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Responses of vertebrate and invertebrate faunal communities to different cattle grazing regimes

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Invertebrate and vertebrate fauna species provide valuable ecosystem services that contribute to the functioning of rangelands. The effect of grazing on vegetation has been widely studied, however the effects on vertebrate and invertebrate fauna are complex and less well understood. Many grazing studies compare grazed and ungrazed areas, however these type of studies may not be very useful for providing advice to land managers, as "not grazing" is usually not a management option. Understanding the influence of grazing on fauna is important for conservation and management of these populations. Due to the scale of rangelands, relatively small changes in their management could have major biodiversity benefits.

In this study we will examine the effects of different realistic grazing regimes on invertebrate and vertebrate fauna in northern Australia. This project will be conducted on the Wambiana grazing trial established by the Department of Agriculture, Fisheries and Forestry QLD in 1997 at Wambiana Station (20˚34'S, 146˚07'E), a cattle-grazing property approximately 70km SW of Charters Towers. The grazing treatments reflect current practices in the area and consist of: heavy stocking rate; moderate stocking rate; variable stocking rate and rotational wet season spelling. We will examine the influence of different grazing regimes on faunal biodiversity and community assemblages in all the vertebrate groups, and invertebrate groups important as food for vertebrates (e.g. insects and spiders). Current and past biodiversity monitoring will be used to determine which species are abundant, and which appear to respond to grazing, either positively or negatively.

A total of six biodiversity surveys will be conducted over three years and include the use of pitfall, Elliot, funnel and cage traps and also active searching, spotlighting and bird survey. This sampling methodology is detailed in (Woinarski and Ash 2002) and has been widely used in biodiversity survey in northern Australia. Additionally, vegetation will be surveyed and as an indication of habitat value in each of the grazing regimes. This will involve the use of drones to capture high resolution aerial imagery as well as more traditional vegetation survey methods.

Three fauna surveys have been conducted so far, and in 30 nights of trapping a total of 115 amphibians, 99 mammals and 861 reptiles were caught in funnel, pitfall, elliot and cage traps. During active surveys 18 amphibians, 92 mammals, 1145 reptiles and 3368 birds were observed. The data has yet to be analysed, however generalised linear models will be used to examine the abundance and species richness of birds, reptiles and mammals in relation to the grazing treatments, vegetation types and season and invertebrate prey availability.

This project will provide valuable long-term data on the effect of different grazing regimes on fauna. It adds value to an existing long-term grazing trial and extends and develops previous, shorter-term biodiversity studies conducted by CSIRO (Kutt, Vanderduys and O'Reagain 2012). The data collected should provide insights into the relationship between economic performance, beef productivity, and land management for biodiversity and provide advice to graziers and land managers on the effect of specific grazing regimes on wildlife abundance and assemblage structure.

Kutt, A., Vanderduys, E. and O'Reagain, P. (2012) *The Rangeland Journal;* **34**, 173-182.
Woinarski, J. and Ash, A. (2002) *Austral Ecology;* **27,** 311-323