

## Rabbits still affect Australian rangelands.

It's not easy to disentangle all the factors affecting groundcover, but that's what PhD candidate Neil Ross has done to assess the impact of rabbits on ground layer plant communities in arid rangelands.

The condition of ground cover in arid and semi-arid areas of Australia can be affected by factors as varied as:

- Grazing history and the consequent 'starting condition'; e.g. highly modified (degraded) with no resident seed source for palatable species, or 'good condition' with high species diversity and palatable species present.
- Herbivore interactions; e.g. how the different grazing behaviour and preferences of livestock, rabbits and kangaroos shape the vegetation.
- Total grazing pressure; e.g. have the subtleties of herbivore interactions been completely overridden by the sheer weight of overgrazing during past droughts, regardless of the species involved.

Neil studied long-term grazing exclosures to understand the impacts of rabbits and kangaroos in the absence of livestock. The study involved 15 exclosures on three de-stocked conservation reserves across SA and NSW, covering chenopod shrublands, *Callitris* (native pine) woodlands, and Belah wilga woodlands. Each site had plots that were grazed by rabbits only, kangaroos only, both species together, and no grazing.

The sites were from 13 to 20 years old so they were assessing changes in post-calici years – changes in plant condition following the cessation of many decades of chronic rabbit grazing.

Key findings were that:

- Ground layer flora at lower productivity (more modified) sites are more sensitive to grazing than at sites in better condition.
- Rabbits consistently have negative impacts on ground layer plant communities, regardless of whether kangaroos are present or not. Kangaroos are more benign, especially if rabbits are excluded.
- Sites grazed by rabbits had:
  - Inhibited recruitment of palatable *Callitris* seedlings.
  - Greater presence of *Marrubium vulgare* (horehound), a rarely grazed weed.
  - More likelihood of being held in a degraded state.
- Sites grazed by kangaroos had:
  - Enhanced recruitment of *Callitris* seedlings in the absence of rabbits, possibly due to reduced competition from grasses due to grazing by kangaroos.
  - Much less *Marrubium vulgare* (horehound) with complete removal possible over time.
  - Reduced presence of competitive grasses.
  - In most cases, when rabbits were absent, altered plant species assemblages.

Conclusions included:

- Rabbits are likely to be keeping Australian rangelands suspended in a degraded state with increased weeds and inhibited recruitment of woody species.
- Rabbit control can facilitate rangeland recovery, but their control alone may be insufficient, e.g. where historic seed banks have been lost.
- Improvements in rangeland condition through rabbit control can be facilitated under kangaroo grazing, as long as kangaroos are not over-abundant.

For more information, see 'Rabbit impacts on ground layer plant communities in arid rangelands' by Neil Ross and Mike Letnic (UNSW), the final report for a Rabbit-Free Australia research project.



*Callitris glaucophylla* juveniles grow inside a combined kangaroo and rabbit exclosure in Mungo sand dune woodland. Mature individuals persist in the background outside the exclosure, which was built in 2000 by Soil Conservation Service, NSW. No *Callitris* seedlings occur outside the grazing exclosure. Image: Neil Ross, UNSW.



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