

ACT conservation research: Summary of recent papers

[Experimental reduction of native vertebrate grazing and addition of logs benefit beetle diversity at multiple scales.](#) Barton et al.

A 16 month studyⁱ, undertaken in a local nature reserve, Goorooyarroo, manipulated kangaroo grazing levels to examine the response on beetle populations. Beetles were chosen to test responses to kangaroo grazing due to their potential for rapid response to habitat change. The experiment was achieved through the addition of hardwood logs (the creation of timber refuges) and exclosure fences. The resulting effects of various levels of kangaroo grazing were examined. A combination of factors contributes to a loss of vegetation at the ground layer, resulting in habitat loss. This includes overgrazing and removal of timber through firewood harvest and land clearing.

Grazing is natural and a certain amount of grazing, when in balance, promotes biodiversity. The key message is 'Management of appropriate levels of grazing is the key objective for management of plant and insect communities.' In summary, this study found heavy grazing from high densities of kangaroos poses a significant barrier to sites undergoing ecological restoration, due to their impact on the vegetation biomass. In addition, the study found that hardwood logs placed in clumps at a certain ratio had a positive effect on beetle diversity. The reduction in grazing levels was found to have a significant positive effect on both beetle abundance and diversity. This rapid response of beetles suggests a potential for a positive flow-on effect for other living organisms.

[Back to the brink – population decline of the endangered grassland earless dragon \(*Tympanocryptis pinguicolla*\) following its rediscovery.](#) Dimond et al.

A studyⁱⁱ of the Grassland Earless Dragon has found it is in grave danger of becoming the first confirmed reptile extinction in Australia since European settlement. The Dragon only occurs in the endangered vegetation community of natural temperate grassland. With the grasslands being smaller and more isolated the opportunities for populations to move and recolonise are limited. Other than habitat fragmentation, the key threats to the Dragon are drought and overgrazing resulting in a reduction in vegetation cover.

Overgrazing by kangaroos reached damaging levels at some sites, impacting negatively on the Dragon population. Research at 23 native grassland sites in ACT over 25 years has shown a decline in the population. The species is no longer detectable at 3 of the 10 research sites indicating the population are close to being, or have become, locally extinct. Efforts to conserve the species persist through a focus on adaptive habitat management.

[Bringing forward the benefits of coarse woody debris in ecosystem recovery under different levels of grazing and vegetation density.](#) Manning et al. {Full article from *Biological Conservation* hosted with permission from Elsevier}.

A studyⁱⁱⁱ in to reptile abundance, undertaken in two endangered Yellow Box – Red Gum grassy woodland sites (Mulligans Flat and Goorooyarroo), over a four year period, examined various influences. The effect of kangaroo grazing pressure on skinks was found to be dependent on the vegetation density. The greatest negative effect of high grazing pressure was on small skinks in high vegetation density. The addition of suitable timber in the form of coarse woody debris is estimated

to be able to fast-track ecosystem restoration processes between 100 and 200 years. Aside from this benefit, the study found all areas treated with timber debris, in presence of high kangaroo grazing pressure, resulted in a small decrease in small skink abundance. Once kangaroos were excluded from the denser woodlands this proved beneficial for skinks.

The ACT Government is utilising the findings of this research. For example the [Woodlands Restoration Project](#) has involved the reintroduction of woody debris in the form of large logs and branches in to nature reserves.

[Biomass and floristic patterns in the ground layer vegetation of box-gum grassy eucalypt woodland in Gorooyarroo and Mulligans Flat Nature Reserves, Australian Capital Territory.](#)

McIntyre et al.

A grassland flora study^{iv} undertaken in two nature reserves, Mulligans Flat and Gorooyarroo, establishes a methodology and presents baseline data for the long term grassy woodland restoration study, commenced in 2007. The study comprised estimates of: ground layer biomass, species biomass, groundcover types and soil properties.

It cites the extremely high kangaroo densities in ACT reserves, being the highest in south-eastern Australia. Studies indicate that biomass estimates are consistent with grazing pressure and high kangaroo densities. The need for reducing kangaroo densities is an important factor in the ongoing experiment and for conservation overall. The study concluded: ACT reserves are under extremely high grazing pressure, sufficient to affect soil processes and habitat. Continued high levels of grazing may inhibit soil, water and nutrient processes essential for restoration of healthy functioning grassy woodlands.

ⁱ Barton P.S., Manning A.D., Gibb H., Wood, J.T., Lindenmayer, D.B., and Cunningham S.A., 2011. Experimental reduction of native vertebrate grazing and addition of logs benefit beetle diversity at multiple scales. *Journal of Applied Ecology* **48**: 943–951.

ⁱⁱ Dimond W.J., Osborne W.S., Evans M., Gruber B., and Sarre S.D., 2012. Back to the brink – population decline of the endangered grassland earless dragon (*Tympanocryptis pinguicolla*) following its rediscovery. *Herpetological Conservation and Biology* **7(2)**: 132-149.

ⁱⁱⁱ Manning, A.D., Cunningham, R.B., and Lindenmayer, D.B., 2013. Bringing forward the benefits of coarse woody debris in ecosystem recovery under different levels of grazing and vegetation density. *Biological Conservation* **157**: 204-214.

^{iv} McIntyre S., Stol J., Harvey J., Nicholls A.O., Campbell M., Reid A., Manning A.D. and Lindenmayer D., 2010. Biomass and floristic patterns in the ground layer vegetation of box-gum grassy eucalypt woodland in Gorooyarroo and Mulligans Flat Nature Reserves, Australian Capital Territory *Cunninghamia* **11**: 319–357