

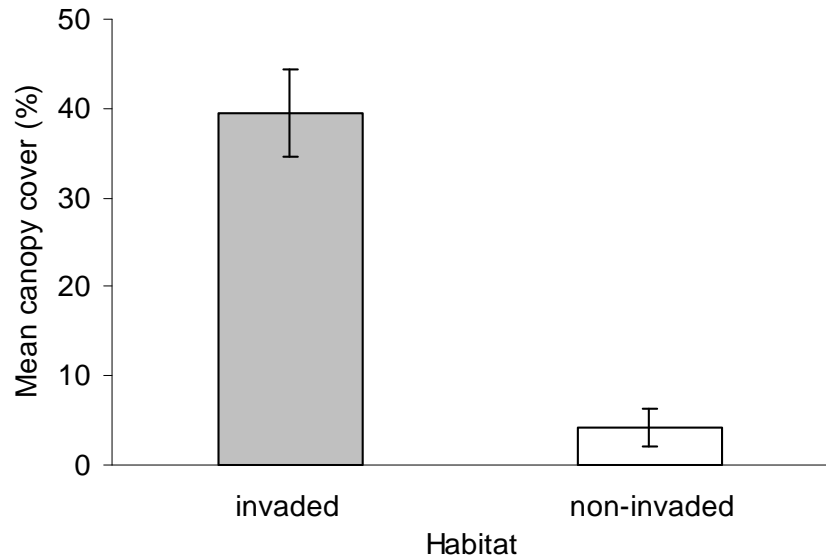
# Impacts of Invasion of Bitou Bush on Coastal Communities

**Kris French**

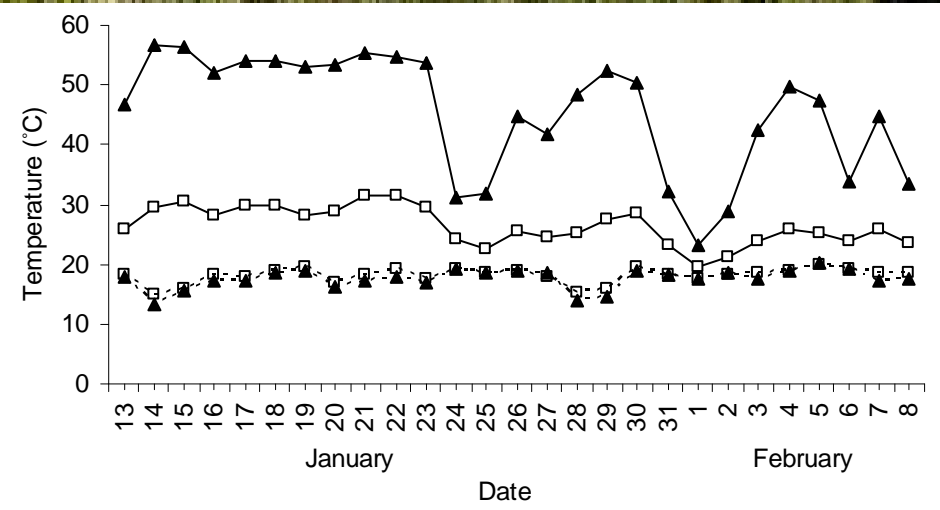
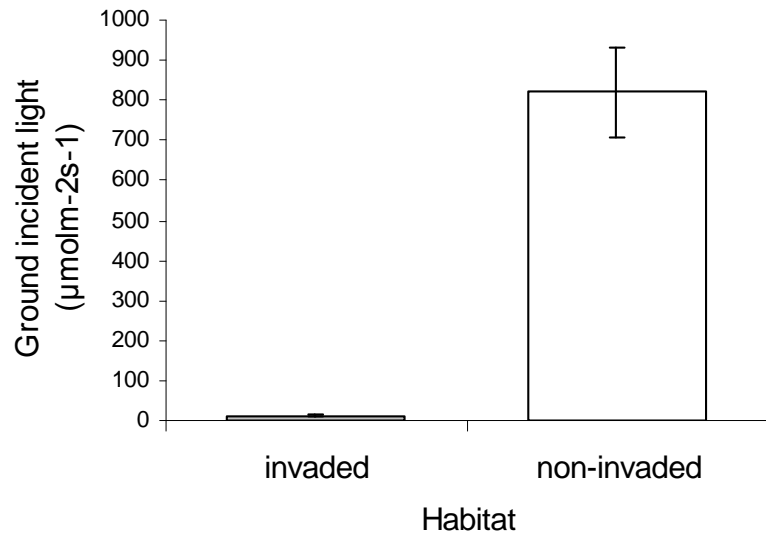
Institute for Conservation Biology & Law  
University of Wollongong, Australia

Bitou bush – *Chrysanthemoides  
monilifera* spp. *rotundata*

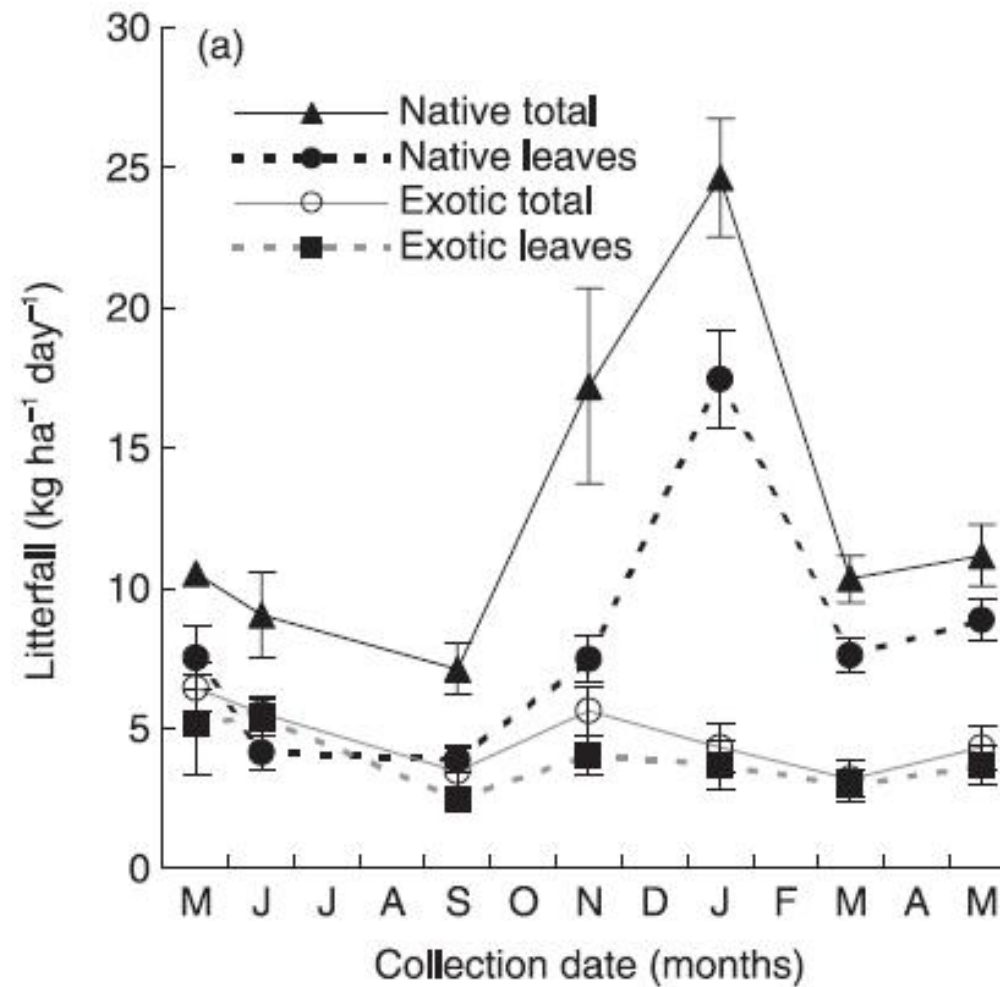




Darker  
Cooler  
Moister

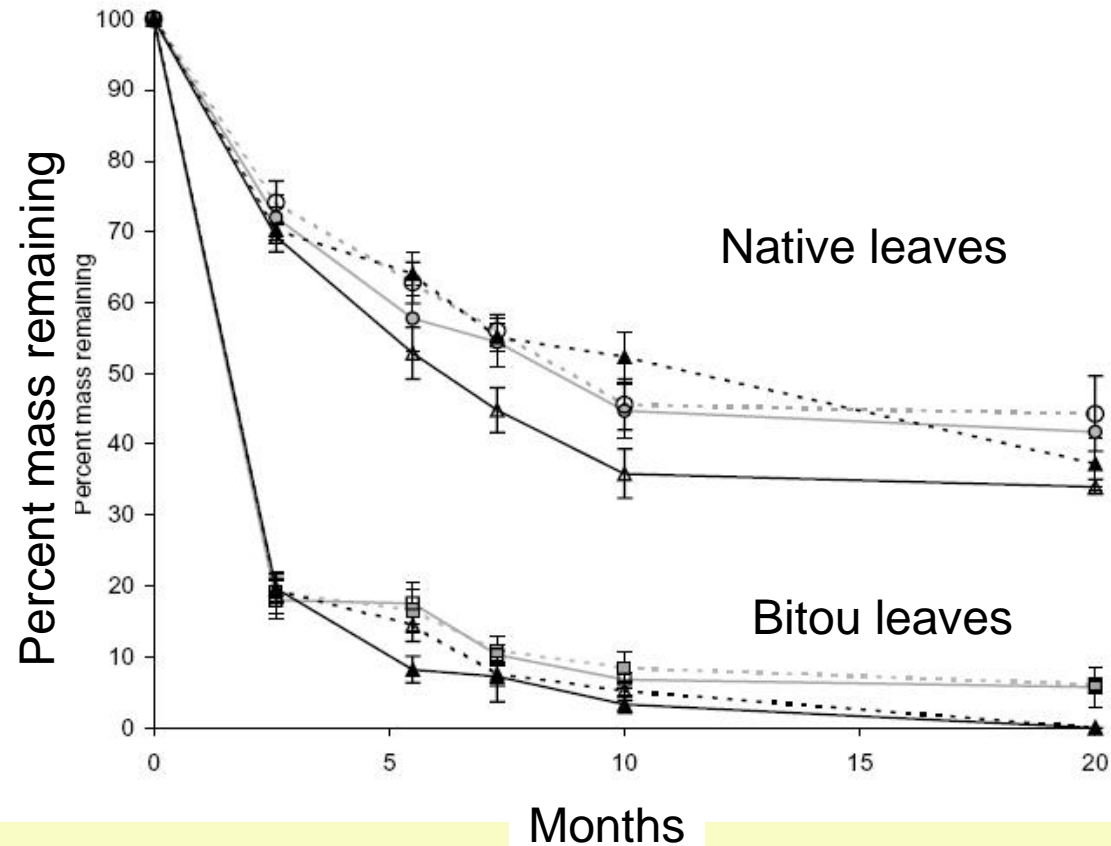


# Ecosystem changes



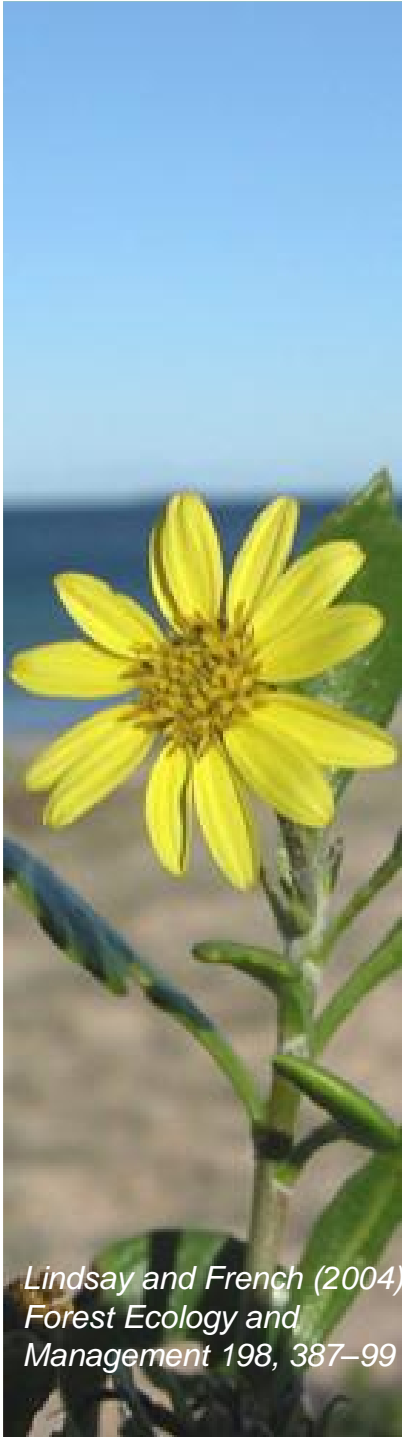
Lindsay and French (2005)  
*J Appl. Ecol.*, 42, 556–566

# Ecosystem changes



Bitou leaves decompose faster  
More litter and more nutrients tied up in litter in  
native areas

*Lindsay and French (2004)  
Forest Ecology and  
Management 198, 387-99*



# Litter Invertebrate changes

M Bulbert © Australian Museum.

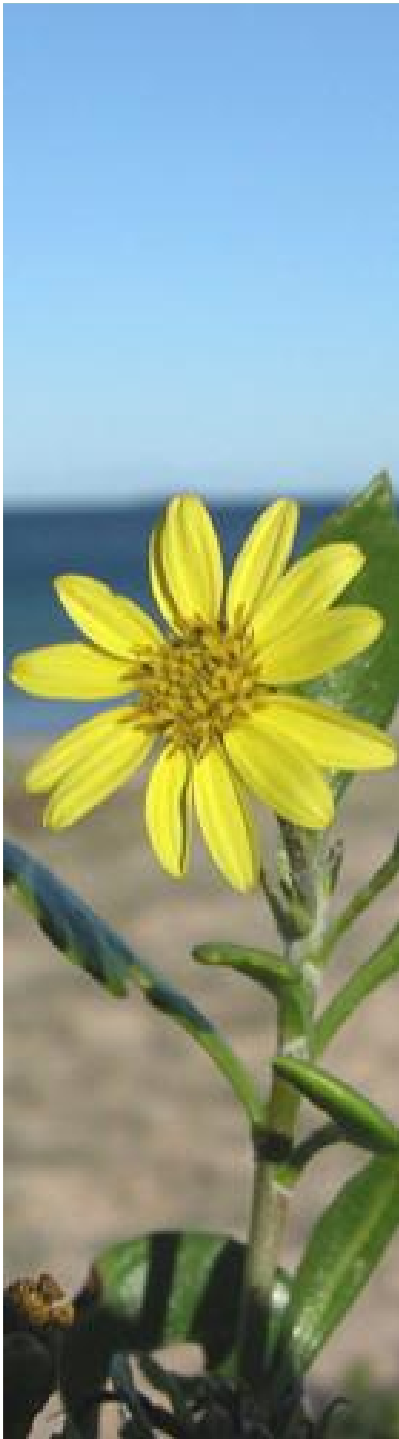


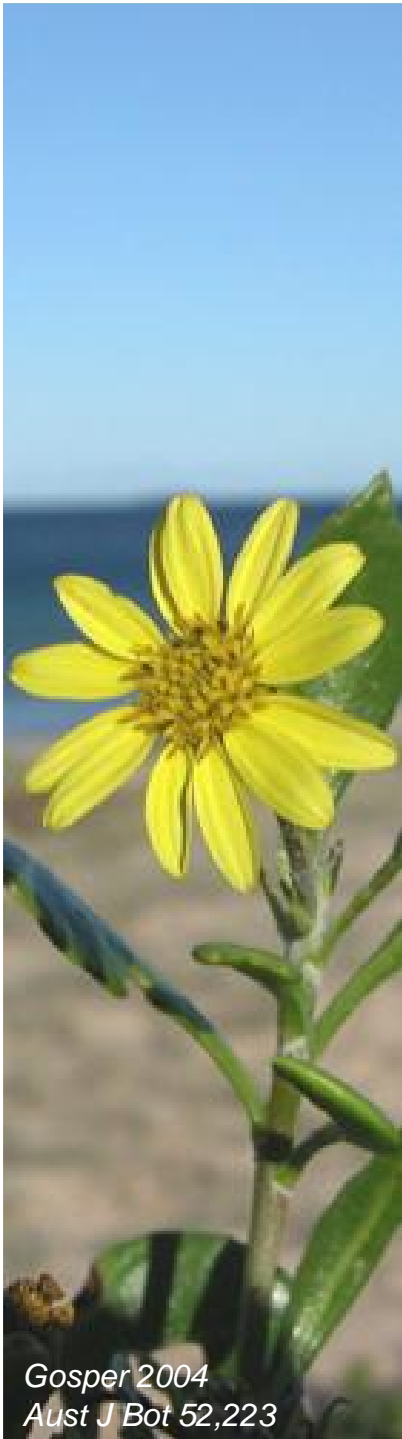
Increased in bitou bush habitat

Decreased in bitou bush habitat

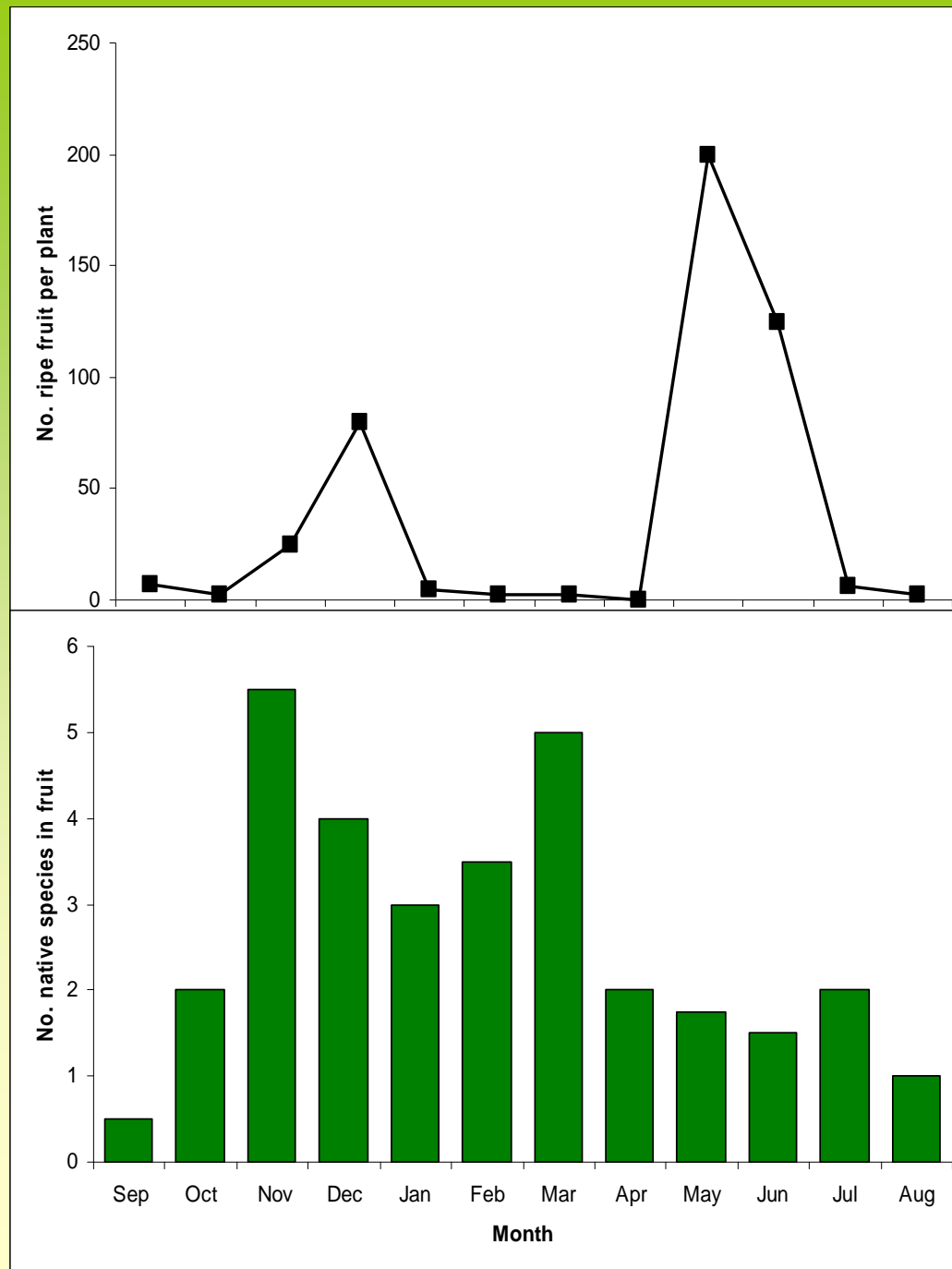


*French and Eardley (1997) and  
Lindsay & French (2006)  
Biological Invasions 8: 177–192*





Gosper 2004  
*Aust J Bot* 52,223



# Bird communities



Canopy foragers

DIDN'T  
CHANGE



Understorey species



www.oiseaux.net

Plant feeders

DECREASED IN  
BITOU  
HABITATS



Large carnivores

French & Zubovic  
(1997) Wild. Res. 24,  
727-735



# Bird behaviour



Ben Owers  
Hons project



idgaantara.blogspot.com

New Holland H'eater



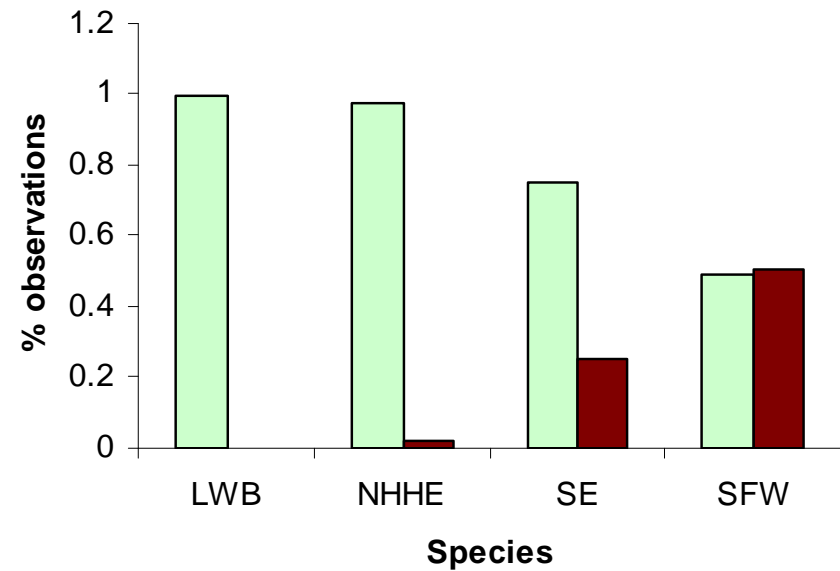
Little wattlebird



Superb Fairywren



Silveryeye



# Fore dune and hind dune vegetation



Mason & French (2007).  
*Biol. Cons.* 136, 246-259.



- Reduced climber richness
- Reduced graminoid richness
- Reduced herb richness
- Lower cover at ground levels



- Reduced shrubs
- More open canopies

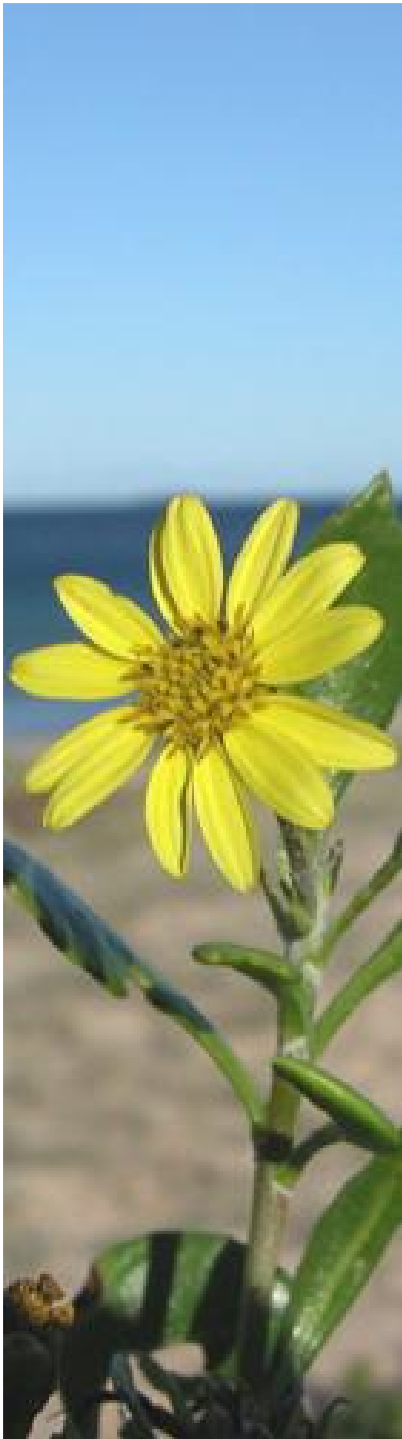
# Fore dune and hind dune vegetation

## Disadvantaged by bitou invasion

- *Actites megalocarpa*
- *Correa alba*
- *Desmodium varians*
- *Dianella crinoides*
- *Dichondra repens*
- *Microlaena stipoides*
- *Pelargonium australe*
- *Pittosporum revolutum*
- *Pteridium esculentum*
- *Rapanea variabilis*
- *Scaevola calendulacea*
- *Senecio lautus*
- *Spinifex sericeus*
- *Zoysia macrantha*

## Disadvantaged by bitou invasion and management

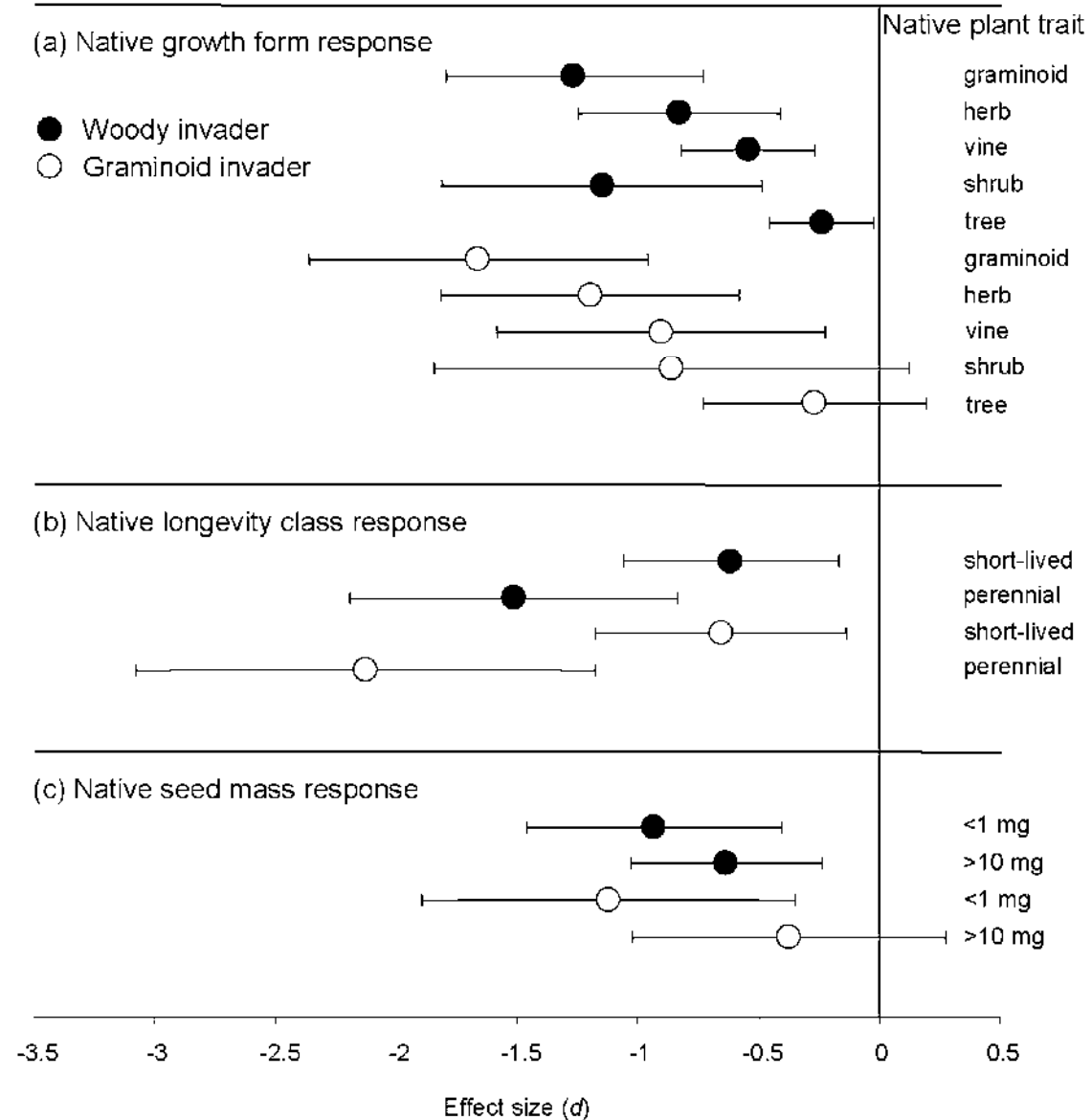
- *Acacia longifolia* var. *sophorae*
- *Acacia ulicifolia*
- *Banksia serrata*
- *Carpobrotus glaucescens*
- *Cynodon dactylon*
- *Gonocarpus teuroides*
- *Hibbertia linearis*
- *Hibbertia obtusifolia*
- *Leucopogon parviflorus*
- *Oxalis rubens*
- *Poa poiformis*
- *Pratia purpurascens*
- *Rhagodia candolleana*
- *Ricinocarpus pinifolius*
- *Solanum prinophyllum*
- *Viola hederacea*

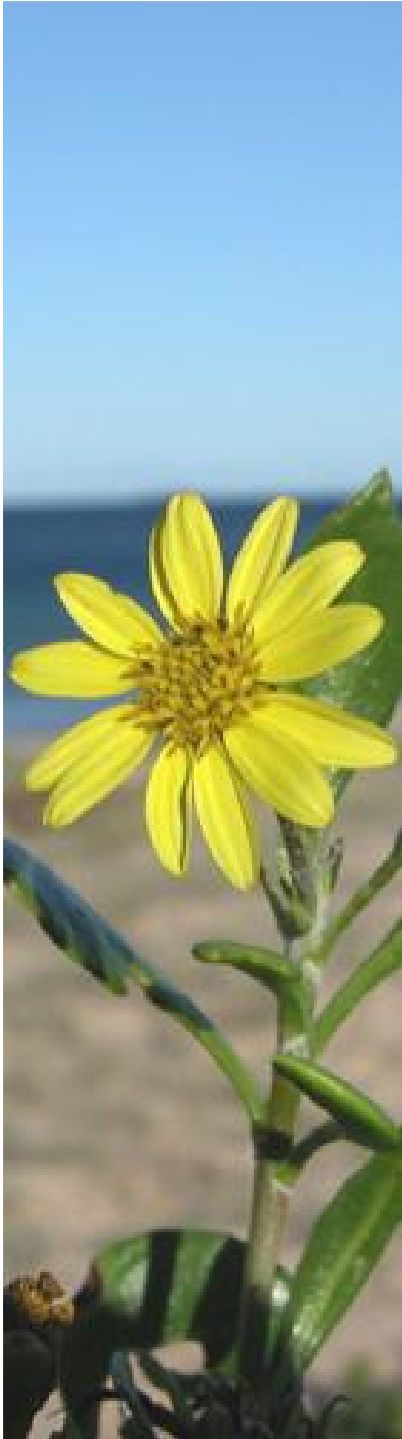


# Meta-analysis



Mason, French and  
Lonsdale  
In prep





# Mechanism of Invasion

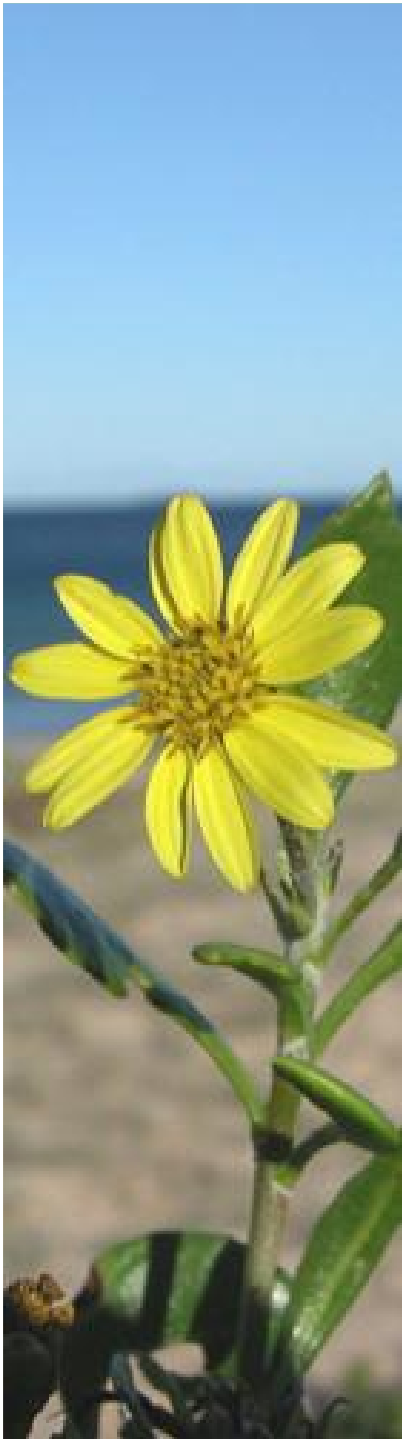
How is it causing these changes in vegetation?

Replacing adult plants through mortality?

Or

Affecting the germination and establishment of seedlings?

# Mechanisms: Effects on adult plants



	Flower abundance	Vegetative buds	Reproductive: vegetative buds	Fv/Fm
Species	p value	p value	p value	p value
<i>C. alba</i>	0.983	0.390	0.880	0.576
<i>M. elliptica</i>	0.231	0.443	0.683	0.360
<i>L. longifolia</i>	0.963	0.666	0.898	0.551

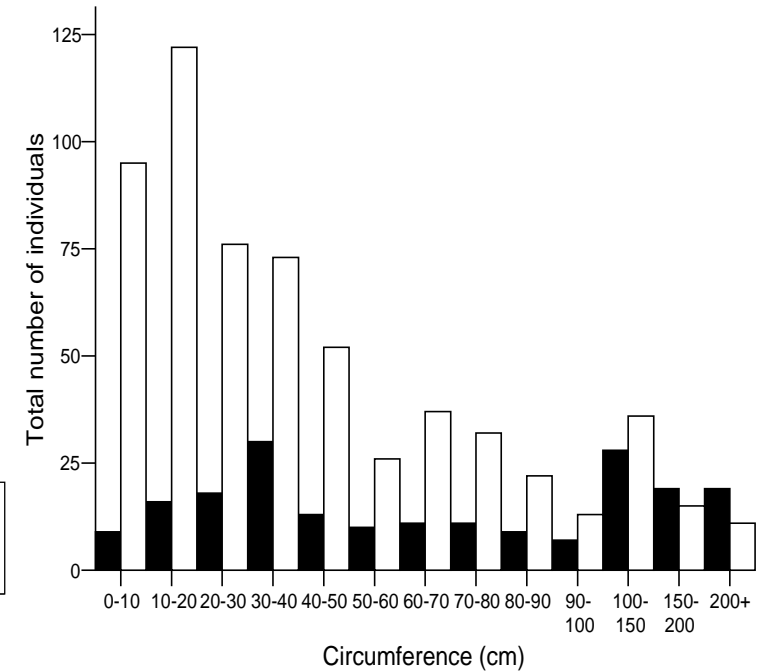
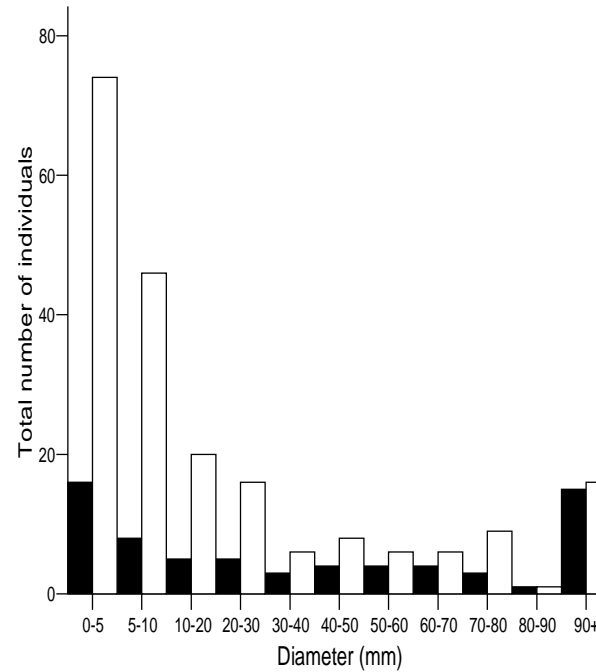
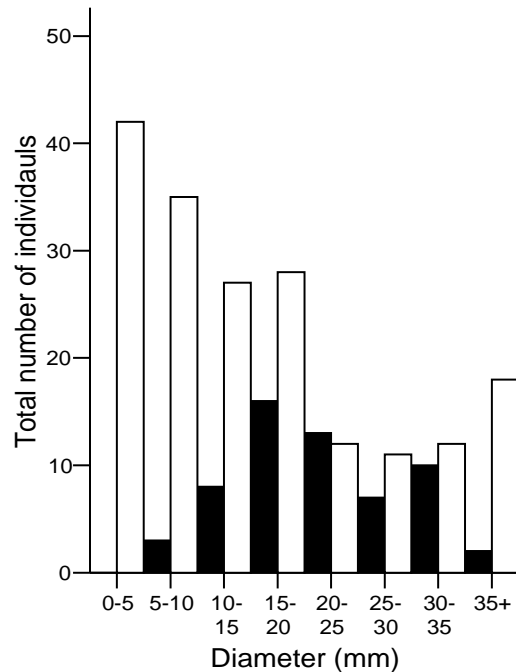
There are no impacts on growth, reproduction or physiological function of adult plants.

# Effects on population structure

*Correa alba*,

*Monotoca elliptica*,

*Lomandra longifolia*

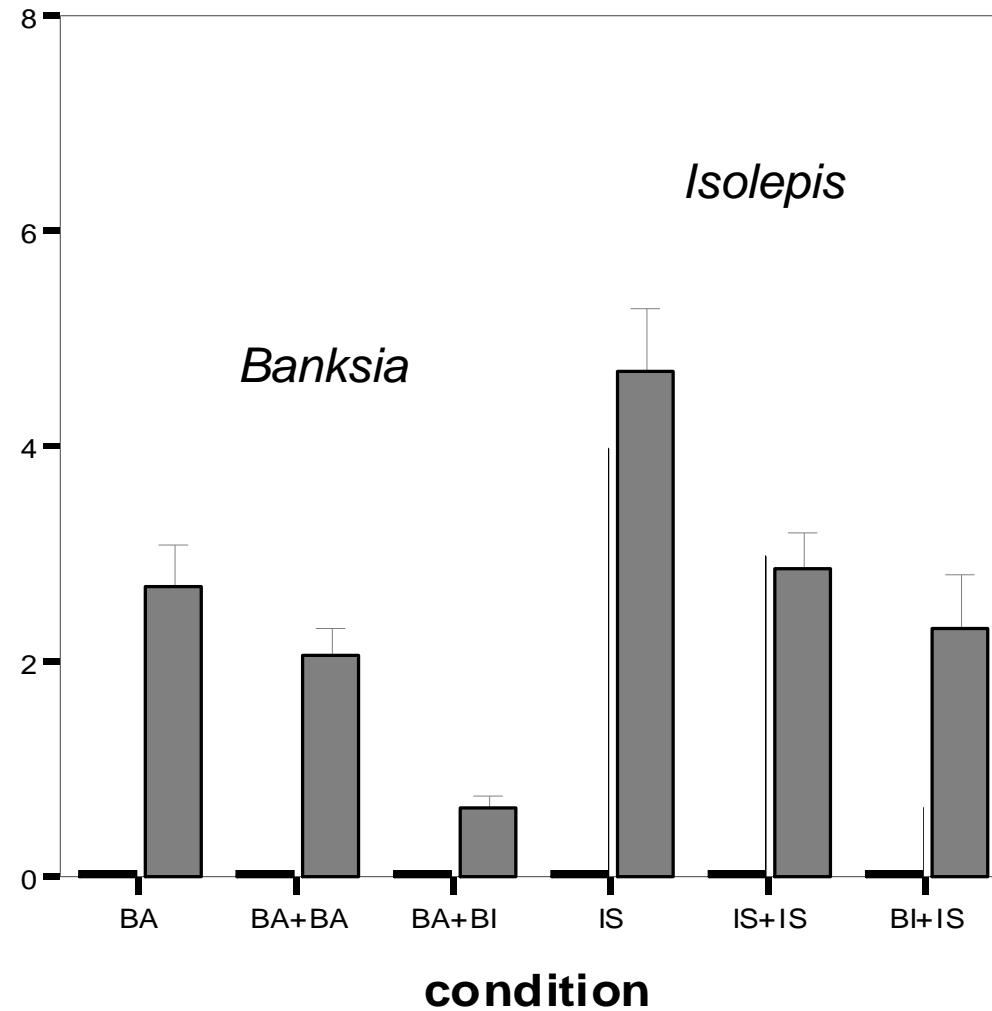


Losses in small individuals  
or lack of recruitment  
Changes in population structure



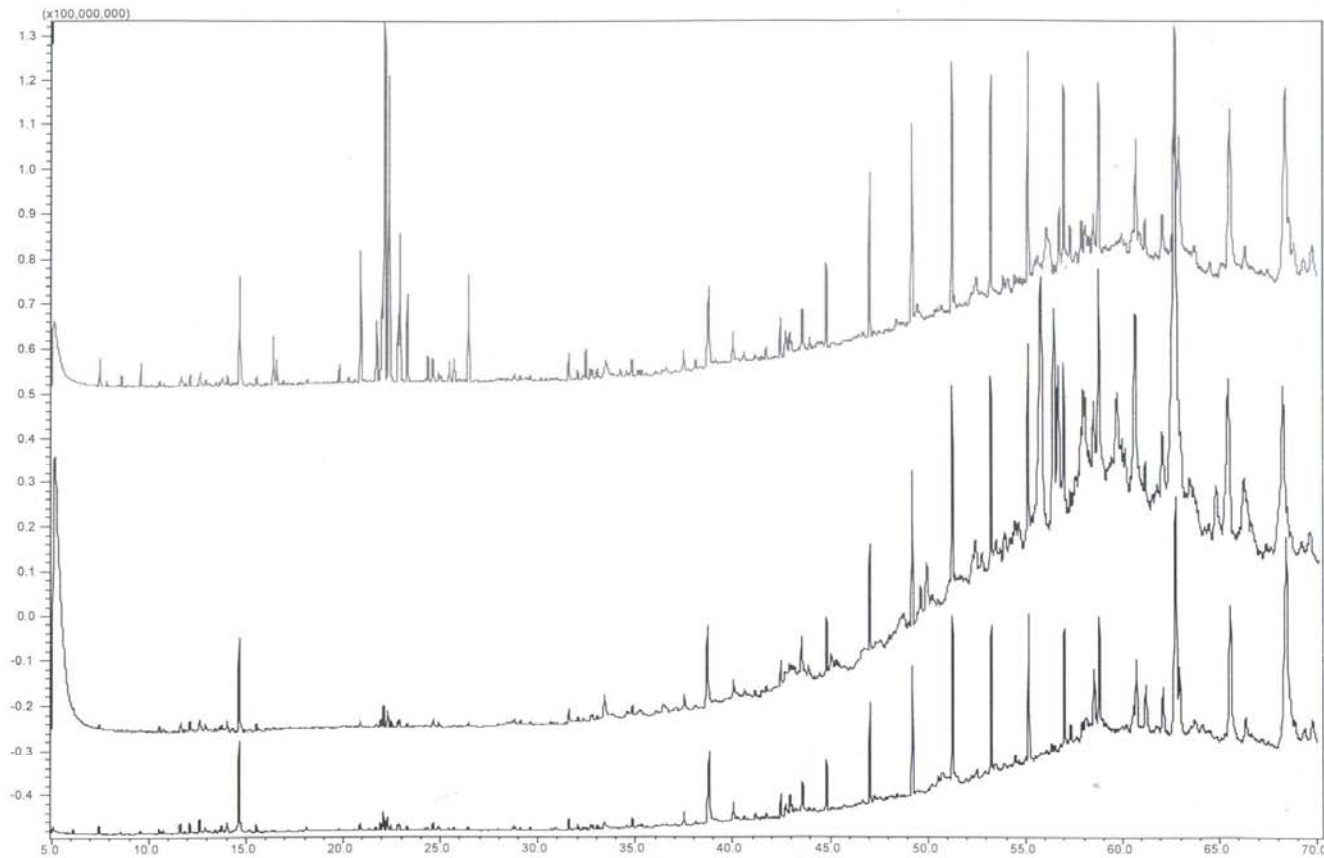
Native species affected more strongly by growing with bitou than growing with conspecific

Mean native shoot dry weight (g)





# Allelopathy



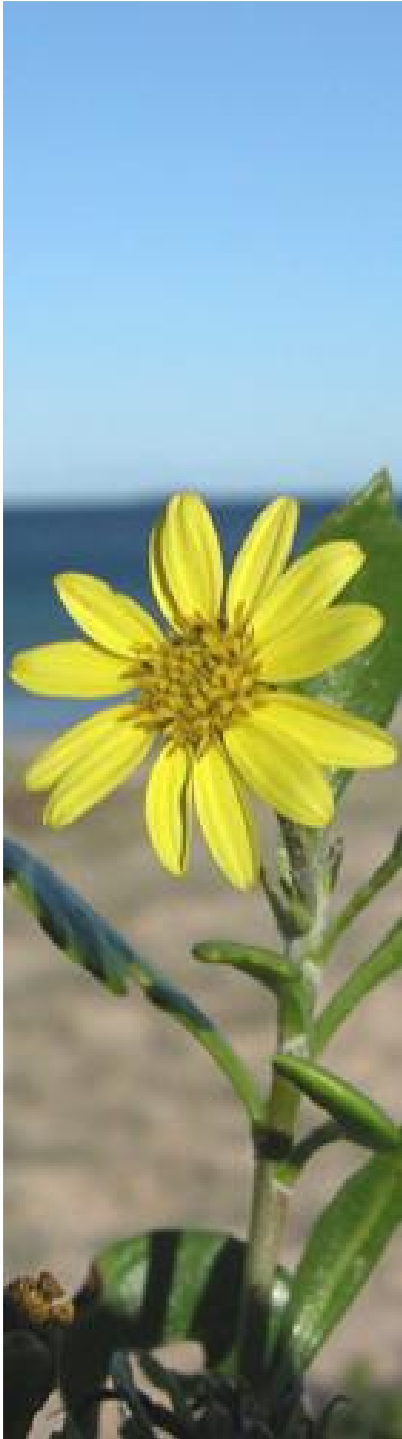
Bitou

Acacia

Bare soil

# Summary

- Significant changes to ecosystem processes and habitat characteristics
- Impacts on faunal communities
- Decreases in plant species richness
- No competitive effects on adult native species
- Effects on seedlings from both resource and interference competition



# Acknowledgements

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- DPI
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- Land and Water Australia

Thank you

