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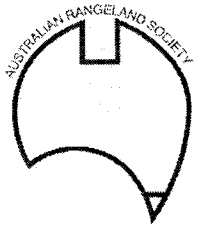

The Australian Rangeland Society

RECOVERY OF VEGETATION ON KIDMAN SPRINGS:1973-1999

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ABSTRACT

The rate of recovery of vegetation from a state of poor condition is valuable information for rangeland managers who are controlling livestock and feral animal numbers in paddocks to improve condition. We monitored vegetation changes in three exclosures built in 1973 on Kidman Springs Research Station. Data from permanent transects and examples from photo-points illustrate that from a poor state in 1973 recovery of total pasture biomass on red loam soils was relatively rapid (about 5 years), but changes in plant composition are still occurring after 26 years. Tall perennial grasses and shrubs are still replacing annual and short-lived grasses. Since 1973, vegetation within an exclosure on grey cracking clay soils has changed relatively little, except for an increase in some woody plants into these grasslands. These results have implications for the management of these savannas, with the control of grazing and woody vegetation being important considerations.

INTRODUCTION

Kidman Springs is located in the Victoria River District of the Northern Territory and is managed by the NT Department of Primary Industries & Fisheries as a research station. Prior to the establishment of this station in 1965, feral donkeys and horses and open-range cattle heavily utilised and degraded areas near more permanent water-holes, such as along Kidman Creek. The vegetation on many of these areas was rated in poor condition by the early 1970s (Foran *et al.* 1985). Condition was particularly poor on savanna woodlands occurring on red loam soils near Kidman Creek. Savanna grasslands on grey clay soils near this creek were in better condition in the early 1970s.

Exclosures are valuable tools for documenting vegetation recovery following the removal of domestic and feral stock (Valamanesh 1999). Vegetation condition within exclosures provides managers with ungrazed references or base-lines for them to evaluate pasture conditions outside exclosures. For example, such evaluations are useful for making decisions about adjusting stock numbers to achieve pasture utilisation goals.

In this poster we document vegetation changes following exclusion of stock on three areas differing in soils and initial condition (red loams in relatively poor and good condition and grey clays in good condition). We illustrate these changes with data from transects and a time-series of photographs taken at fixed points both inside and outside these exclosures.

METHODS

In July 1973, following the development of feral animal and cattle control, fencing and artificial water-points on the research station, exclosures were erected on three areas near Kidman Creek, two on calcareous red loam soils and one on cracking grey clays. One of the red soil exclosures was established on an area assessed to be in poor rangeland condition, and the other on an area in good condition, hereafter referred to as poor and good sites, respectively. Vegetation changes were measured and photographs taken on permanently marked plots annually (May-June) between 1974 and 1979 (Foran *et al.* 1985), and then again in 1989 (Bastin and Andison 1990), in 1994 (Andison and Cobiac, unpubl. data) and in 1999 (Bastin et al. 2000). During these 26 years, rainfall fluctuated about the long-term mean (see Poster Fig. 1). The wet seasons of 1987/88 and 1991/92 were notably dry.

RESULTS AND DISCUSSION

On red loam soils, pasture biomass recovered rapidly after exclosure, but more slowly in grazed areas outside exclosures (Fig. 1). Fluctuations appeared to be due to bursts of annual plants caused by late wet-season rainfall (e.g., a burst of mulla mulla in 1994).

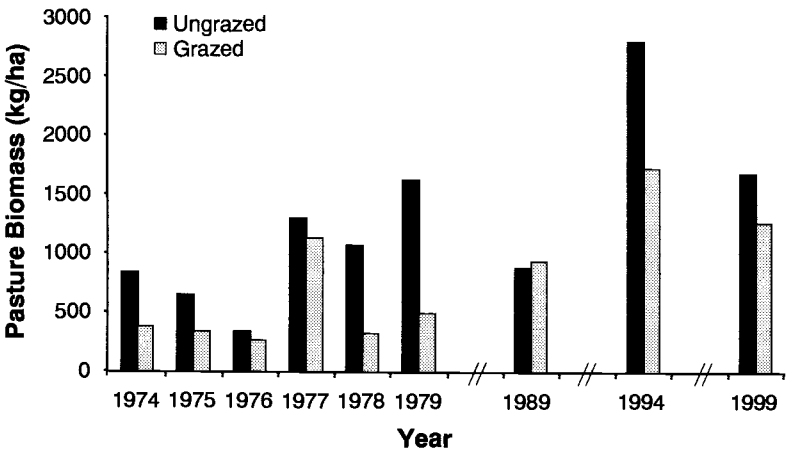

Figure 1. Mean pasture biomass for inside (ungrazed) and outside (grazed) red soil exclosures.

Poster photographs illustrate that pasture composition markedly changed inside the good exclosure from 1973 to 1978, with the exotic rubberbush invading while grass cover increased (see Poster Photos). However, by 1989 rubberbush had largely disappeared and was absent by 1999, and tall perennial grasses such as curly bluegrass and black speargrass had replaced annual and short-lived grasses such as native couch and limestone grass. Although changing less due to grazing, pastures outside the good exclosure also improved in grass cover by 1999.

From 1973 to 1978 pastures outside the poor exclosure also improved in grass cover, although recovery was better inside this exclosure (see Poster Photos). By 1989 and 1999, tall perennial grasses had replaced some, but not all, annuals and short-lived perennials.

By 1999 trees and shrubs had increased inside and outside exclosures (see Poster Photos). This thickening was probably due to fire suppression in these pastures. Only recently has prescribed fire been initiated as part of station management.

On grey soils, ribbon grass and flinders grass have dominated since 1973, with cover appearing to improve after exclosure (see Poster Photos). Rosewood had increased, but not massively.

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