Making the most of 20 million trees: embedding a provenance trial

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"The Australian Government is working with the community to plant 20 million trees by 2020, to re-establish green corridors and urban forests"¹. There is a need to do more than planting trees with mixed success and limited national benefit. An opportunity exists to direct these resources towards ecological restoration experiments².

Greening Australia planned a large scale 20 Million Trees project within Western Sydney Parklands to restore natural vegetation cover and habitat connectivity. In partnership with Western Sydney University an experimental planting was established to test 'local' seed against seed collected from outside the Cumberland Plain (non-local).









- Experimental planting embedded within 20 Million Tree Program
- Testing 'local is best' for dominant eucalypts in the Cumberland Plain Woodland
- Local seed had marginally greater survival
- Experimental design compromised by limited seed





- Additional expertise and labour required
- Potential to build a coordinated, nationally distributed network PERRI²



Species	Location	Region * local
E. tereticornis	Tenterfield	New England (North Coast)
	Wybong	Hunter (Central Coast)
	Oxley Park	Cumberland (Central Coast) *
	Prospect	Cumberland (Central Coast) *
E. amplifolia	Clarence town	Hunter (Central Coast)
	Kemps Creek	Cumberland (Central Coast) *
	Goulburn	Southern Highlands
E. moluccana	Grafton	Northern Rivers (North Coast)
	Wybong	Hunter (Central Coast)
	Riverstone	Cumberland (Central Coast) *
	Goulburn	Southern Highlands
E. parramattensis	Richmond	Cumberland (Central Coast) *

The experimental planting was within Western Sydney Parklands, West Hoxton (NSW) on the Cumberland Plain (top panel). The area consisted of five semicontiguous plots (1.2 to 7.5 ha) covering a total 17.6 ha (shaded area in middle panel). Site preparation

Additional tasks and labour required to setup the experimental planting:

- LABELLING (8 hours labour)
- 11 Seedlots X 3-8 trays of 40 plants = 3000 plants with individual pullthrough seedlot labels.

included slashing and two herbicide treatments (broad spectrum + residual herbicide). Two border trees were established around the plot (red line perimeter 3.6 km). Trees were planted 12 m apart with shrubs every metre along rows with 6 m spacing (bottom right panel). Tube stock was established in 10 cm auger holes with slow release fertiliser and water crystals (bottom left panel). Plants were watered monthly for 3 months and finally with fertiliser. A broad leaf selective herbicide was used to control annual weed emergence.

RANDOMISED LAYOUT (16 hours labour) 2.

- 50 experimental trays each containing all 11 seedlots with 2-4 seedlings / tray fully randomised.
- MARKING ROWS (8 hours labour) 3.
- Marker paint on-ground to indicate border trees, shrubs, and experimental trees for planting team.
- MAPPING (24 hours labour) 4.
- GPS the location of all 2000 experimental trees across the 5 plots.
- MONITORING (30 hours labour) 5.
- All trees and shrubs in one plot (3825 plants) had health scored (5 point scale) and presence of rabbit grazing and drought dieback recorded.



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References

1 National Landcare Program - 20 Million Trees Program <u>http://www.nrm.gov.au/national/20-million-trees</u> 2 Prober SM, Broadhurst, L, Boggs G, Breed MF, Bush D, Lynch AJJ, Dickson F (2018) Discussion Paper: Achieving more with less – linking ecological restoration investments with ecological restoration research infrastructure. CSIRO, Australia. https://publications.csiro.au/rpr/download?pid=csiro:EP184148&dsid=DS1