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THE WESTERN AUSTRALIAN RANGELAND MONITORING SYSTEM (WARMS) SHOWS WIDESPREAD IMPROVEMENT IN PERENNIAL VEGETATION ACROSS THE GASCOYNE-MURCHISON REGION OF WESTERN AUSTRALIA

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ABSTRACT

Analyses of 223 Western Australian Rangeland Monitoring System (WARMS) sites in the Gascoyne-Murchison region of Western Australia show improvements in perennial vegetation and hence range condition, over the last few years. Substantial increases in shrub density were found for both the majority of sites and the majority of species. Those species known to decrease under livestock grazing had about the same increase in density as the weedy species, known to increase under grazing. The cover of the perennial vegetation also increased across most sites. Recruitment of new plants was found on all sites and for most species. The sites were installed during the period 1993 to 1997 and reassessed during the period 1999 to 2001.

INTRODUCTION

Information on biophysical changes in rangelands is required by a number of stakeholders, for a range of reasons (Anon, 2000; National Land and Water Resources Audit 2001).

The Western Australian Rangeland Monitoring System provides an indication of change in pastoral rangelands at broadscales using a set of representative point based sites on which attributes of soil and perennial vegetation are recorded. WARMS is based on the belief that monitoring the health of the perennial vegetation provides a good indication of the health of the rangelands more broadly.

This poster/paper presents summarised results for analyses of demography (i.e. mortality and recruitment) and hence density, canopy area, species occurrence and species richness for the Gascoyne-Murchison region of Western Australia.

METHODS

The population dynamics and canopy size of perennial shrub and tree species were recorded on permanent sites installed between November 1993 and February 1997 and reassessed between August 1999 and June 2001. These sites were installed on representative and broadly uniform areas of the pastoral rangelands. About three-quarters of the sites were between 1.5 km and 3.5 km from permanent water. The average reassessment interval was 5.3 years, with a range of 3.8 to 7.4 years.

RESULTS

Substantial increases in perennial shrub and tree density were observed for both the majority of sites and the majority of species. The average increase in density for all sites was 48%, when all individuals were considered on each site. The average increase in density for each species was 42%, after first filtering the data to include only those species for which there was a reasonable population size (at least 20 individuals). Those species known to decrease under livestock grazing had approximately the same average density increase as those species known to increase under grazing.

Canopy area (a surrogate of cover) increased by 80% averaged across all sites. The increase was 70% when averaged by species. The average increase for species known to decrease under pastoral use was slightly less, at 50%. The canopy size increased for all species, for which there were populations of at least 20 individuals. These results suggest vigorous growth over the assessment period and indicate healthy populations.

On average, species were found on 10% more sites at reassessment compared to installation. Most species (87%) were found on more sites at reassessment than installation. There was no difference between species that are known to decrease under livestock grazing and species that are known to increase.

Species richness by site increased an average of 14% and on 88% of sites there were at least as many species at reassessment as at installation.

There was recruitment on all 223 sites and for almost all species (96%) when considering populations of reasonable initial size (i.e. at least 20 individuals on each site).

DISCUSSION

No species appear to be disappearing from those representative areas sampled by WARMS sites. Furthermore, species known to be “woody weeds” are not increasing their population size or distribution at rates higher than those of species known to decrease under grazing.

Taken together, these results are impressive because of the consistency between sites, the consistency between species, and the scale of the improvement. They show that the shrublands of the Gascoyne-Murchison are not moribund and are capable of responding when circumstances allow.

The Gascoyne Murchison area received unusually high rainfall, particularly during summer, over the assessment period. There is no doubt that the high rainfall was a major factor in producing these results. Assessing the contribution of good pastoral management to these results is more difficult. However, discussion of causality is a second order issue to the fact that there have been substantial positive changes observed on all areas of the Gascoyne Murchison where data are available.

It may well be that the run of good seasons has allowed transitions to more desirable states for these representative range systems. The management challenge now is to maintain these improvements into the future and avoid making transitions back to less desirable states.

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