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MONITORING MULGA LAND CHANGE: 12 YEARS LATER

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INTRODUCTION

The Mulga Land Biogeographic region represents a significant proportion of Australia's rangelands and is a microcosm of the biodiversity and production related issues faced by rangeland managers world wide. The Mulga Lands have undergone significant changes in relation to productivity and biodiversity in the past 200 years. These ecosystems are serendipitous in nature, a phenomenon best described by state and transition models. Figure 1 diagrammatically represents the factors reported in the literature as influencing system dynamics. This figure highlights that apart from social, economic and cultural factors, grazing pressure, climate (particularly rainfall) and woody shrub densities are the main drivers of historic vegetation change in the Mulga Lands. This study investigates the contemporary effects of these factors in a 12 year monitoring program undertaken in two Mulga Land communities in SW Queensland. The experimental design includes a manipulation of grazing regimes and woody shrub densities.

This study was undertaken on Currawinya National Park, situated in south west Queensland (28° 25'S, 144° 30'E). The area was proclaimed a National Park in 1992 following 150 years as a sheep station. Rainfall (331mm/yr) is highly unpredictable both within and between years. The area was considered degraded at the time of declaration with evidence of soil erosion, palatable perennial grass extinction and increased density of native woody shrubs. Vegetation monitoring under three grazing regimes (off-park: feral, native and domestic grazing, on-park: feral and native grazing, exclosures: no mammalian grazing pressure) began in 1992. In 1994 shrubs were removed from matched paired sites and included in the monitoring program. The two vegetation communities measured were Sandplain Mulga and Dunefields. Annual rainfall over the study period ranged from 72 mm (2002) to 582 mm (2000) with below average rainfall in 1992, 1993, 1994, 1996, 2001, 2002 and 2003.

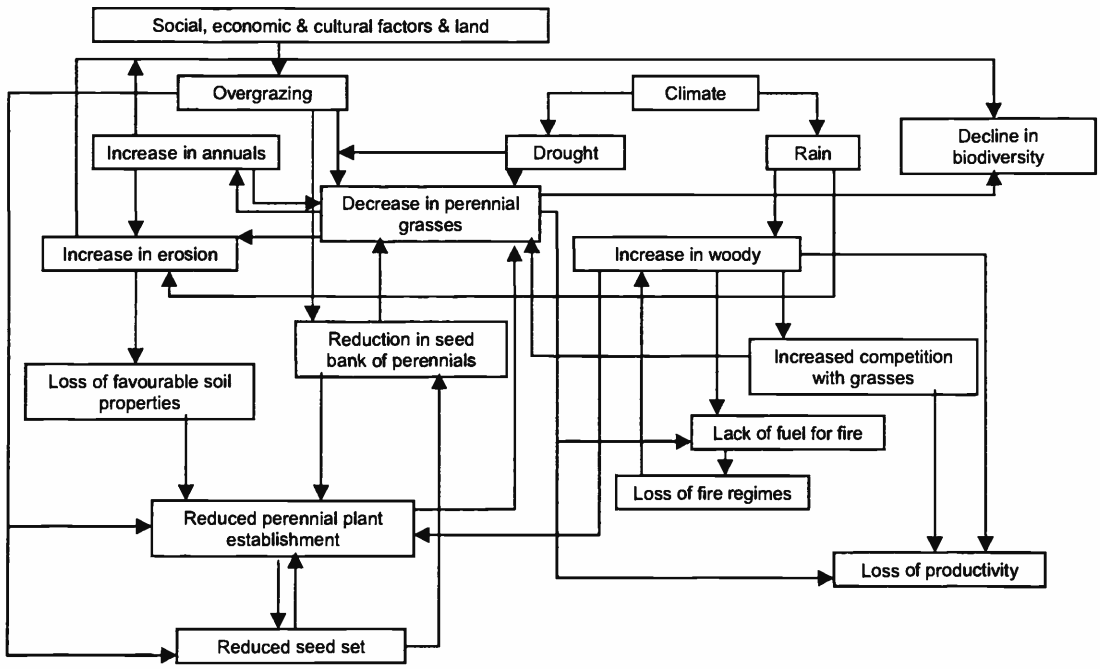

Figure 1. Vegetation change factors in the Mulga Lands.

RESULTS

Figure 2 is an example of the results from this study. This figure shows the mean percentage cover of grasses over the three grazing regimes, with woody shrub present and absent, over the 12 years for each vegetation type. Perennial grass cover is a good indicator to assess both production and conservation goals (Figure 1). The results indicate that the main driver in these systems is the amount and timing of rainfall. However, total removal of mammalian grazing pressure resulted in significant increases in the cover and diversity of perennial grasses. Simply removing sheep only results in significant differences following good summer rainfall. The success of woody shrub control is negatively correlated with grazing pressure but if grazing pressure is present, the result is a higher density of shrubs.

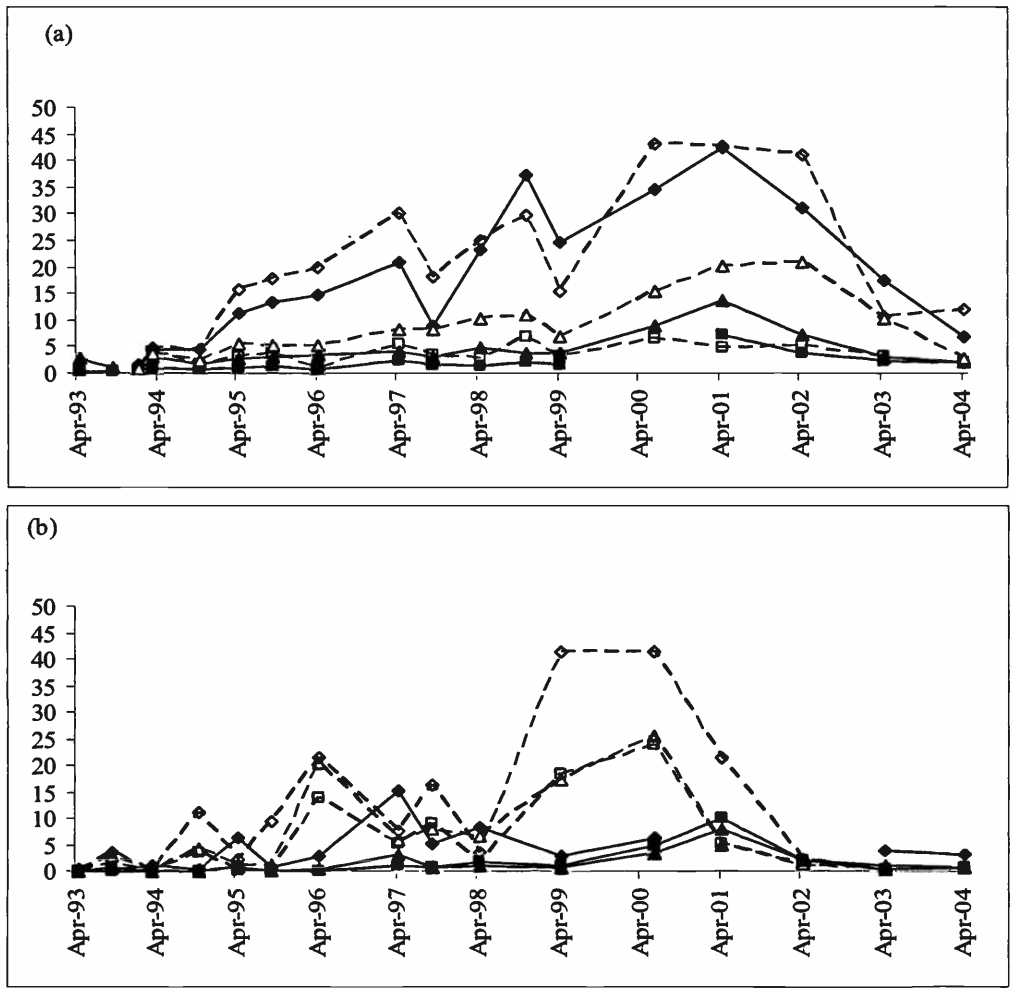

Figure 2. Mean percent cover of perennial grasses in (a) Sandplain Mulga and (b) Dunefields between 1993 and 2004 under three grazing regimes (♦exclosure, ▲on-park, ■off-park) and with woody shrubs present (solid line) and absent (broken line).

DISCUSSION

Firstly, from a production point of view, simply reducing stock numbers will not result in significant long term improvement unless coupled with good summer rainfall. The main lesson being that without reducing grazing pressure, other strategies such as woody shrub control are a waste of time. Secondly, the declaration of a National Park followed by simply removing domestic stock is not enough for these areas to be restored and conservation objectives realized. As managers cannot manipulate the timing or amount of rainfall, this study indicates that total grazing pressure must be managed in order to gain the greatest production and restoration results.