

Pros and cons of introducing fire to degraded GBGW and implication for management

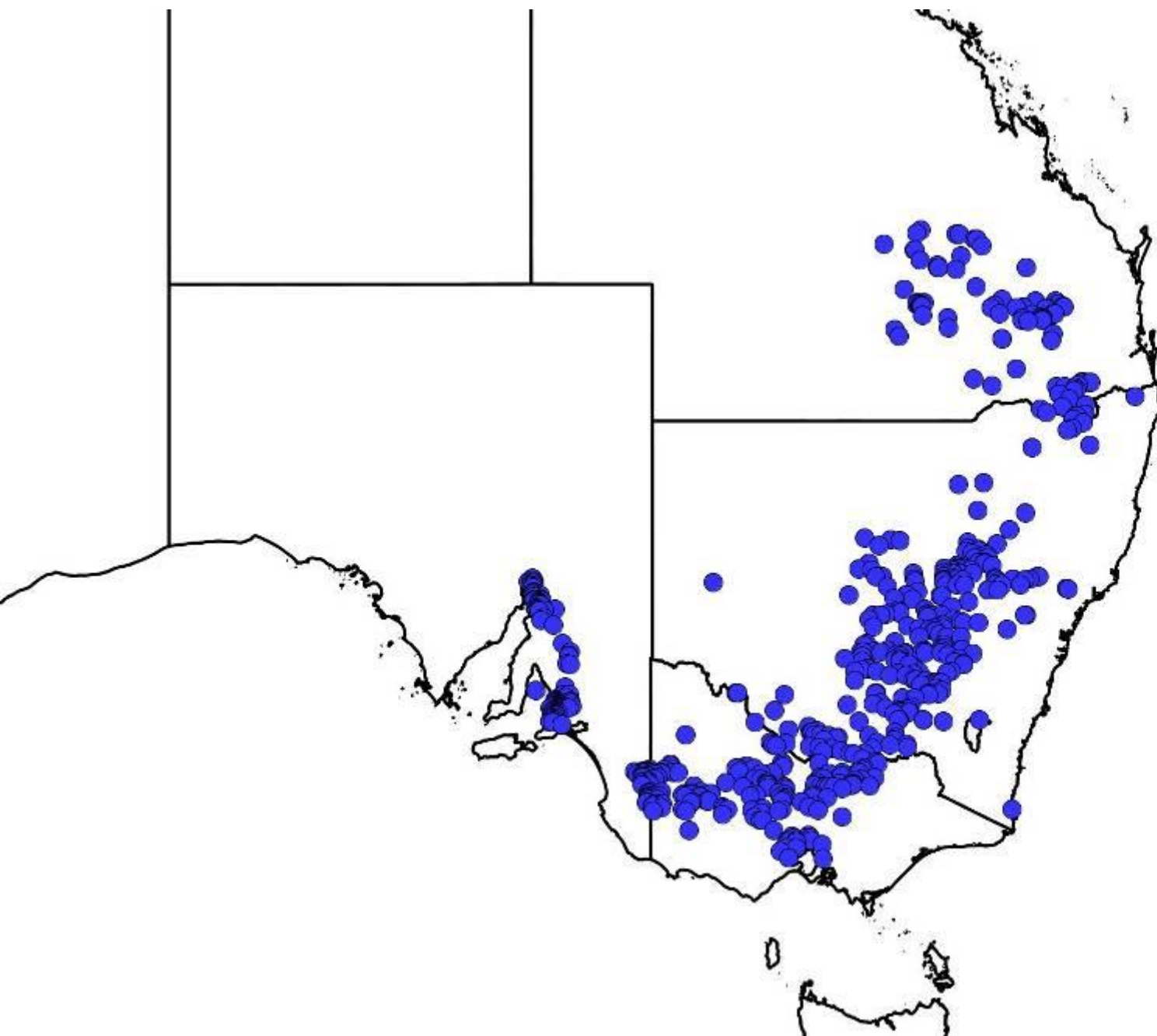


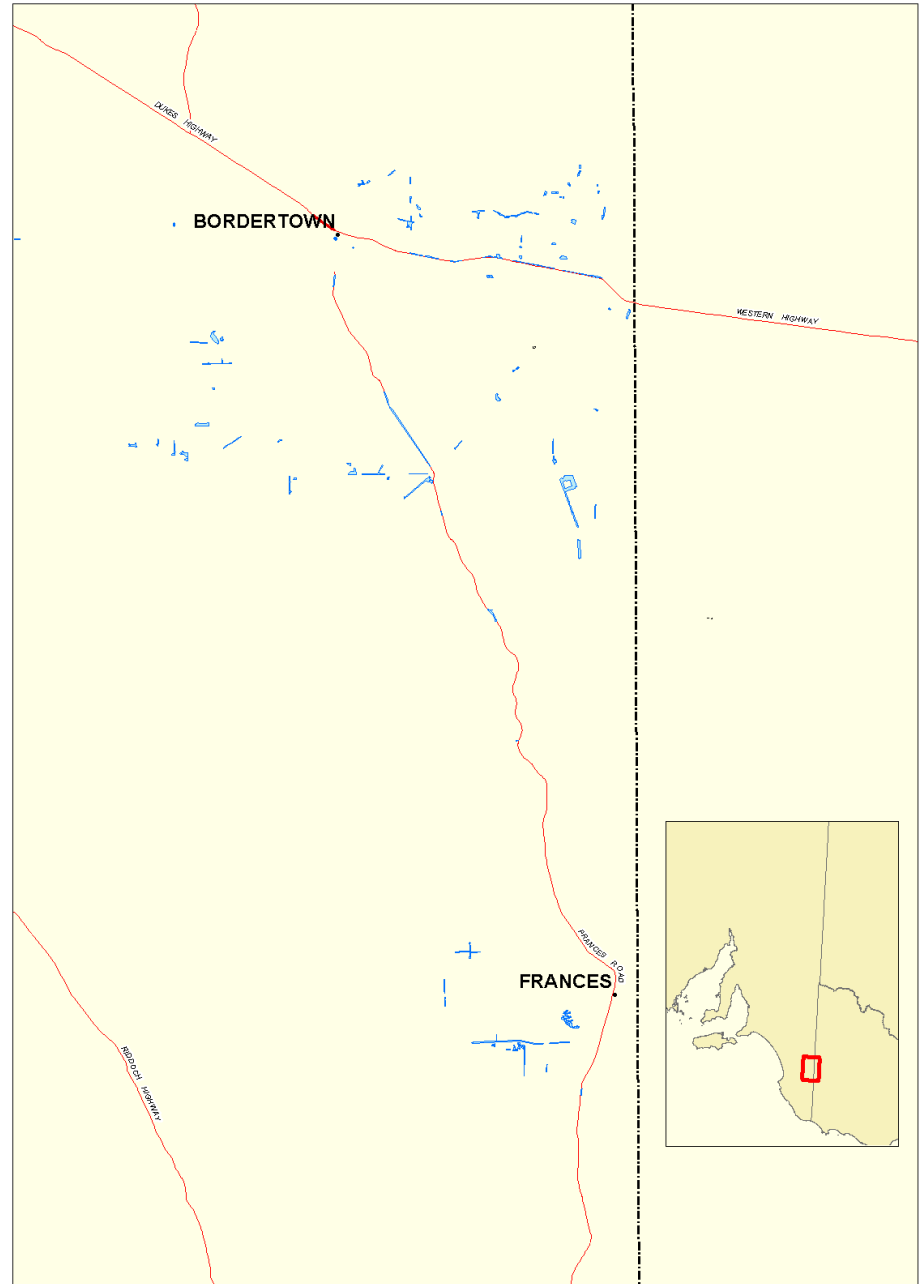
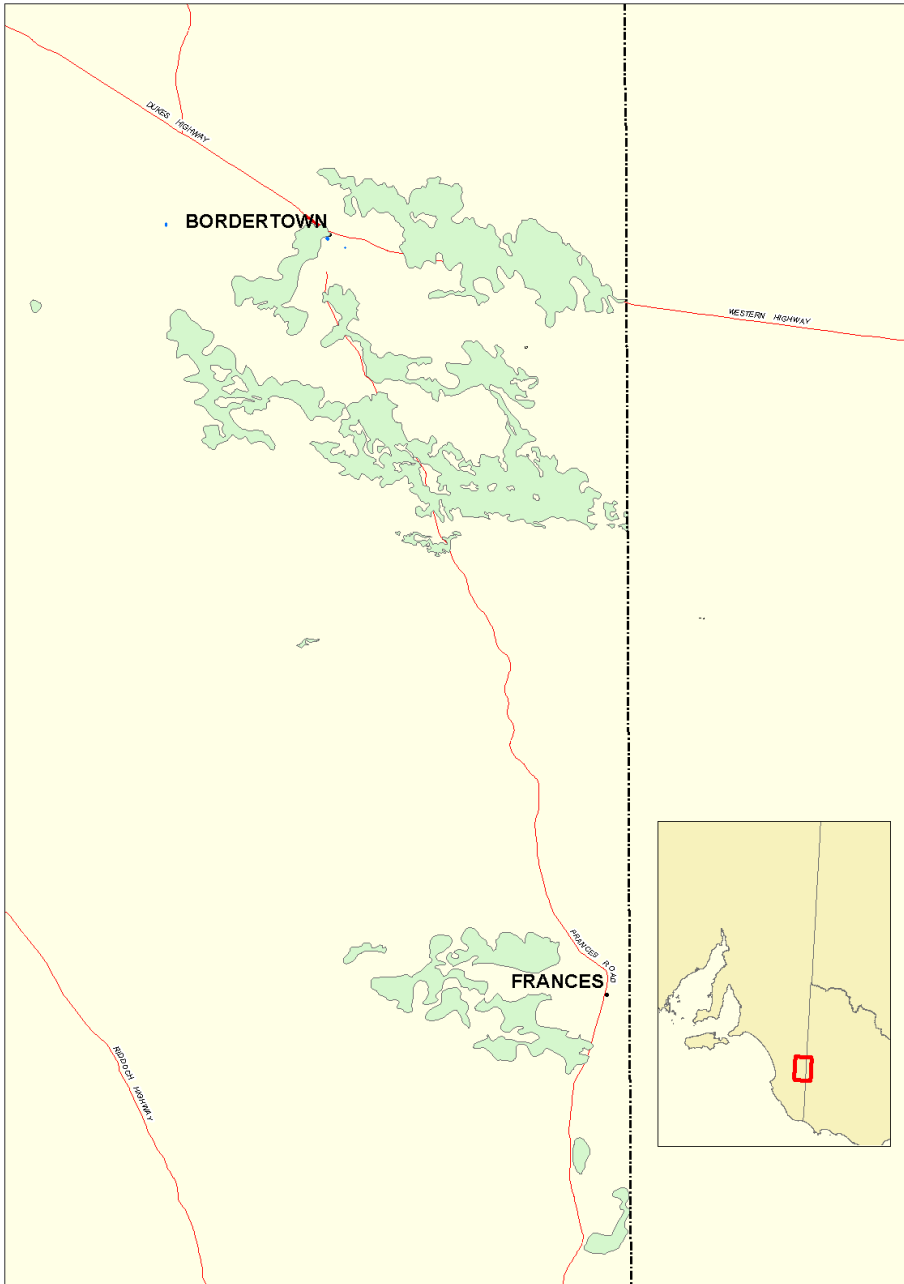
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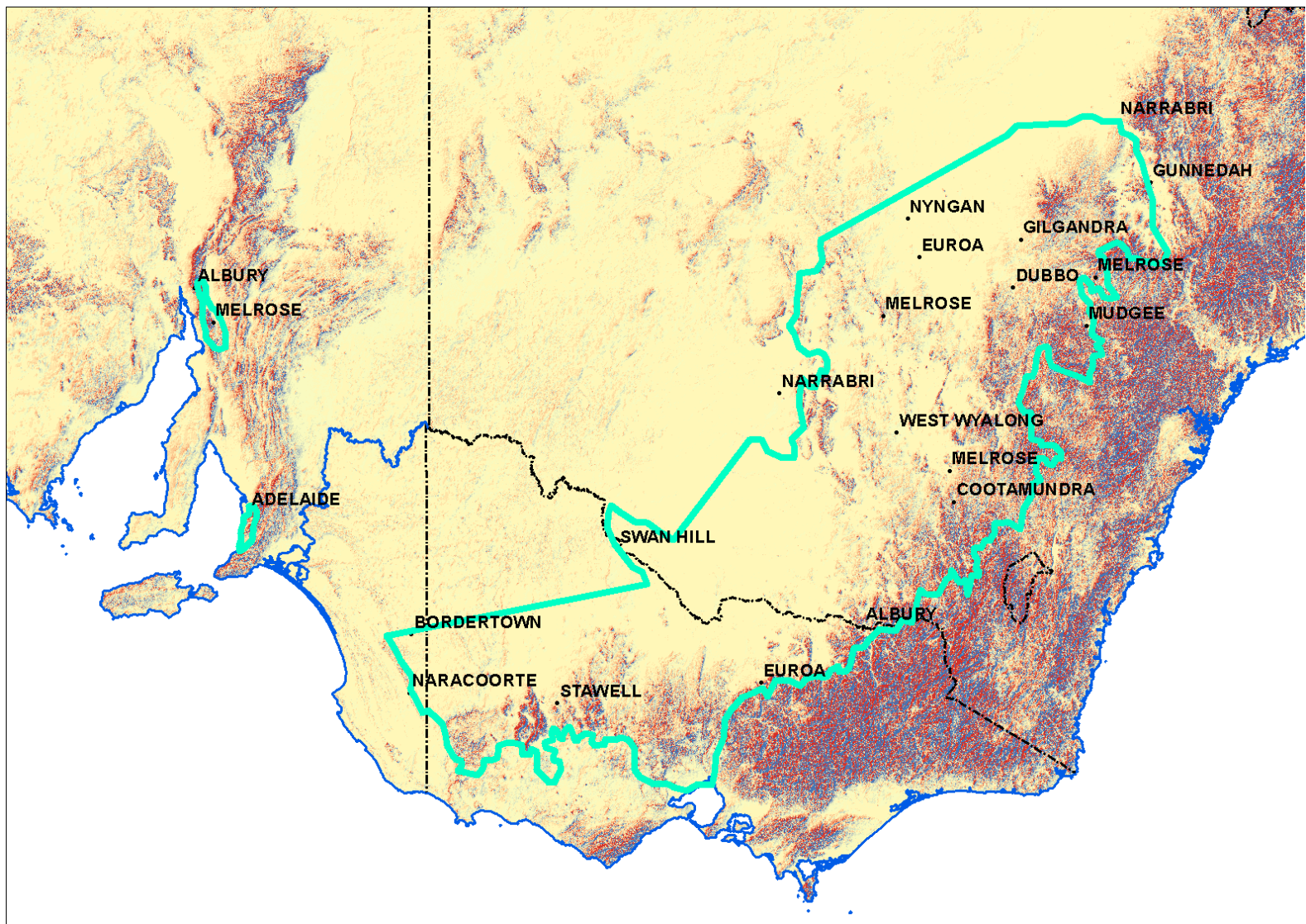
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'An ecologically discrete entity'

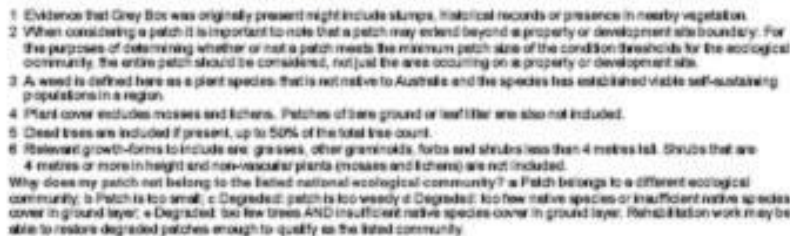


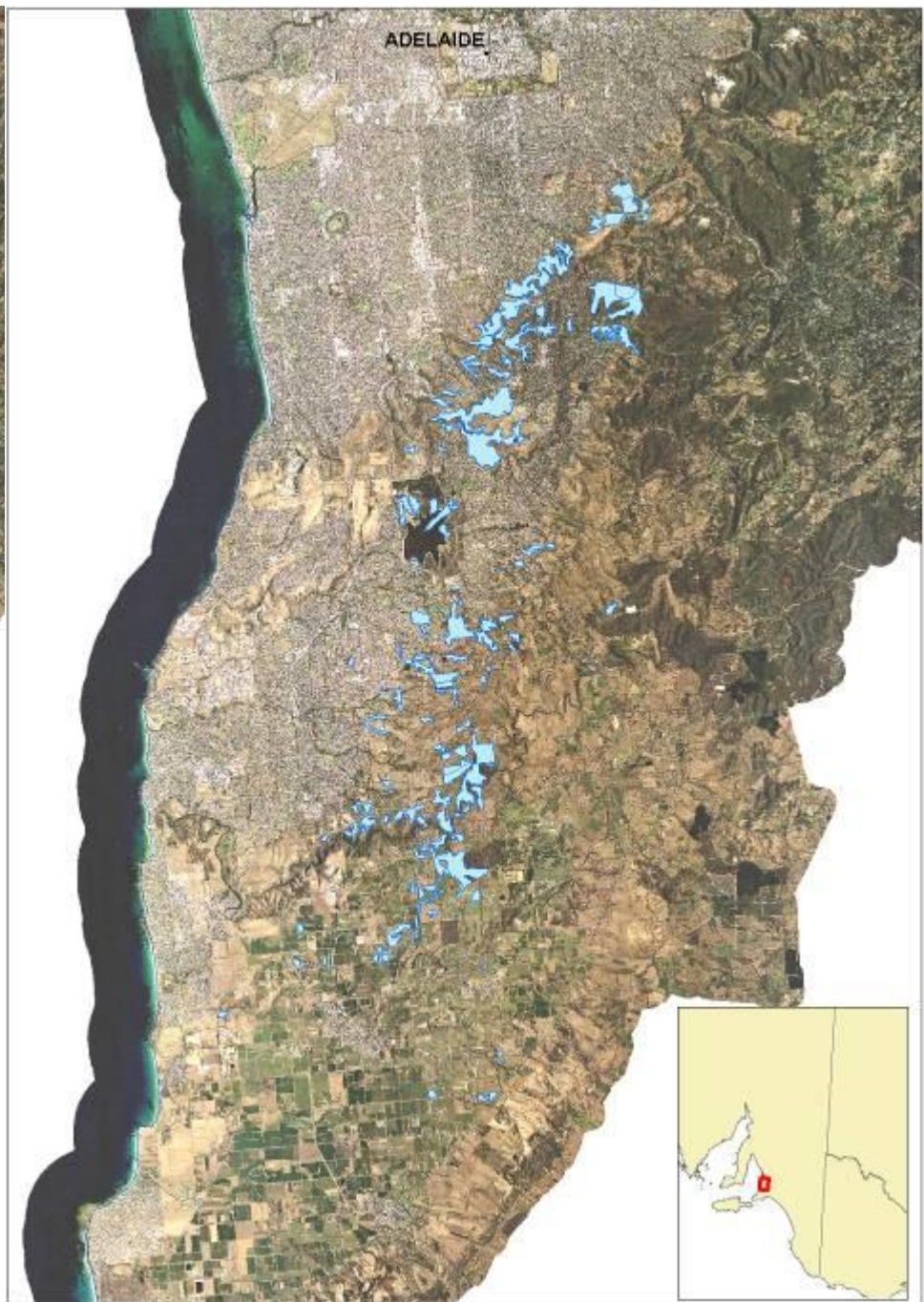
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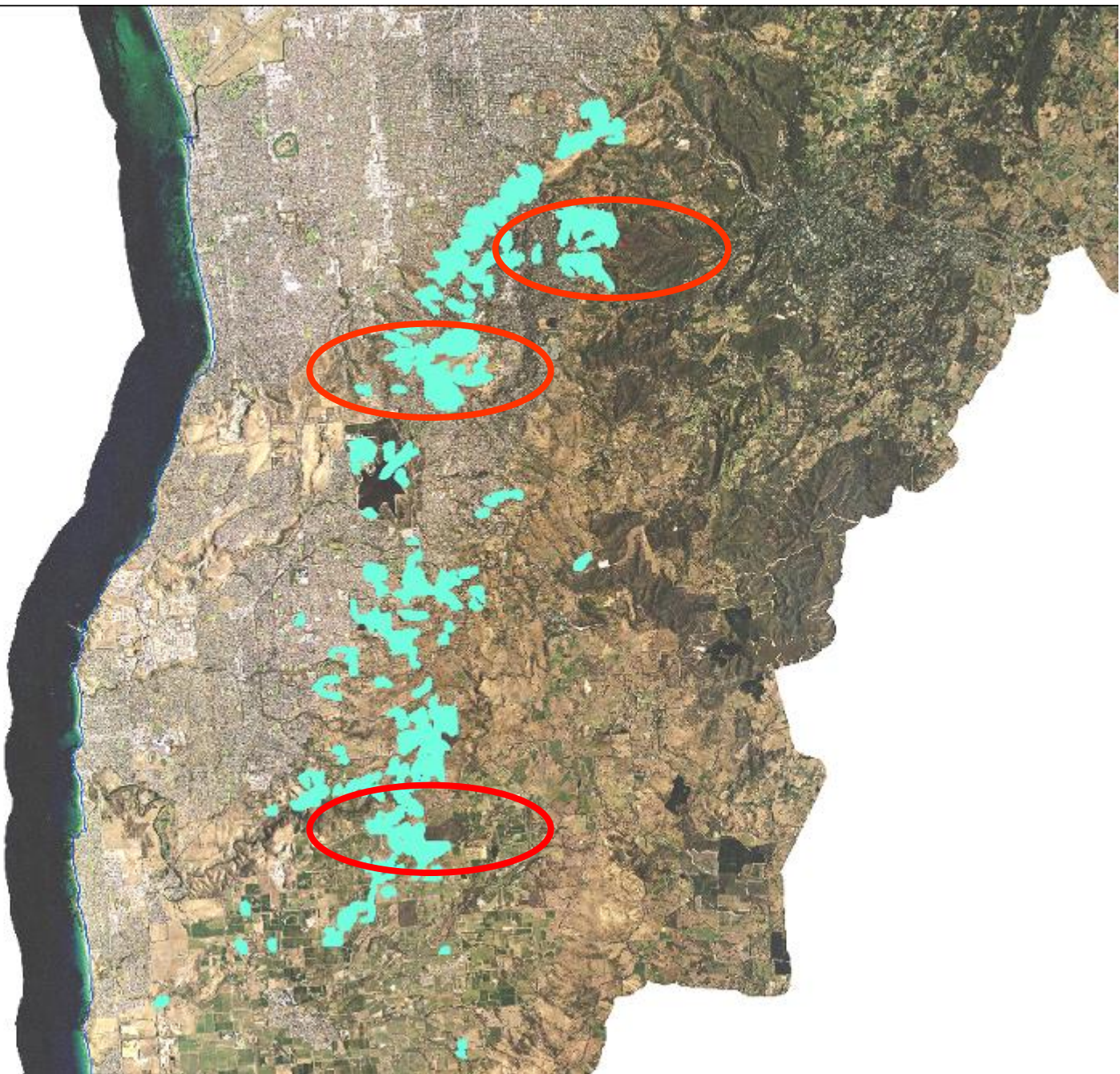
Grey Box Grassy Woodlands in AMLR

- **Approximately 10% of estimated pre-European extent remaining**
- **Much of what remains is in a degraded state**
- **Highly fragmented**
- **Variable and somewhat atypical compared to main SE Australian distribution**

- **Much of the current AMLR extent occurs in a peri-urban setting**
- **Implications for fuel management**
- **All of the burns discussed were fuel management burns**
- **Implications of introducing fire in GBGW poorly understood**

Perceptions

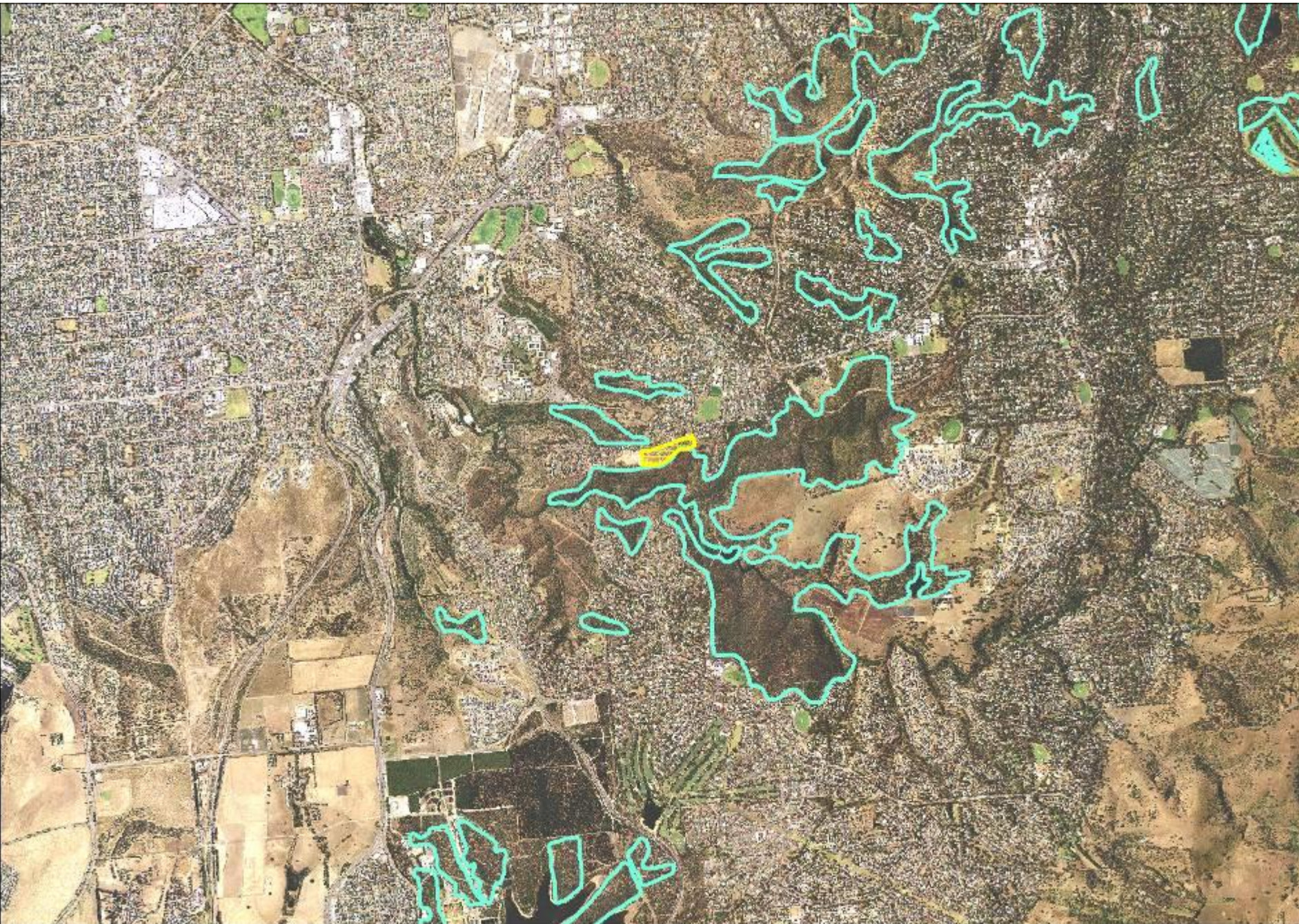
- **Prober *et al.***
- **Basalt Plains Themed**

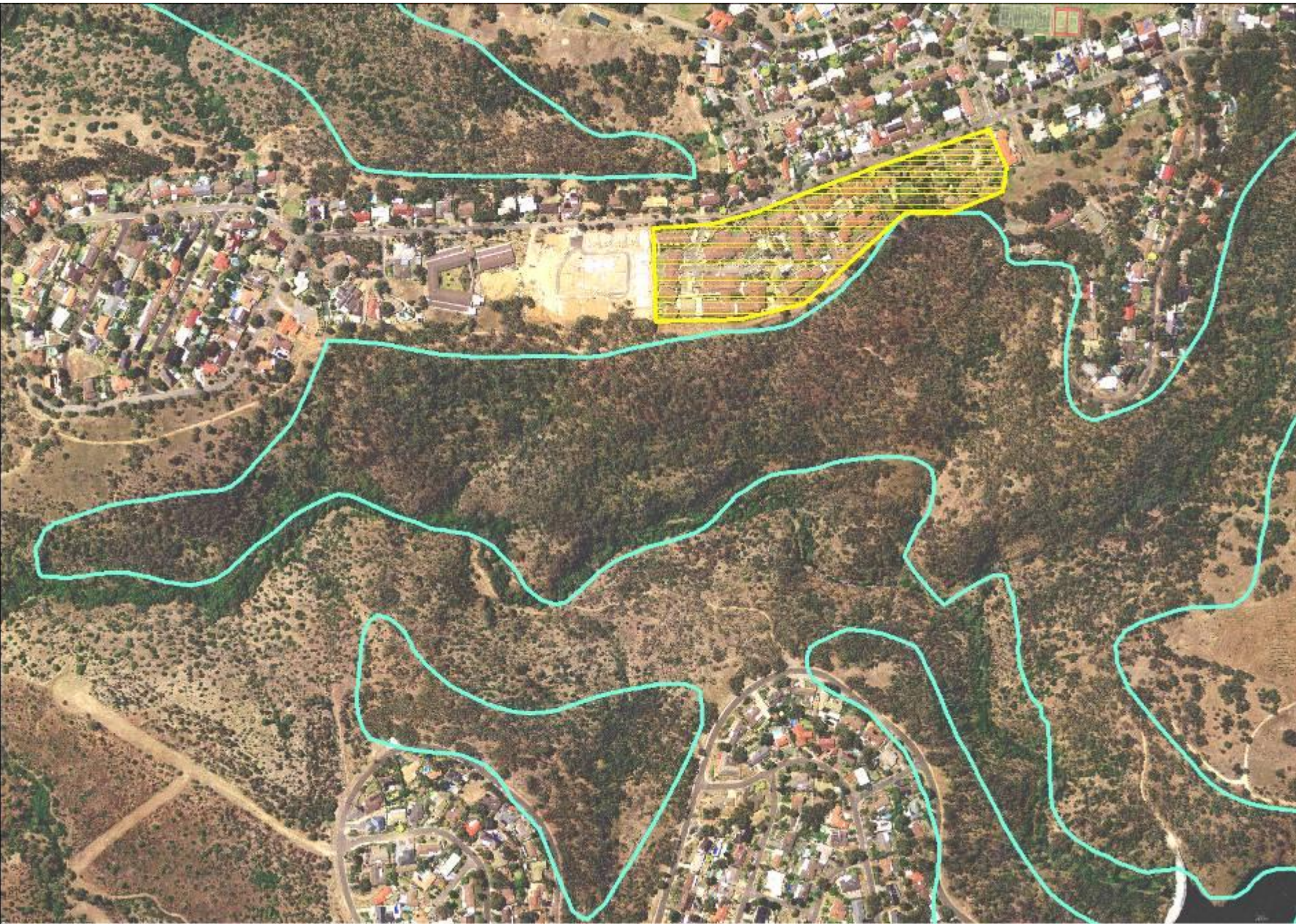












Resthaven Bellevue Heights

- 55 **high care** and 44 **low care** residents
- 65 independent retirement living units
- High care residents present challenges in event of evacuation



Hypotheses

- The condition of degraded GBGW will not deteriorate as a result of single fire
 - Native understorey cover will not decrease relative to weed cover
 - Native species diversity will not decrease
 - Weed species diversity will not increase

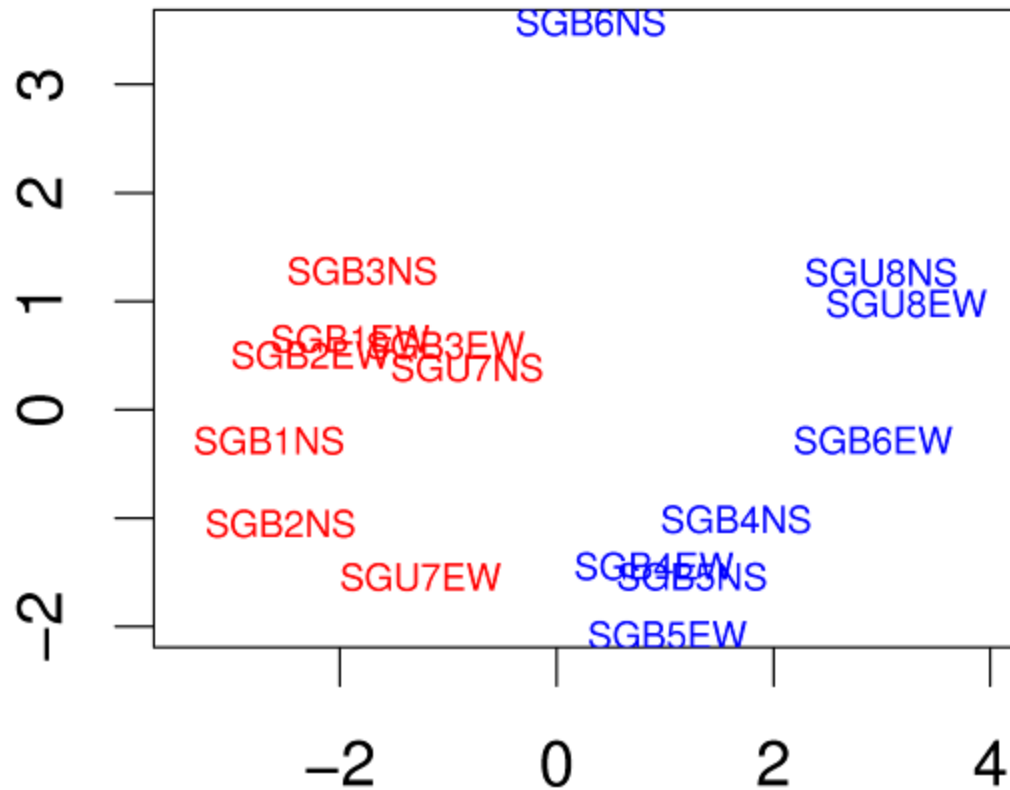
Hypotheses cont....

- **The pre- and post-fire difference in native understorey cover and diversity will not differ between sites in ‘good’ condition compared to those in a more degraded condition**

Design

- **Before After Control Impact**
- **Eight sites in total**
- **Three ‘good’ and three ‘poor’ burnt sites**
- **Two control (unburnt) sites; one ‘good’ and one ‘poor’**

Second principal component

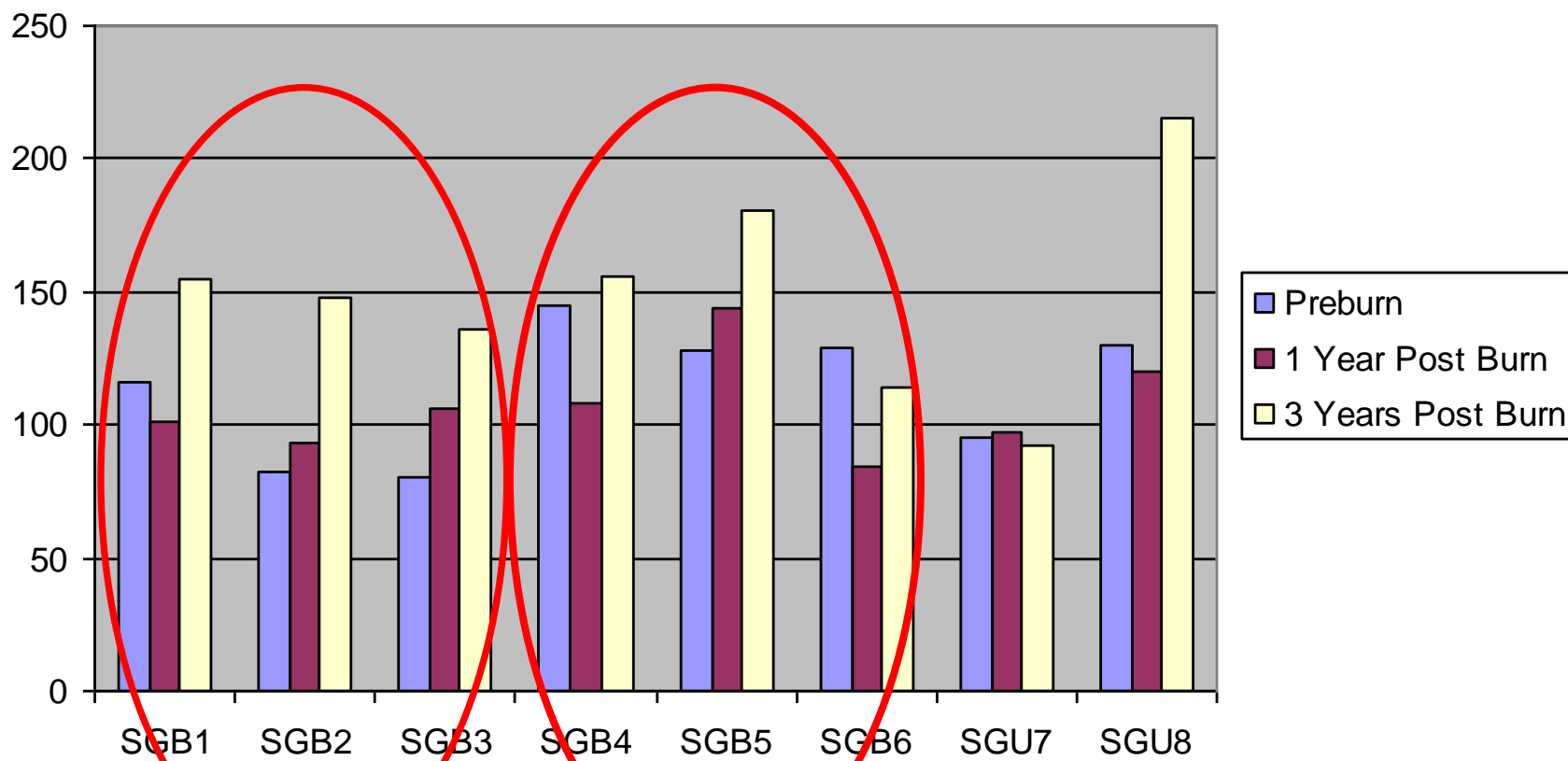


First principal component

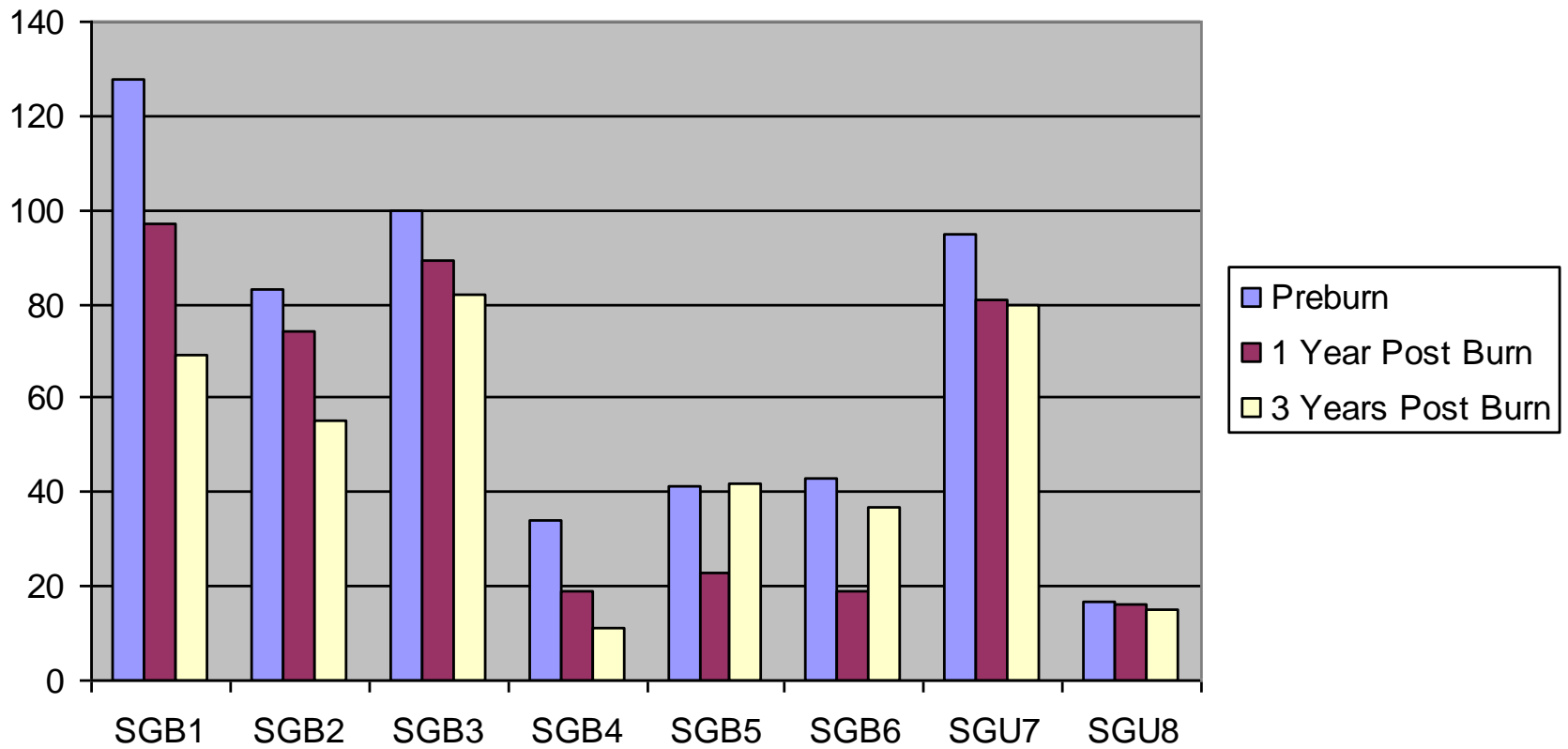
Methods

- **15 x 15 metre quadrats**
- **Line intercept method to measure native and exotic ground cover**
- **Two transects at each quadrat**
- **All species touching a metal ‘pin’ (2.5 mm diameter) at 25 cm increments along the tape were recorded**

Exotic Touches

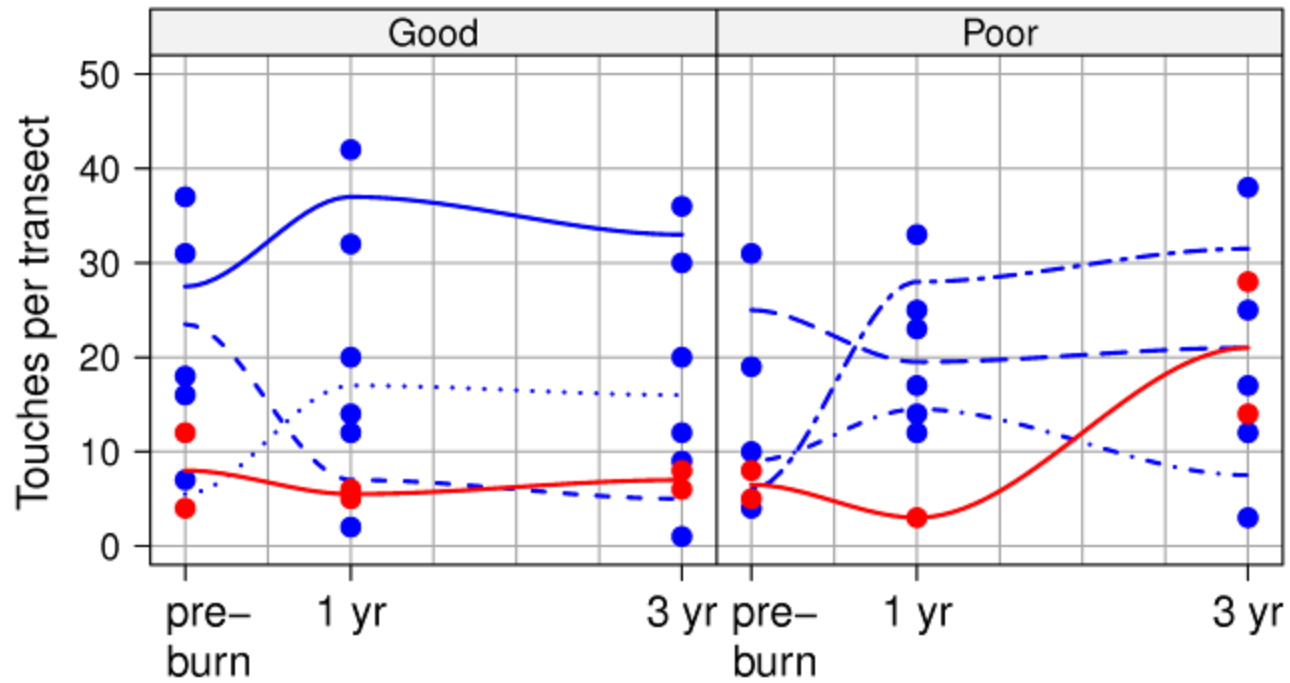


Native Touches



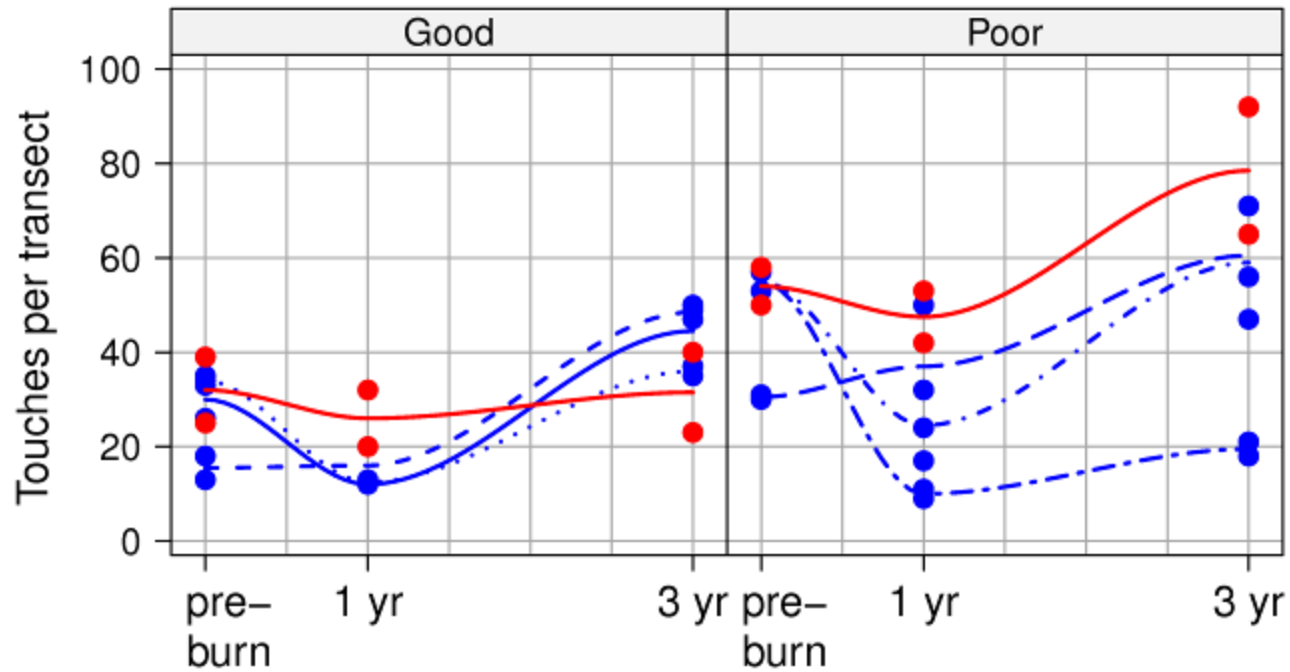
Change in exotic geophyte cover

burnt ● unburnt ●



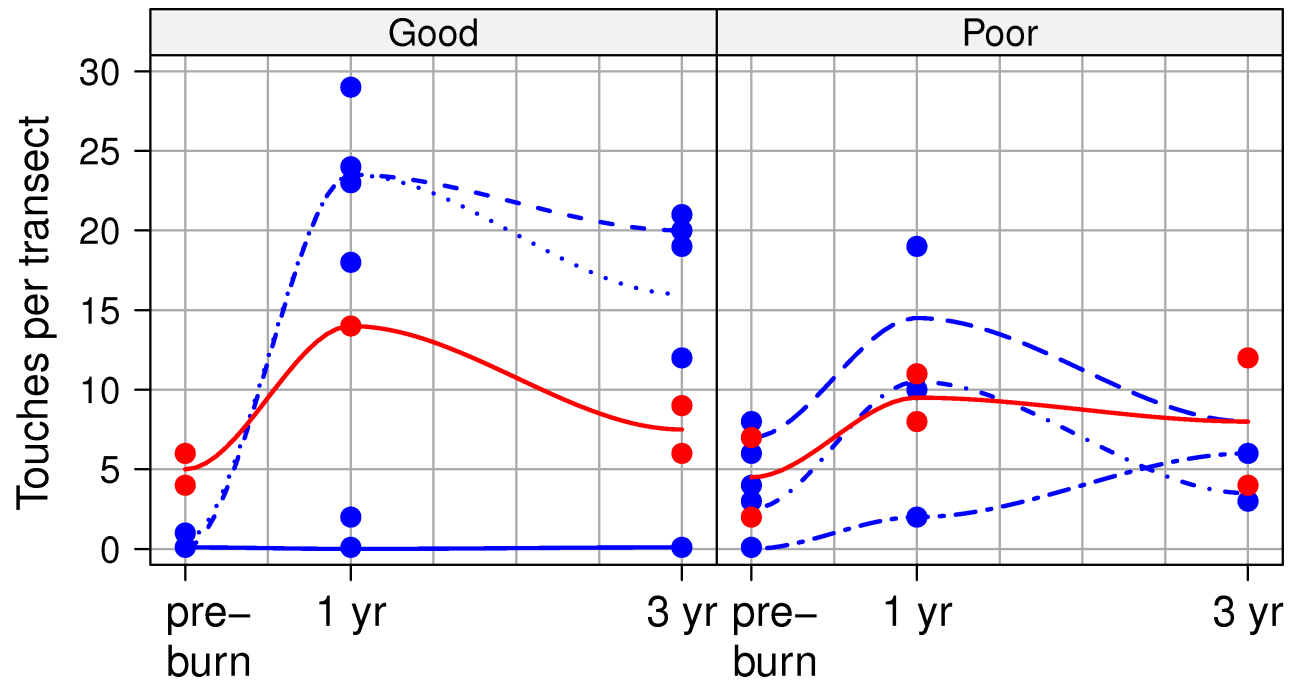
Change in exotic grass cover

burnt ● unburnt ●



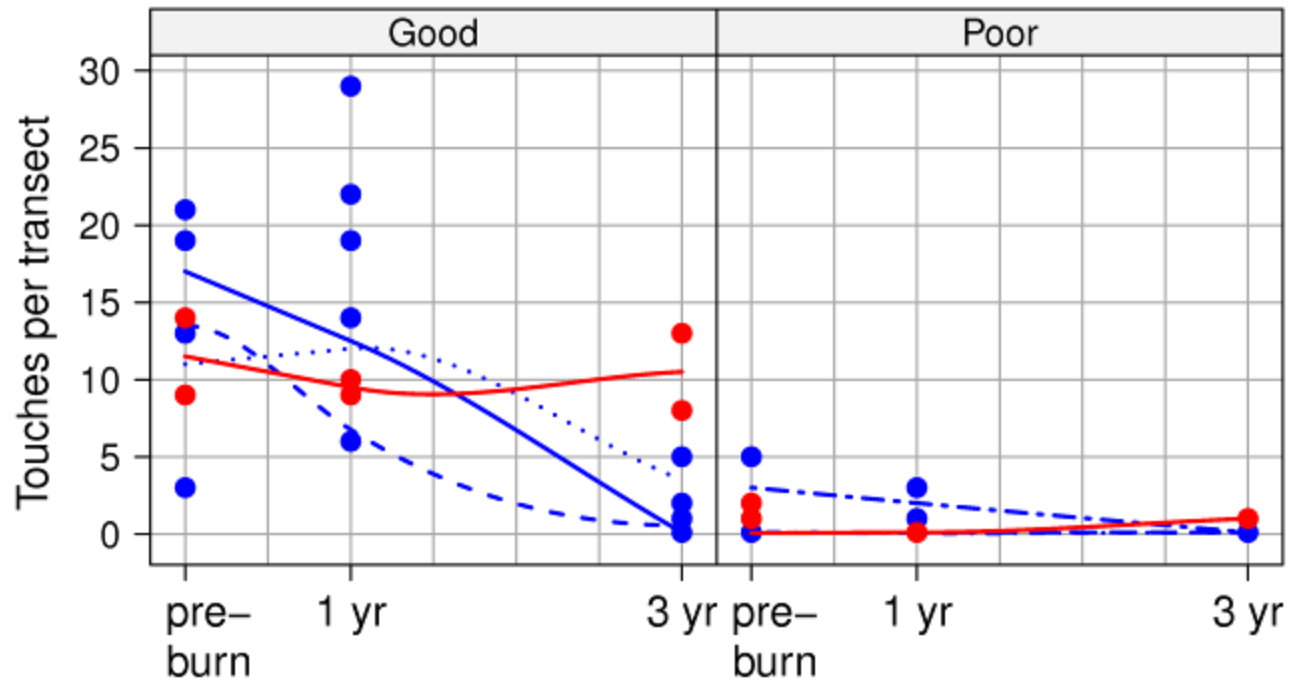
Change in exotic herb cover

burnt ● unburnt ●

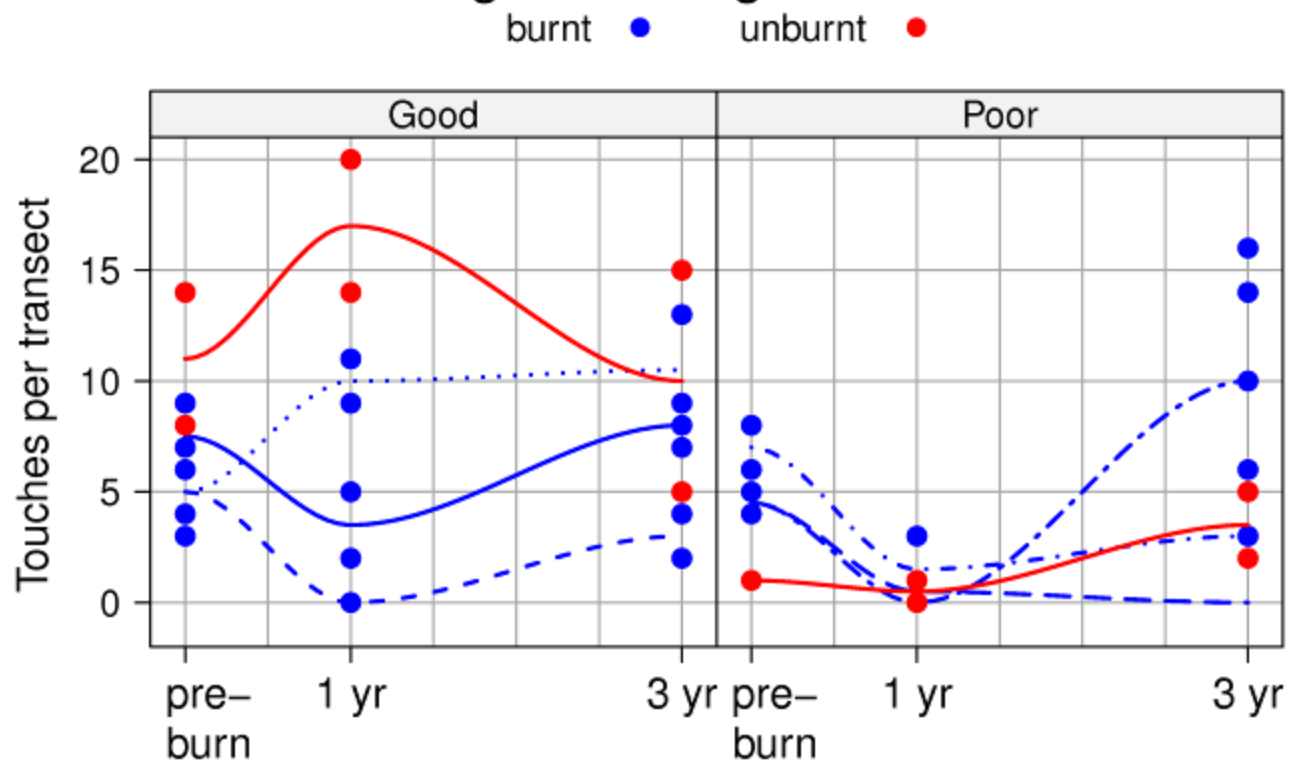


Change in native geophyte cover

burnt ● unburnt ●



Change in native grass cover



Trends against hypotheses

- **Native understorey cover will not decrease relative to weed cover?**
 - **Decreasing trend in native geophytes**
 - **Increasing trend in exotic herbs**
 - **Increasing trend in exotic grass cover**

Trends against hypotheses cont...

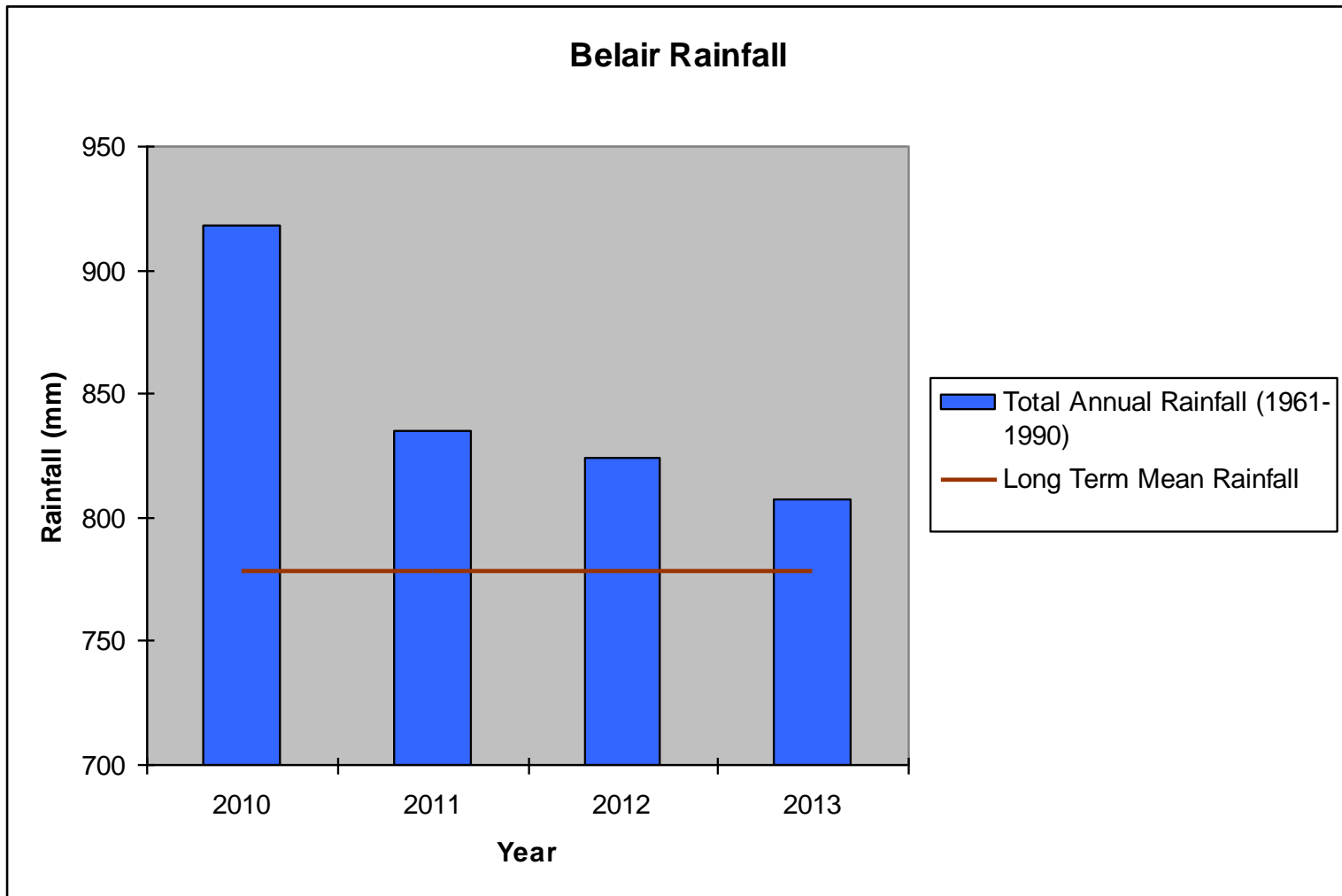
- The pre- and post-fire difference in native understorey cover will not differ between sites in 'good' condition compared to those in a more degraded condition?

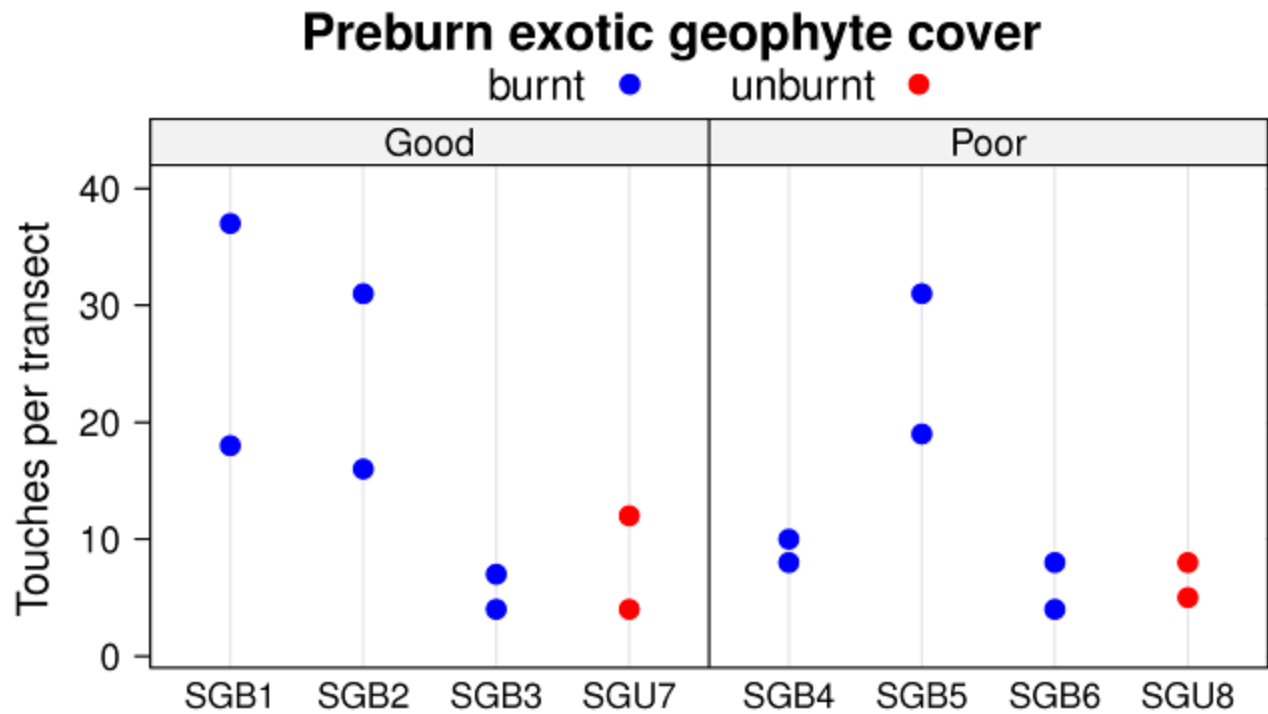
Trends against hypotheses cont..

- **Decrease in overall native cover sustained at three years post-fire in 'good' burnt plots**
- **Increase in overall exotic cover pronounced in 'good' plots**

Limitations

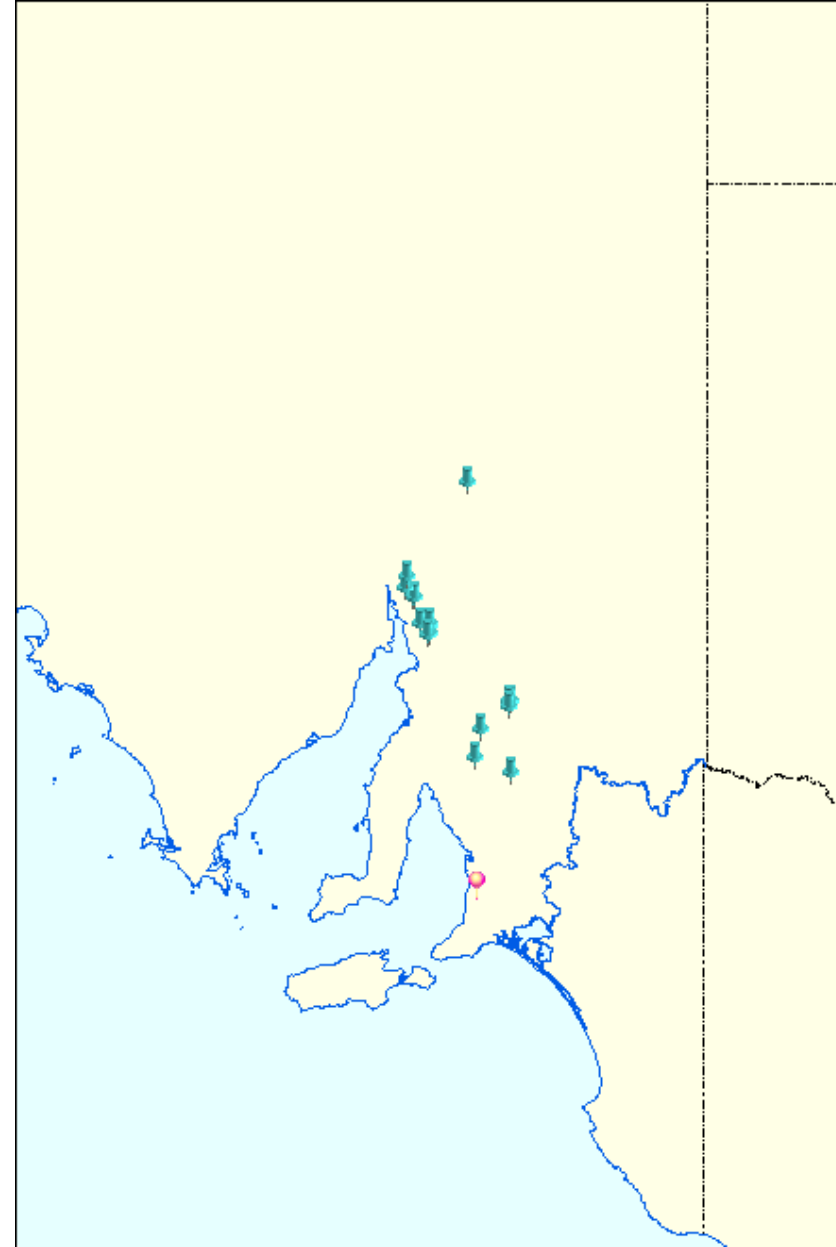
- **Season – pre-burn and first post-burn surveys undertaken in La Niña period (2010 – 2011)**
- **Unburnt plots show weaker trends but in the same direction for some lifeforms?**
 - **eg exotic herbs (favourable growth and reproductive conditions?)**
 - **Marked increase in exotic grasses and exotic geophytes in unburnt ‘poor’ site?**





On the side.....

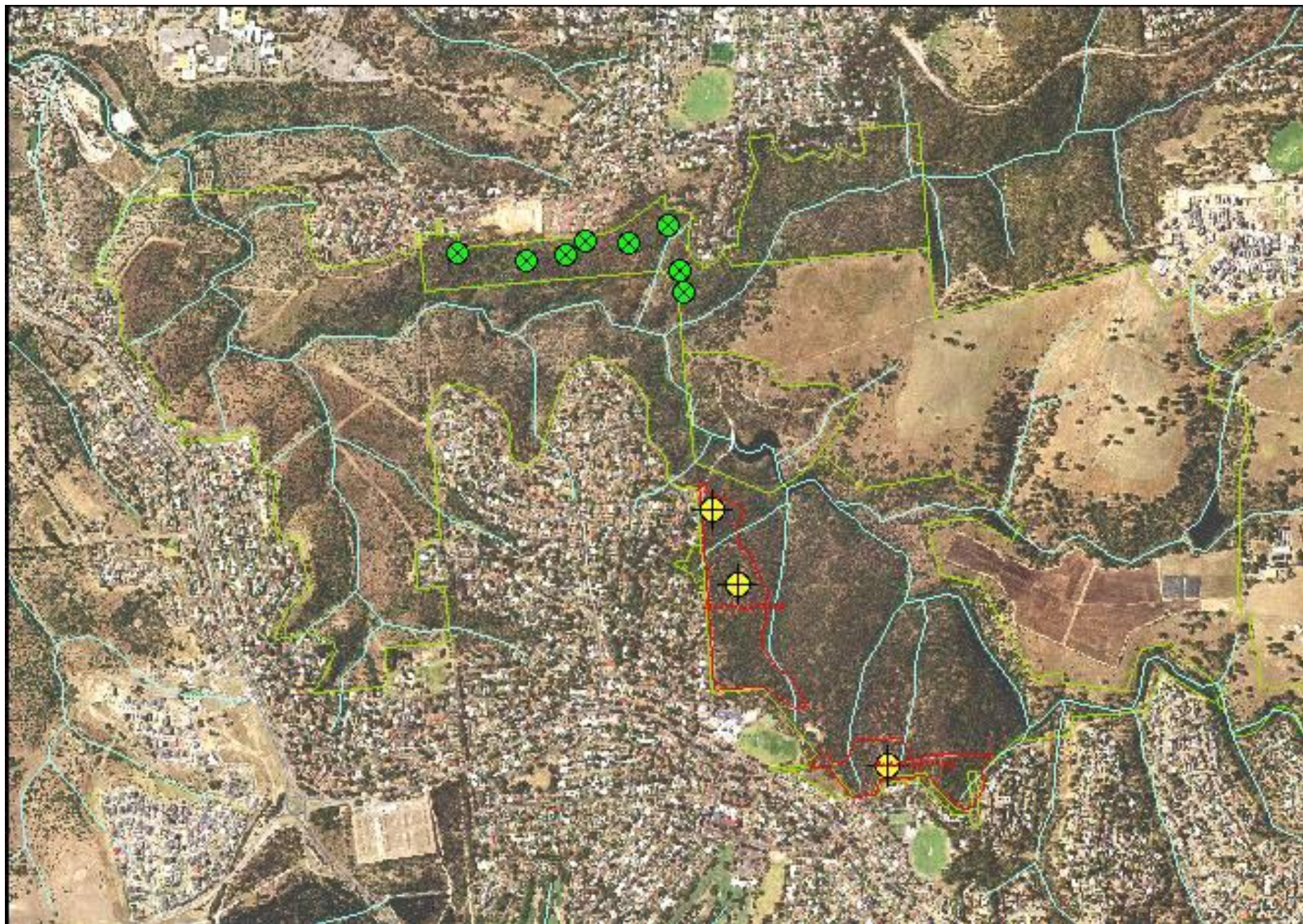
- 2013 resulted in the first ADHERB specimen of *Festuca benthamiana* from Southern Lofty!



‘EPBC Act’ monitoring

- **Associated with a referral under the EPBC Act**
- **Designed principally to detect changes against pre-determined condition criteria**
- **Focused on two prescribed burns in GBGW**
 - **Belair S11**
 - **Sturt Gorge S11 B2**





Design and Methods

- **Three quadrats in each of the two burns, notionally stratified into ‘Good’, ‘Moderate’ and ‘Bad’ condition**
- **20 x 20m quadrats**
- **Ten (or more) 1 x 1m randomly selected plots within each quadrat**
- **Species presence recorded within each 1 x 1m plot, along with visual cover estimates**

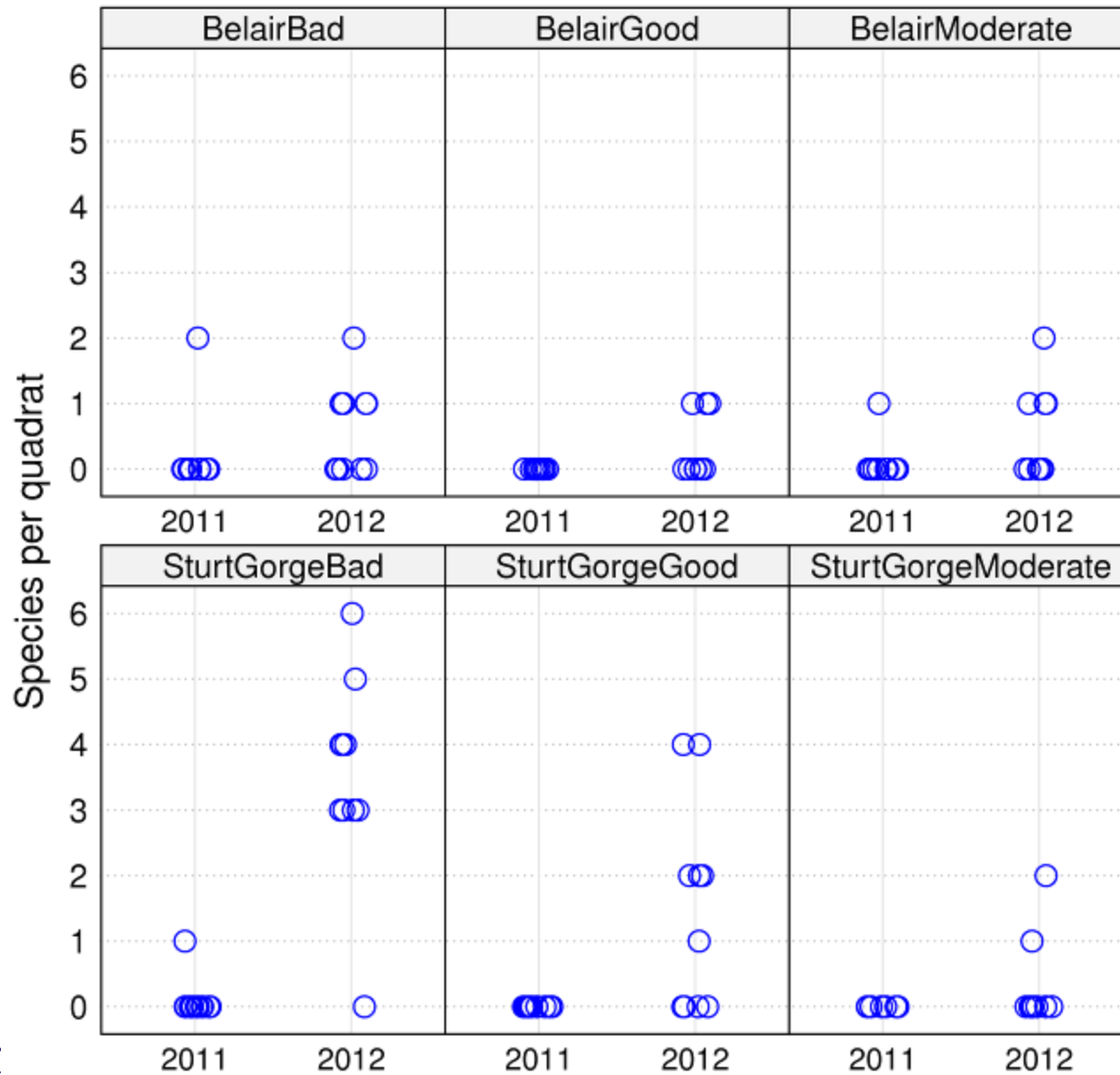
Exotic geophyte species richness



Exotic grass species richness



Exotic herb species richness



Native geophyte species richness



General Trends

- **↑exotic geophyte richness**
- **↑exotic herb richness**
- **↑native geophyte richness**

What does this mean?

- **There is little evidence of positive trends in native lifeforms and some evidence for increases in key exotic lifeforms**
- **In better condition sites trends are more pronounced**
- **Contrary results between the two study methods: a pronounced increase in exotic geophyte richness but little change in cover.**









Observations cont...

- **‘Curing’ in grasslands means that GBGW burns have been undertaken in early summer**
- **Which means that annual exotic grass seed load has well and truly dropped**

Prober *et al.*

- **Found that spring burning led to a substantial decline in annual exotic grasses and an increase in broad-leaf annuals**
- **Postulated that decrease in annual grass may be due to transient or short-lived seed banks**
- **Found little evidence for increased native grass cover in unseeded plots**
- **Some C₃ grasses declined in response to burning**

Prober *et al.*

- Burn treatment 3 x 2-m plots
- Burnt in mid-October using a gas powered weed burner





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Biodiversity gains?

- **Winners and losers**
- **Short-term loss of habitat vs medium-term recruitment of seeding shrubs?**
- **Native vs exotic geophytes**
- **Sturt 'Good' full of Ehrharta etc but still high in native richness?**

Management Implications

- **Mechanical treatment of woody shrubs, including natives, in A- and B-zones preferred**
- **Well-timed brushcutting and slashing in A-zones to reduce annual grasses and change the fuel arrangement**
- **Experimenting with burning in early- to mid-spring?**

Acknowledgements

- Kirstin Abley
- Graeme Hastwell
- Andy Sheath
- Mandy Slipper
- Marcus Pickett

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Thank you for your participation



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