New Research

Ground-layer vegetation is heavily modified in box-gum grassy woodlands

Why this research is important

• Temperate grassy woodlands are an ecological community that has been greatly affected by pastoralism with impacts on its plant composition and ecological functioning, a major concern for conservation managers.

• The grasses and forbs that make up the ground-layer vegetation of grassy woodlands provide important habitat and foraging sites for many small mammals, reptiles, birds and insects.

• Two nature reserves, Mulligans Flat and Goorooyarroo in the ACT contain box-gum grassy woodland. The vegetation in these reserves has been modified by past agricultural practices, and current high levels of grazing by kangaroos.

Ground-layer vegetation was assessed as part of a long-term restoration experiment.

• Recent research published in the journal Cunninghamia outlines the results of a vegetation survey initiated as part of a long-term grassy woodland restoration experiment.

• Vegetation biomass (total amount of living material in a given area) and floristics patterns were assessed across Mulligans Flat and Goorooyarroo Nature Reserves, the site of the woodland experiment.

• Grasses, forbs and other types of ground covers were surveyed in 96 one-hectare sites across the two nature reserves. Over 100 species of native plants and 60 species of exotic plants were recorded.

• Distinct vegetation types were found to dominate in different parts of the reserves, and soil phosphorus and nitrate was associated with differences in floristic composition.
Soils and grazing pressures can have a big impact on vegetation diversity and biomass.

- Vegetation was dominated by the grasses *Joycea pallida*, *Austrodanthonia* spp., *Themeda australis* and *Aristida ramosa*, with their abundance influenced by soil pH and phosphorus levels.
- Forbs were highly sensitive to levels of soil nitrates, with exotic forbs dominating in sites with high nitrate levels.
- Vegetation biomass was significantly affected by high kangaroo (*Macropus giganteus*) densities. The grazing pressure from kangaroos has resulted in average grass biomass for Mulligans Flat of 592 ± 76 kg.ha⁻¹ and in Goorooyarroo 546 ± 45 kg.ha⁻¹.
- These results forms an important baseline for future research, and will allow comparison of future changes in soil characteristics and the plant community in response to management and ongoing experimental manipulations.

**Conservation Implications**

Ground-layer vegetation is important because it provides:
- Habitat for a variety of animals, including small mammals, reptiles, birds and insects.
- Cover for soils and prevents erosion.
- A critical link between the cycling of nutrients below and above ground.

The loss of grass biomass and sward structure due to heavy kangaroo grazing is sufficient to negatively affect habitat quality for animals, as well as water and soil processes such as infiltration and nutrient cycling.

Improving ground-layer vegetation will be critical to the restoration of functioning box-gum grassy woodlands.

**Published Research**