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DEGRADATION AND POTENTIAL FOR RECOVERY IN SOME CENTRAL AUSTRALIAN RANGELANDS: II. VEGETATION

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ABSTRACT

In a complementary presentation (Tongway & Friedel, this volume), we examined the impact of cattle grazing on the landscape and soils of calcareous shrubby grasslands. In this presentation we look at the way soil changes were expressed in the vegetation.

On severely degraded soils, herbage and shrubs were largely restricted to sandy bands, and most herbage was unpalatable. Shrubs were small. Herbage palatability was better on less degraded soils, and the number and size of shrubs were greater. On land rested for 10 years, there was excellent recovery on the sandy bands but not on the intervening stripped surfaces, and there were few large shrubs. Palatable perennial grass appeared for the first time.

Thus there is an increase in discrimination amongst landscape units as stability improves, and both vegetation quantity and forage quality are better. Degraded vegetation can recover provided the landscape units remain largely intact; once sandy bands and hummocks lose their structure, a critical threshold is crossed and potential for recovery is low.

INTRODUCTION

The calcareous shrubby grasslands of central Australia are highly preferred grazing for cattle. In all but the driest seasons, forage is predominantly selected from the herbage layer and, as a consequence, this layer is often in a degraded state. Chenopod shrubs (mostly *Maireana astrotricha*) and sparse acacias (*Acacia kempeana*, *A. ligulata* and *A. tetragonophylla* are rarely eaten but nevertheless they are in poor condition near watering points.

Can we predict that the productive potential of the vegetation will be restored under conservative management? To do so, we must understand the ecological processes of degradation and recovery. Our study concerns an area where stocking rate had been reduced to about 30% of its former level, so that recovery was a possibility.

METHODS

We selected three areas with contrasting histories: Site 1, 0.3km from a dam; Site 2, 4.5km from a dam; and Site 3, similar to Site 2 but fenced out and largely ungrazed by cattle for 10 years. At each site, we estimated the cover of herbage species within $1m^2$ quadrate, located at 5m intervals along 200 to 300m transects, in order to sample the various landscape units described by Tongway & Friedel (this volume). Shrubs were sampled in 5 to 10m wide belt transects along the same 200 to 300m; an index of shrub size was generated from measures of height x widest diameter.

Results & Discussion

On Site 2, aerial cover of herbage was at its maximum (2%) on the sandy bands, somewhat less on the colluvial material of degraded bands and very low on the stripped, erosional areas in between (**Fig. 1a**). Most of the herbage was unpalatable. On Site 2, cover reached 3% on the sandy bands and 1.5% on the erosional surfaces (**Fig. 1b**), and the proportion of species of intermediate grazing preference was greater. Cover at Site 3 exceeded 6% in the depositional zone (**Fig. 1c**), and the palatable perennial grass *Digitaria coenicola* was dominant. Cover was low on the remainder and was largely confined to the sandy hummocks. Thus recovery of herbage appears greatest on the more stable and sand surfaces.

Bluebush (*Maireana astrotricha* occurred as a few small plants at Site 1 (**Fig. 2a**), mostly on sandy bands and remnant colluvial material. The bushes had been large but were dying back and their surrounding hummocks were eroding away. At Site 2, there were many more small plants, of recent origin, and some larger individuals (**Fig. 2b**), suggesting that recovery was in train. Erosional surfaces supported a number of shrubs. Even greater numbers were recorded at Site 3 (**Fig. 2c**), suggesting that recovery of shrubs preceded recovery of herbage (cf. **Fig. 1c**). Comparing the three sites, it appears that recovery is possible (within a practical time frame for management) only where the landscape units remain relatively intact.

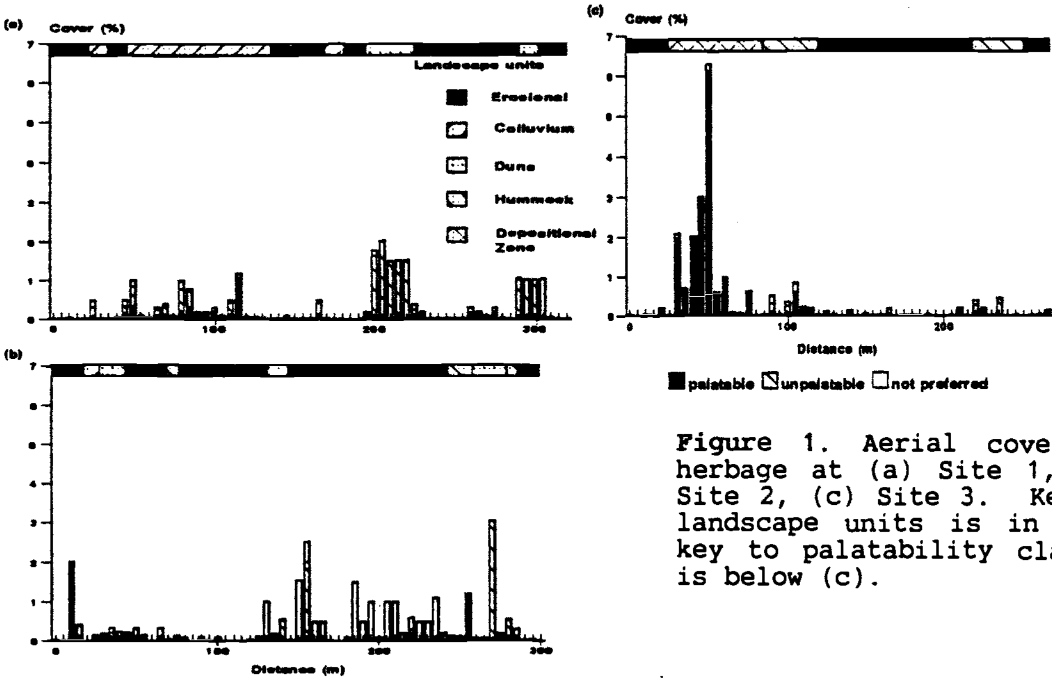

Figure 1. Aerial cover of herbage at (a) Site 1, (b) Site 2, (c) Site 3. Key to landscape units is in (a); key to palatability classes is below (c).

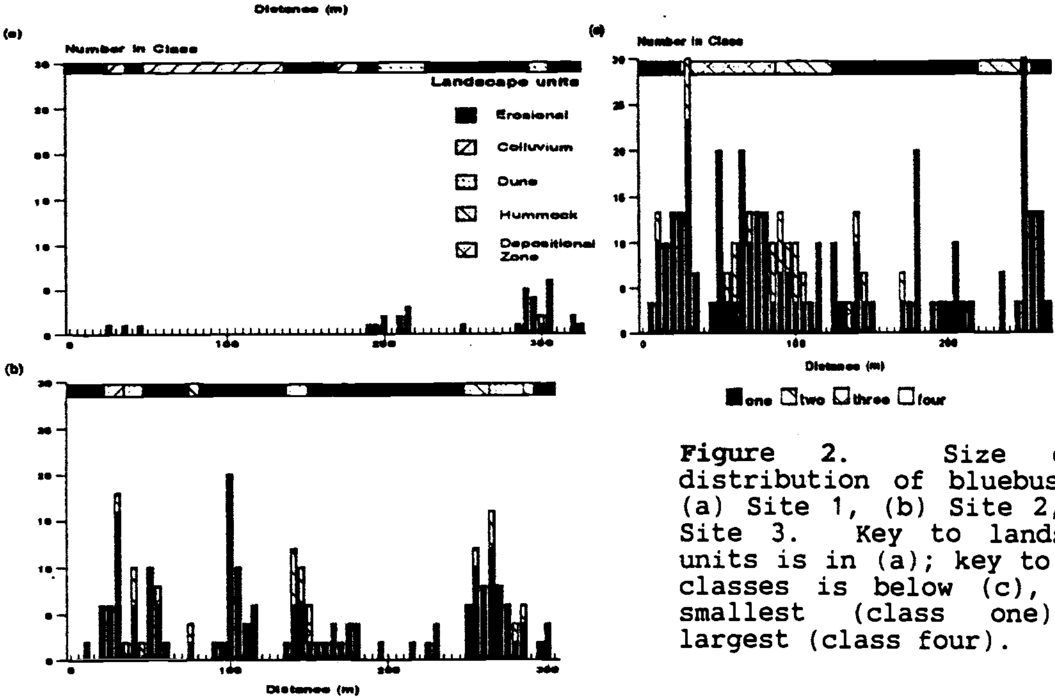

Figure 2. Size class distribution of bluebush at (a) Site 1, (b) Site 2, (b) Site 3. Key to landscape units is in (a); key to size classes is below (c), from smallest (class one) to largest (class four).

REFERENCE

Tongway, D.J. and Friedel, M.H. 1992. Degradation and potential for recovery in some central Australian rangelands. Landscape and soils. Working Papers 7th Bienn. Conf. Aust. Rangel. Soc. October 1992 Cobar NSW.