



Recent advances in Queensland's silvopastoral systems

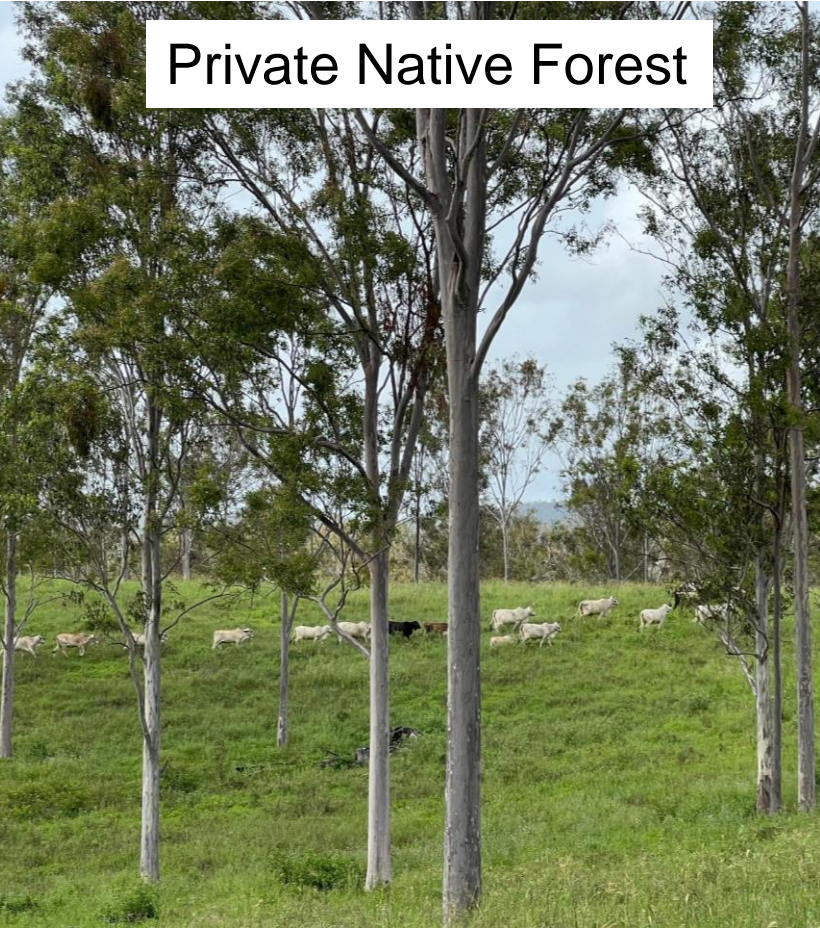
Dr Nahuel Pachas QDAF

DAF BPRF, Gayndah, QLD



Silvopastoral system:

Private Native Forest



Four mile property, Wonbah QLD

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Photos: Dr Nahuel Pachas

Mixed-hardwood species

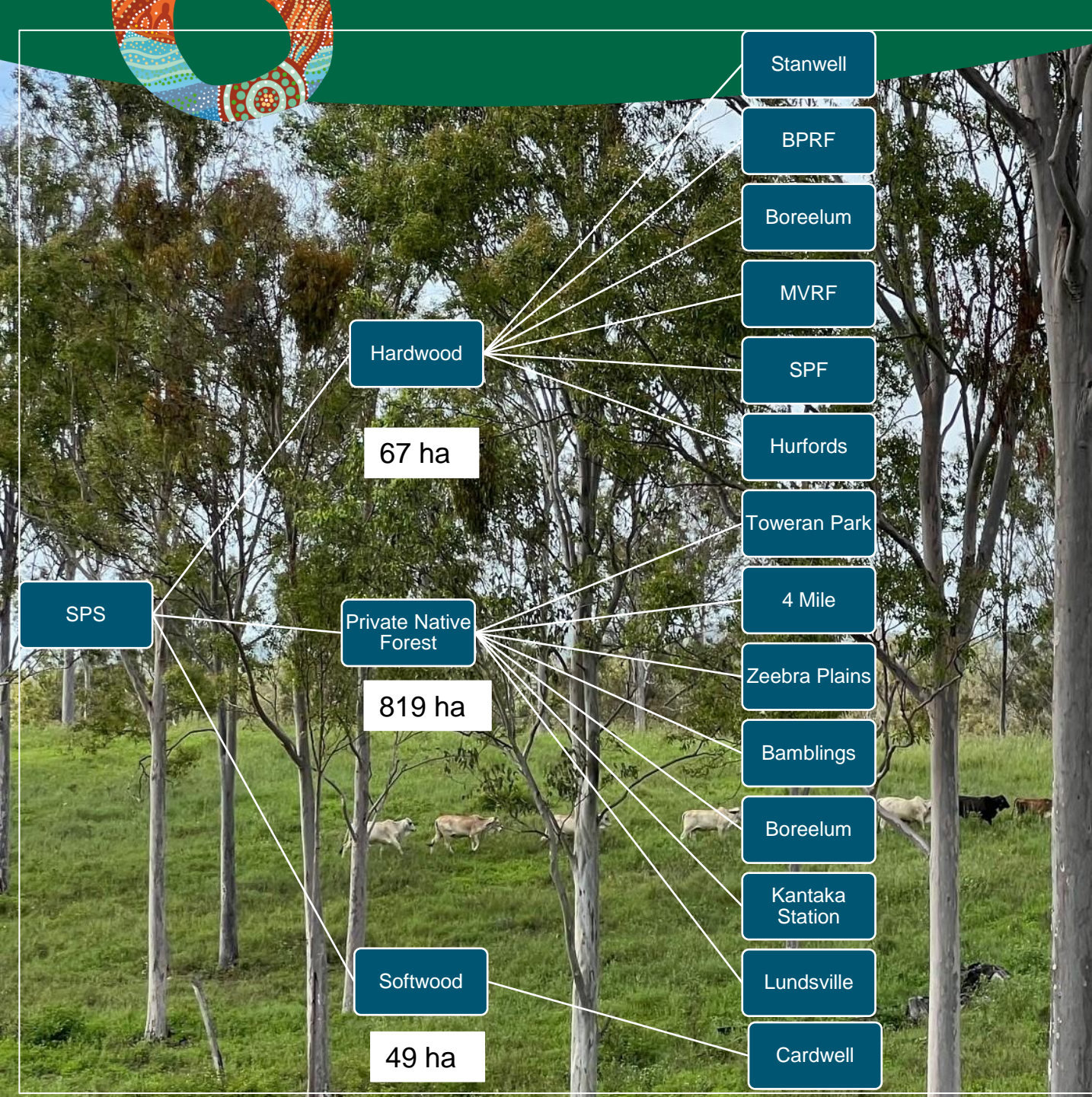


Dunrobin property, Sextonville NSW

Caribbean pine



HQP, Dumper Creek QLD



Un-thinned + improved pasture



Stocking: 396 stems/ha
DBH MAI 0.4 cm/year
Carbon stock: 91 t C/ha
C seq: 2 t C/ha/year
Pasture production: 1.8 t/ha/year

Thinned + improved pasture



Stocking: 100 stems/ha
DBH MAI 0.9 cm/year
Carbon stock: 31 t C/ha
C seq: 1.1 t C/ha/year
Pasture production: 3.3 t/ha/year

Lundsville property, Gaeta, QLD



Average rainfall 1020 mm/year

November 2022



After thinning (April 2023)



Boreelum property, Colosseum, QLD


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Stocking: 620 stems/ha
DBH MAI 0.5 cm/year
Carbon stock: 70 t C/ha
C seq: 2.3 t C/ha/year
Pasture production: 7.5 t/ha/year

Stocking: 120 stems/ha
DBH MAI 1.7 cm/year
Carbon stock: 28 t C/ha
C seq: 2.2 t C/ha/year
Pasture production: 28 t/ha/year





Average rainfall 805 mm/year

Corymbia hybrid of 14 years of age

C. citriodora subsp. *variegata* x *Corymbia torelliana*

Control 610 stems/ha

350 stems/ha

225 stems/ha

100 stems/ha



DBH MAI 0.4 cm/year
Carbon stock: 83 t C/ha
C seq: 4.3 t C/ha/year
Pasture production: 0.3 t/ha



DBH MAI 0.7 cm/year
Carbon stock: 54 t C/ha
C seq: 4.7 t C/ha/year
Pasture production: 0.7 t/ha



DBH MAI 0.9 cm/year
Carbon stock: 45 t C/ha
C seq: 4.8 t C/ha/year
Pasture production: 0.6 t/ha



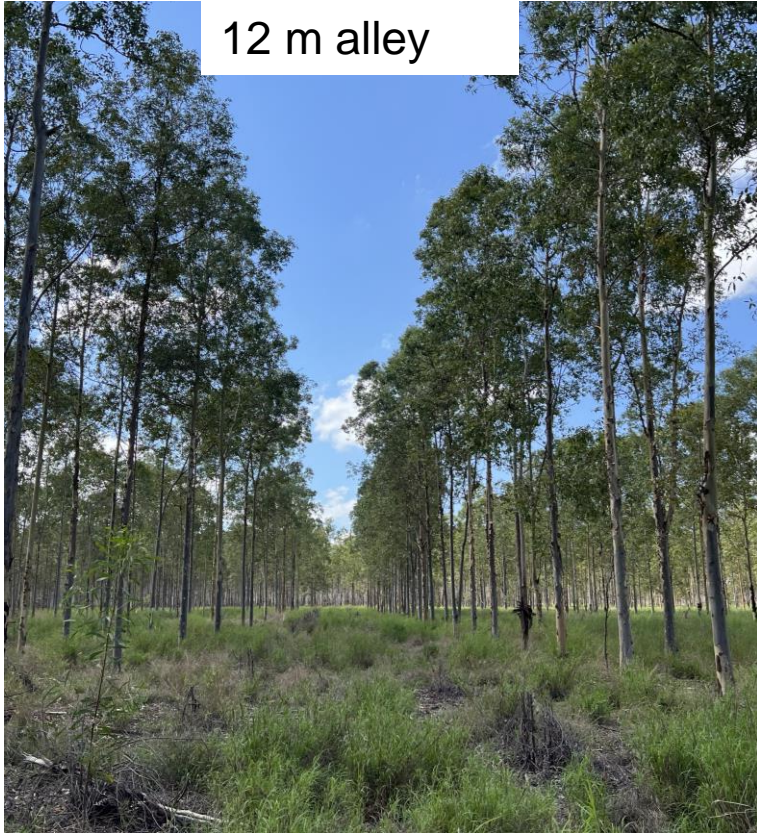
DBH MAI 1.5 cm/year
Carbon stock: 35 t C/ha
C seq: 5.4 t C/ha/year
Pasture production: 2.2 t/ha



Alley configuration

Average rainfall 805 mm/year

350 stems/ha
12 m alley



225 stems/ha
16 m alley



100 stems/ha
20m alley



DBH MAI 1 cm/year
Carbon stock: 31 t C/ha
C seq: 3.8 t C/ha/year
Pasture production: 3.1 t/ha

DBH MAI 1.4 cm/year
Carbon stock: 20 t C/ha
C seq: 3.3 t C/ha/year
Pasture production: 7.7 t/ha

DBH MAI 1.6 cm/year
Carbon stock: 20 t C/ha
C seq: 3.5 t C/ha/year
Pasture production: 7.6 t/ha



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Photos: Dr Nahuel Pachas

Stanwell Corporation, Stanwell, QLD



inland
Government

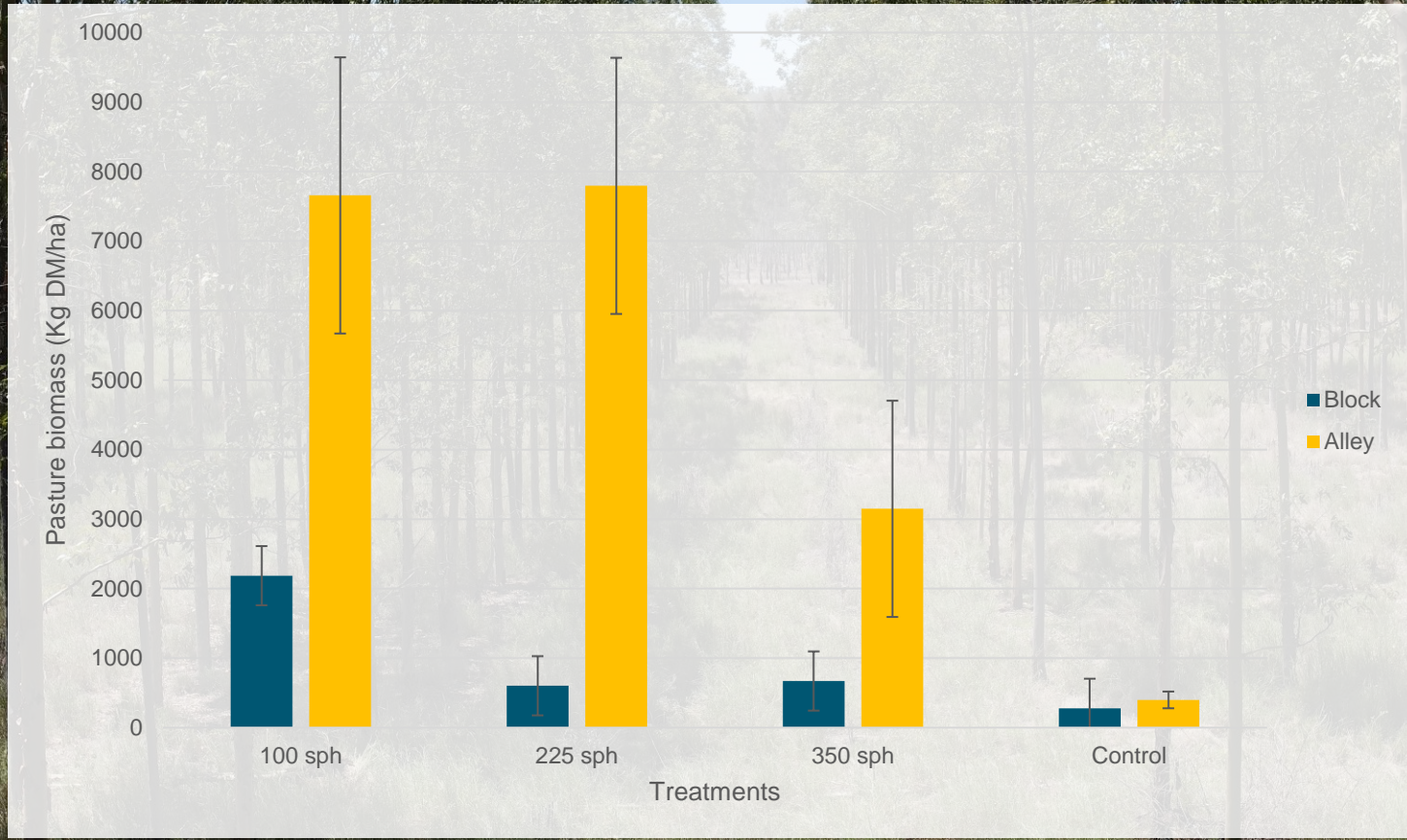


Photo: Dr Nahuel Pachas, Stanwell Corporation, Stanwell, QLD



Pros

- Good balance between trees-grass interactions
- Lower cost of establishment
- Reduced impact on pasture productivity due to delayed thinning/pruning operations
- Allows grazing after planting

Cons

- Low stocking, needs high quality seedlings and germplasm
- Timber quality (uneven tensions in the wood)

Average rainfall 1020 mm/year



Average rainfall 1020 mm/year



Photo: Dr Nahuel Pachas

Photo: Adam & Jac Coffey

Boreelum property, Colosseum, QLD



Average rainfall 760 mm/year



Photo: Dr Nahuel Pachas, Brian Pastures Research Facility, Gayndah, QLD

	Open Pasture	SPS
Average LWG (kg/day)	0.66	0.62
Beef production (Kg/ha/year)	128	90.6
Cattle emission (t CO ₂ e/ha/year)	0.71	0.56
C sequestered (t CO ₂ e/ha/year)	-----	1.1

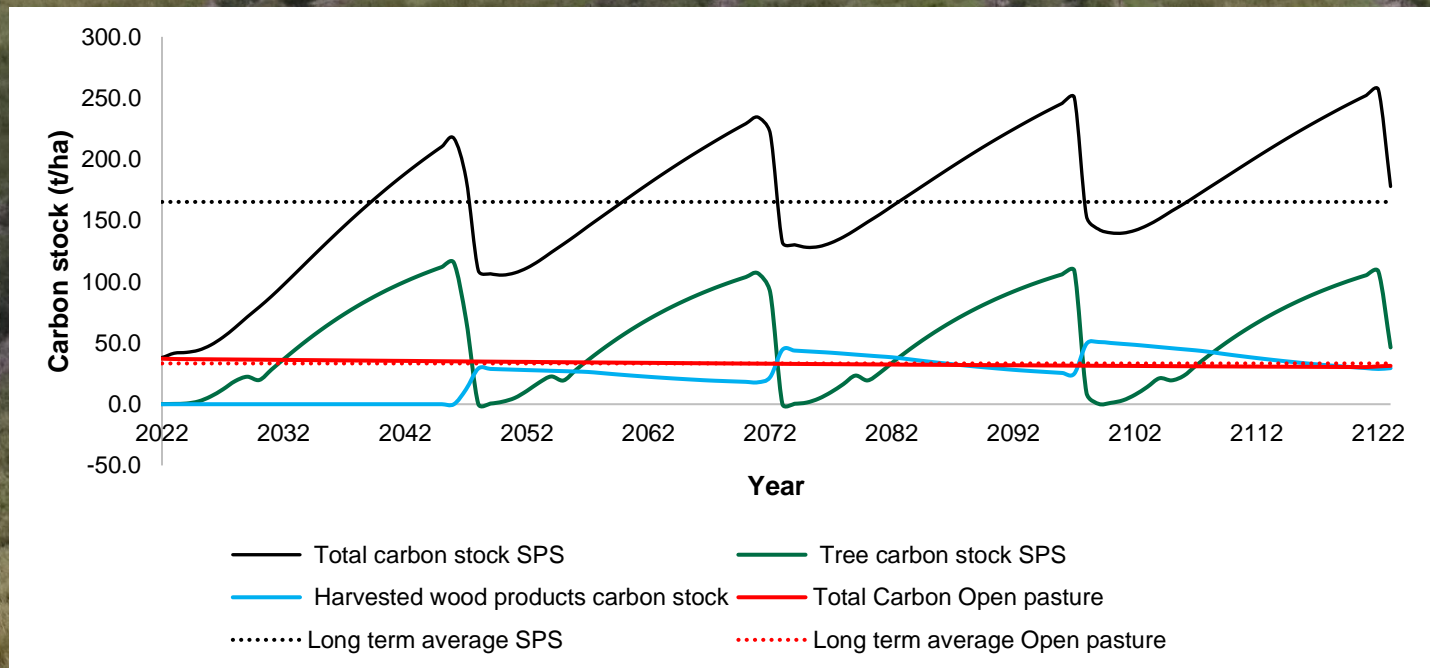
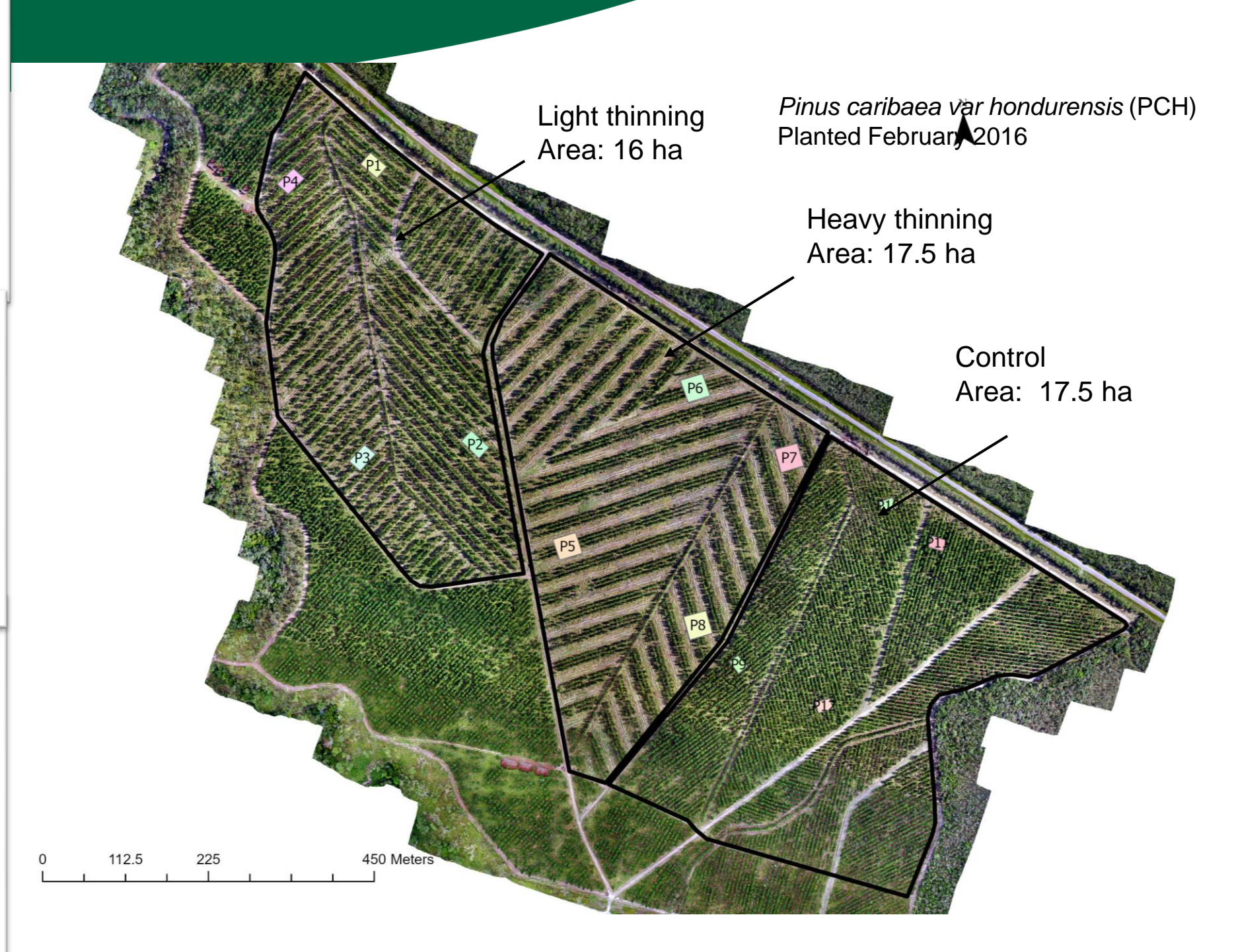
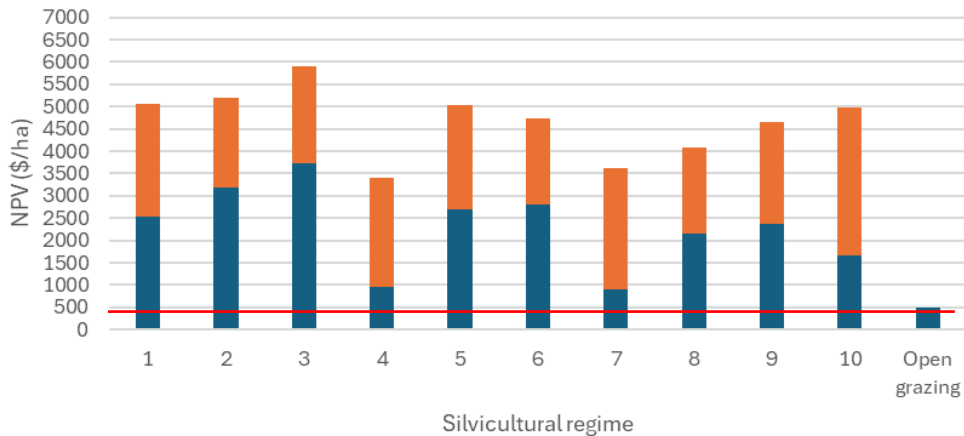


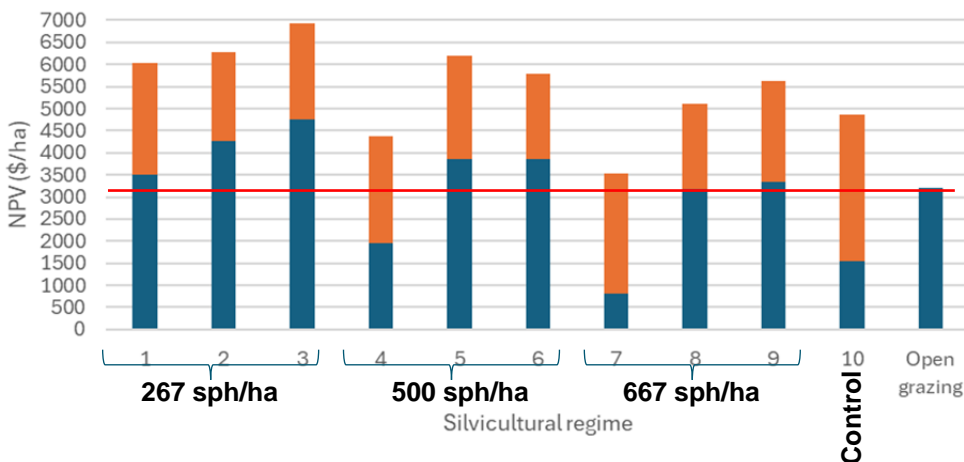
Photo: Dr Nahuel Pachas, Brian Pastures Research Facility, Gayndah, QLD



NPV timber, carbon and grazing native pastures (\$/ha)



NPV timber, carbon and grazing improved pastures (\$/ha)

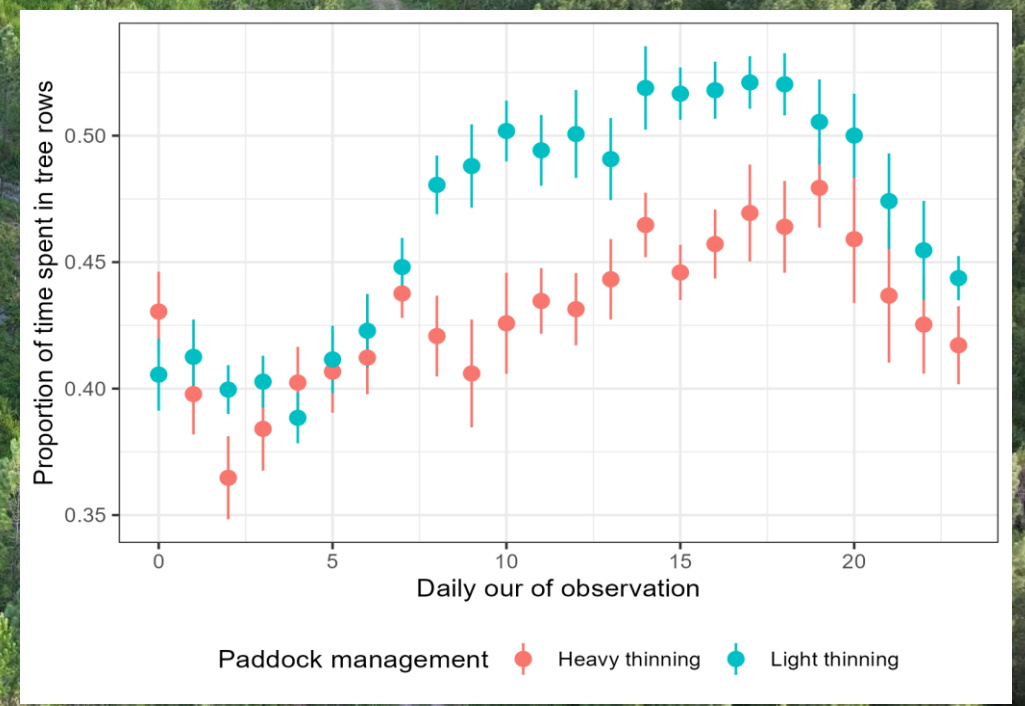
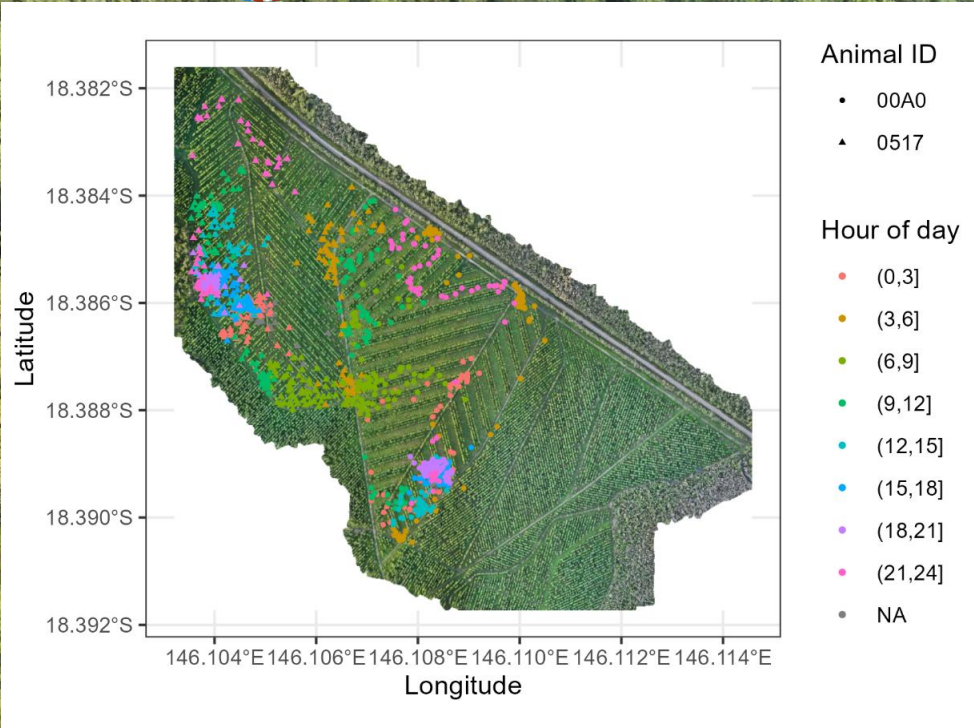


SILVOPASTORAL SYSTEM SCENARIOS EVALUATED

Silviculture	Silvopastoral system scenario									
	1	2	3	4	5	6	7	8	9	10
Initial planting density (SPH)	267	267	267	500	500	500	667	667	667	1000
Survival (%)	80	80	80	80	80	80	80	80	80	80
Stocking (trees per ha)	214	214	214	400	400	400	534	534	534	800
Selective commercial thin at age 10 (% of stems)		50			50		50			
Stocking after thinning (SPH)		107			200		267			
Selective commercial thin at age 15 (% of stems)			50			50			50	
Stocking after thinning (SPH)			107			200			267	
Clearfall at age 25 (SPH)	200	107	107	400	200	200	534	267	267	800

Note Scenarios 1-3 are below tree stocking at trial site; 4-6 approximates heavy treatment; and 7-9 the light treatment. SPH - stems/trees per ha

Source: Dr Tyron Venn (UQ)



Source: Dr Thomas William (CQU)

Bird occurrence during 30 visits



Peaceful Dove

White-winged Chough

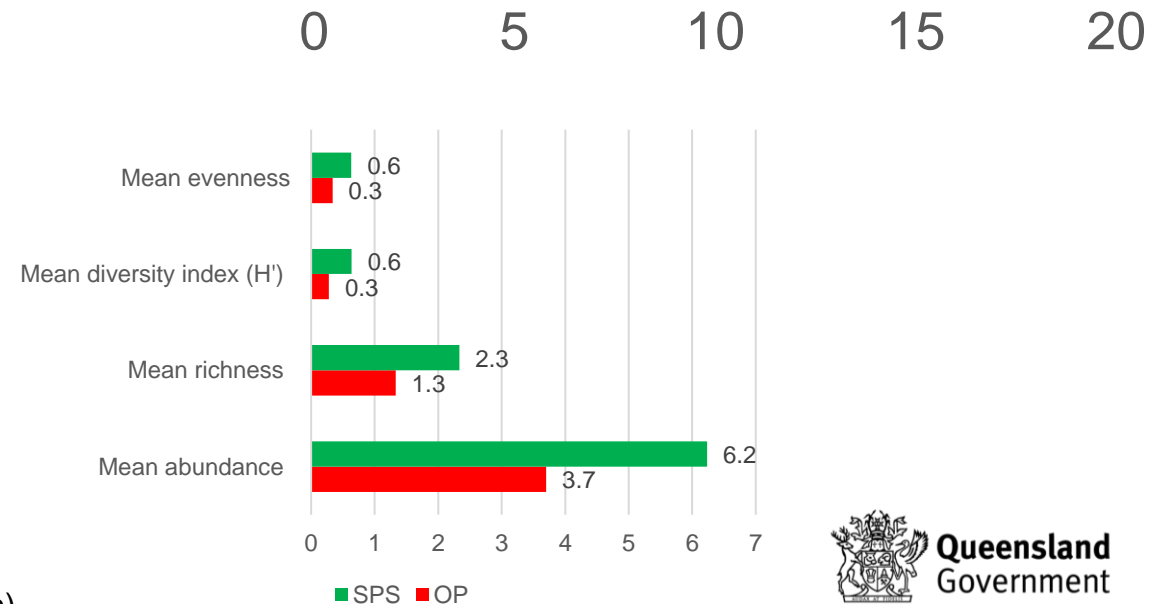
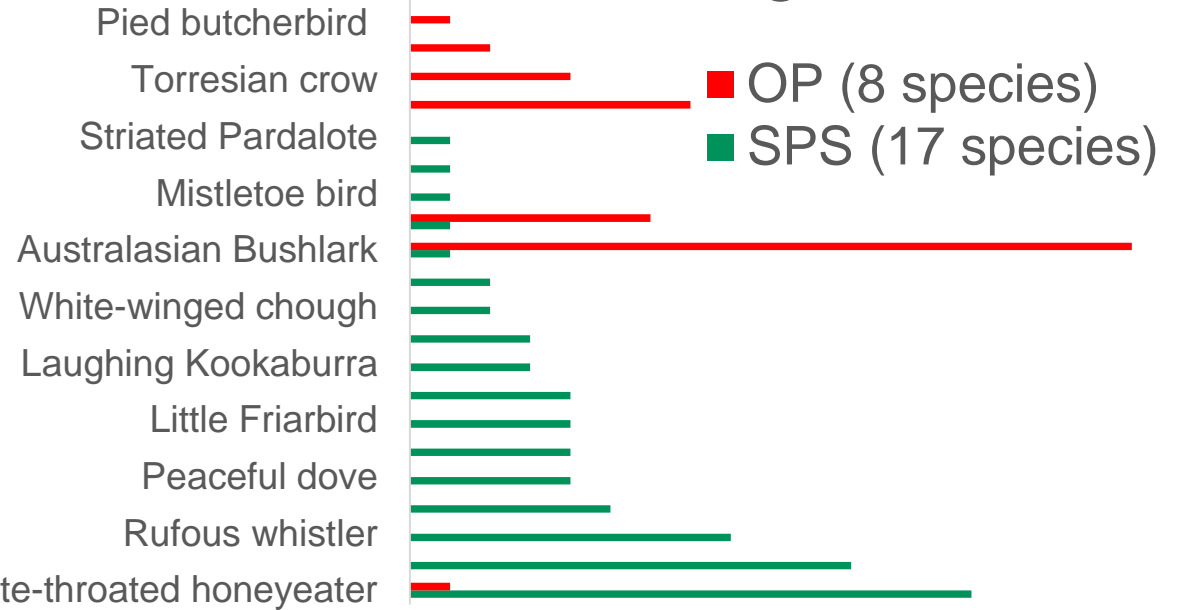
Noisy Friarbird



Common Cicadabird



White-throated Honeyeater





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Thank you

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<https://futurebeef.com.au/resources/steak-n-wood/>