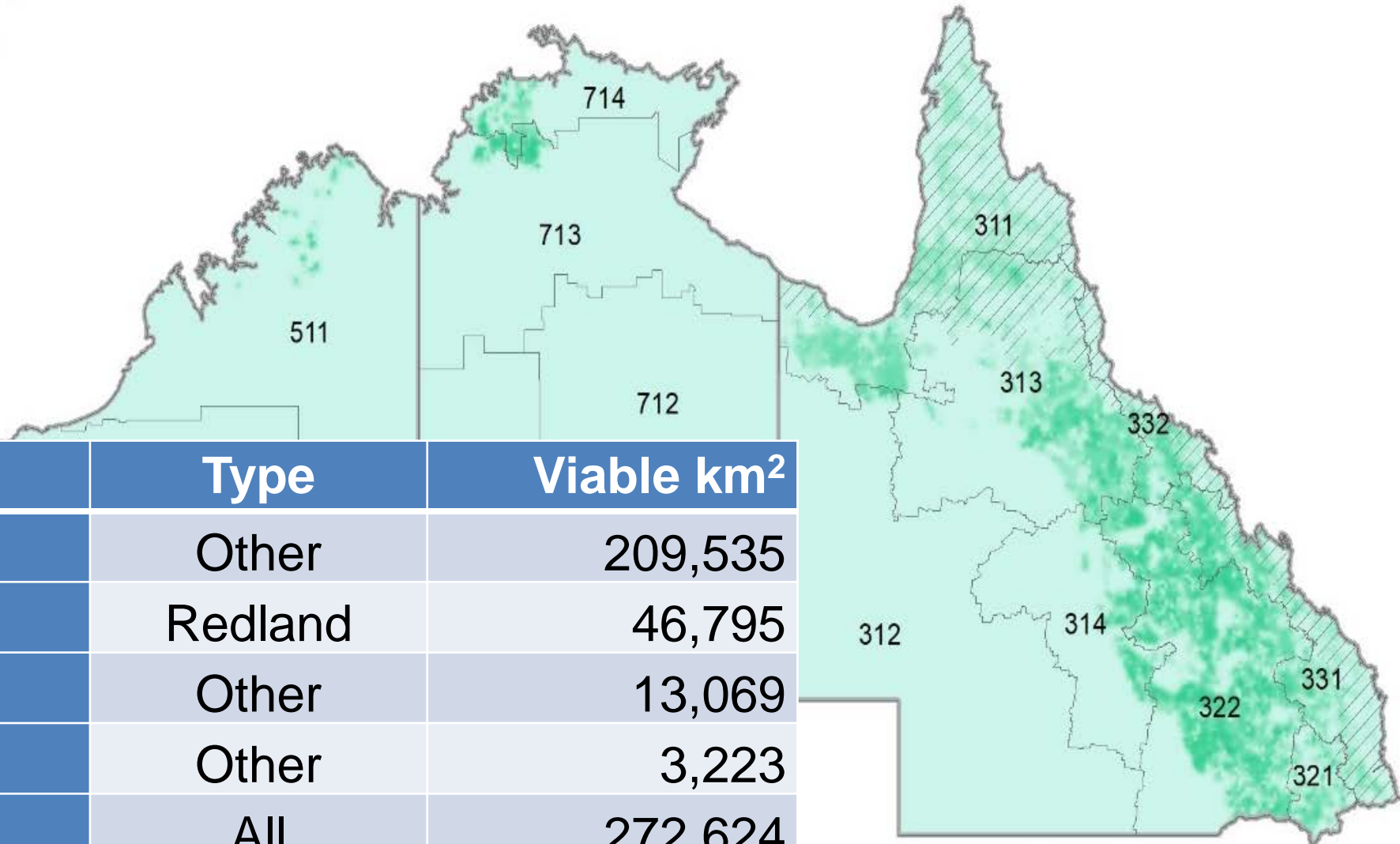
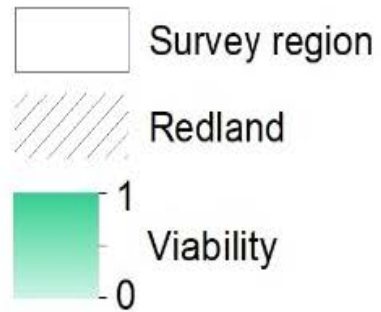




# Potential distribution?



# Potential distribution?



	Type	Viable km <sup>2</sup>
Qld	Other	209,535
Qld	Redland	46,795
NT	Other	13,069
WA	Other	3,223
Total	All	272,624

# Potential distribution take homes

Queensland has most of potential Leucaena cultivation areas

Redland could significantly extend that area

Analysis doesn't include weed, veg, leasehold and other conditions

Even so, space not a limiting factor for cultivated Leucaena

Room to avoid weed risks (CoP)

Agencies could target higher viability areas

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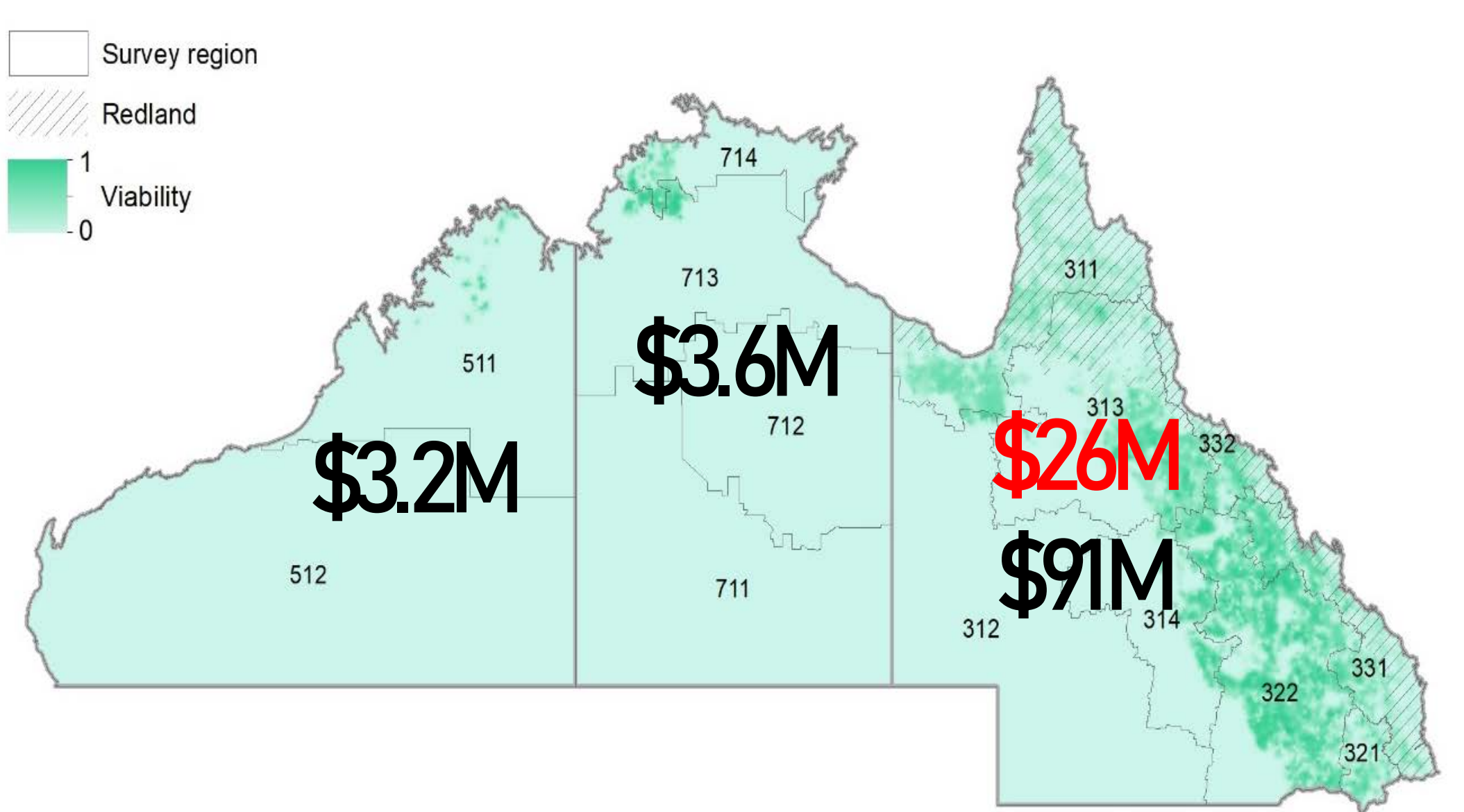
# Financial benefits?

- What are the benefits at industry level?
- Total NPV (5%) of new *Leucaena* cultivations (2022-2061)

## Assumptions

1. Adoption then dis-adoption as technology changes
2. New cultivations peak at 1,900 km<sup>2</sup>, reflecting historical expansion

# Financial benefits?



# Financial benefits take homes

Queensland has the lion's share of Leucaena and potential returns

Redlands cv has substantial potential to increase that

This was a conservative financial analysis

But results could differ at farm level

- Depends on resources and management
- IRR >30% for some Fitzroy enterprises



# Take home messages

The standing crop of cultivated Leucaena is relatively small

We have a good monitoring system in Queensland

Space is not a limiting factor in Queensland, Redlands or other Leucaena

- Scope to grow in lower weed risk areas (CoP)

- Agencies could target higher viability areas

Redlands cv has potential to impact coverage and \$ returns, but not yet

A conservative financial analysis suggests modest returns

Doesn't preclude good returns per property with suitable soils, management etc





ASQ RD&E Seminar:  
Microbes and Mapping - Maximising  
Leucaena Munchability

Diane Ouwerkerk and Terry Beutel



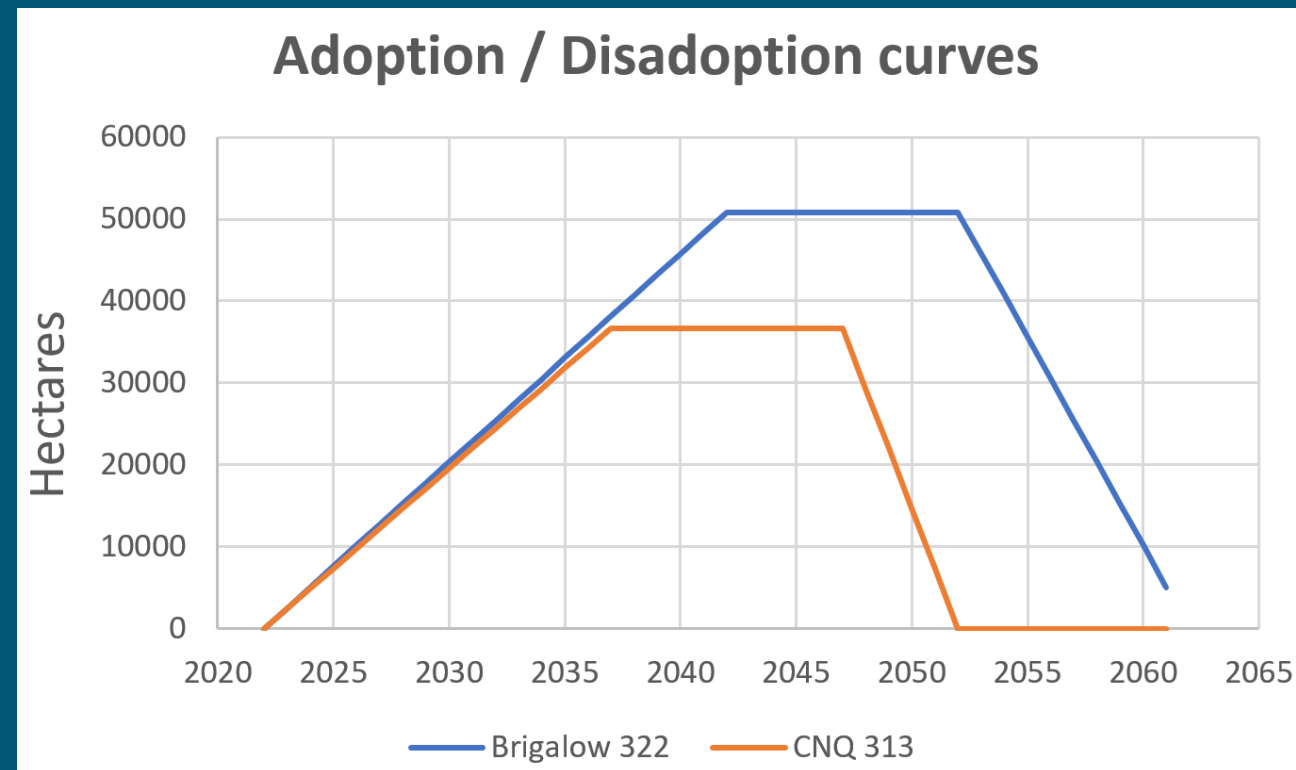
# Financial benefits?

## Net Present Value of Leucaena adoption at industry level

- Total NPV of Leucaena adoption (5% discount)
- Applies to new cultivation only (2022-2061)

## Assumptions

1. Regional (dis)adoption curves
  - Reflects technology change
2. Peaks at 1,900 km<sup>2</sup>
  - -Reflects historical expansion



# Background

Forage Leucaena first released in 1960s

Mostly Queensland and mostly Fitzroy

For right conditions, excellent return on investment

Limited by psyllid predation (>800mm pa)

Redlands cv is developed for psyllid resistance

Creates options for tropical Leucaena use

# Potential distribution

## Expert advisor panel (n=7)

1. Selected relevant spatial layers for their jurisdiction

2. Defined viable ranges in those spatial layers

3. Assessed layer interactions in Excel map tool

Variable	Optimal	Viable	Non-viable	Choice
Soil pH to 60cm	6.5–8.5	5.5–6.4 & 8.6–9.0	<5.5 and >9.0	1
	6.0–8.5	5.5–6.0 & 8.6–9.0	<5.5 and >9.0	2
	5.5 – 8.5	8.6 – 9.0	<5.5 and >9.0	3
Available water capacity	>150mm in top 1m	100-149mm in top 1m	<100mm in top 1m	4
	If soil is Kandosol then >150mm in top 1.5m, else as above	If soil is Kandosol then 100-149mm in top 1.5m, else as above	If soil is Kandosol then <100mm in top 1.5m, else as above	5
Annual rainfall (mm)	>700	550-700	<550	6
	>600	550-600	<550	7
	>900	750-900	<750	8
Dry season length (months<20mm)	<6 months	6-7 months	>7 months	9
	<5 months	5-6 months	>6 months	10
	<4 months	4-5 months	>5 months	11
	<3 months	3-4 months	>4 months	12
Soil order	Chromosols, Dermosols, Ferrosols, Kandosols, Vertosols	Sodosols, Calcarosols	Anthrosols, Hydrosols, Kurosols, <u>Organosols</u> , Podosols, Rudosols, Tenosols	13
Slope (%)	<5%	6-10%	>10%	14
Woody cover	0-10%	11-20%	>20%	15
	0-9%	10-14%	>14%	16

# Financial benefits?

