

Monitoring in the rangelands

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Citation

Watson I 2006, 'Monitoring in the Rangelands', paper prepared for the 2006 Australian State of the Environment Committee, Department of the Environment and Heritage, Canberra, <<http://www.deh.gov.au/soe/2006/emerging/rangelands/index.html>>.

Background

It is important to monitor and understand change in the rangelands so that effective actions can be taken to maintain ecological, economic and social values. Since most of the rangelands remain vested in the Crown, rather than as freehold land, government has a direct stake in tracking changes over time.

Rangelands in Australia cover more than 75 per cent of the continent and include a diverse group of relatively undisturbed ecosystems such as tropical savannas, woodlands, shrublands and grasslands. Rangelands extend across low rainfall and variable climates, including arid, semi-arid, and some seasonally high rainfall areas. Extensive grazing on native vegetation occurs across the rangelands while broadscale cropping and cultivation generally do not take place. Australia's rangelands are home to a significant number of rare, threatened and endangered species and include a number of World Heritage sites.

Some of the past and current management practices have proved inappropriate for the rangelands. These practices have resulted in vegetation decline, accelerated soil erosion, an increase in the number and distribution of weeds and feral animals, reduced water quality and decreased biodiversity.

The Australian Collaborative Rangeland Information System

Over the last 15 years there has been considerable interest at state, territory and Commonwealth levels for combined reporting of change in the rangelands across Australia. However, progress has been slow partly because each state and the Northern Territory collect data in different ways and for different purposes. In order to bring this disparate information together, the Australian Collaborative Rangeland Information System (ACRIS) has been formed. This is a partnership between the Commonwealth and New South Wales, Queensland, the Northern Territory, Western Australia and South Australia that aims to provide ready access to information on condition and change in Australia's rangelands (Bastin et al. 2005).

One of the first tasks for ACRIS was to embark on a set of pilot projects, one in each of the participating jurisdictions. The aim of these pilot projects was to determine how well existing data could be accessed and reported in a form amenable for reporting across Australia.

In Western Australia, the Gascoyne-Murchison region was chosen. The results show that there are some encouraging signs that pastoral rangelands have improved over the last decade (Watson et al. 2005). This conclusion comes from the Western Australian Rangeland Monitoring System (WARMS) maintained by the Department of Agriculture and Food. WARMS consists of a set of permanent sites on which attributes of perennial vegetation and landscape function are measured. These attributes are used as indicators of change in the rangelands more generally.

As defined for the ACRIS pilot project, the Gascoyne-Murchison region is made up of the complete Carnarvon, Gascoyne, Murchison and Yalgoo IBRA bioregions (Thackway and Cresswell 1995, Environment Australia 2000) as well as Province 1 of the Geraldton Sandplain bioregion. Within this area there are 785 WARMS shrubland monitoring sites and 71 WARMS grassland sites. The sites were established between 1993 and 1999. All the grassland sites and 700 shrubland sites were reassessed between 1999 and 2004.

In shrubland areas, the density of native shrub and tree species remained the same or increased on 70 per cent of sites. The density remained the same or increased for the majority of species (87 per cent). Recruitment of at least some native species was found on 696 of the 700 sites assessed. This recruitment came from nearly all species, where the population size was sufficient to expect some recruitment. The canopy size (an indicator of cover) increased on 82 per cent of sites and for 95 per cent of species. Most species (82 per cent) were found on at least as many sites at reassessment as at installation, suggesting increased local distribution. On 80 per cent of sites species richness was maintained or increased.

Both seasonal conditions and grazing management play a role in vegetation dynamics on pastoral areas. However, by comparing the observed changes with those expected under the prevailing seasonal conditions and by investigating the response of species known to be adversely or positively affected by livestock grazing it was possible to conclude that at least some of the positive changes observed could be attributed to benign grazing management, rather than seasonal conditions alone.

However, there are some caveats to this generally good news. There were some indicators of landscape function decline, even on sites where the vegetation changes had been positive. For example, the proportion of the sites which shed water and nutrients increased in comparison to the proportion of the sites in which water and nutrients were captured. Chronic degradation issues remain in a number of areas and insidious decline has been identified in many catchments (Pringle and Tinley 2003) some of which is not monitored by WARMS (Pringle et al. in prep.). These issues are not ignored. Rather, the Pastoral Lands Board relies on individual lease inspections to identify and act on specific degradation issues.

In grassland areas, 40 sites have been reassessed twice since installation. The results on these sites were more mixed than on the shrubland sites. On 15% of sites, perennial grass frequency decreased at both reassessments and on 68% of sites frequency decreased between the first and second reassessment. These changes occurred despite generally favourable seasonal conditions.

The region also experienced an increased capacity for change in recent years. This was assessed in a number of ways including the perceptions of pastoral managers, their confidence in the future, the financial health of many pastoral businesses and a range of on-ground actions. These on-ground actions include better control of grazing animals, relatively rapid and comprehensive destocking during drought conditions and improved landscape and ecosystem management (Watson et al. 2005).

As well as the Gascoyne-Murchison region, ACRIS has tested the reporting system across four other pilot regions (Gawler, Darling Riverine Plains, Desert Uplands, Victoria River District) and has developed a framework for reporting on change across different data types and regions, and can now develop the information system to report across the entire rangelands. Although the testing has shown that there is a decreasing information base for monitoring change, many information gaps, and differing quality and coverage of data across the country, it has been possible to obtain a glimpse of what is happening in the pilot regions, generally since the early 1990s.

- critical stock forage has generally improved
- the density of native plant species is stable in most areas
- landscape function was mostly stable although it decreased in some areas during periods of poor rainfall
- tree cover has decreased with clearing in 2 regions but other components of cover have remained generally stable
- census data shows that communities living in the rangelands are becoming less diverse and this may result in a reduced capacity for future change

The pilot projects finished in 2005. By 2007 each of the jurisdictions will report across the rangelands more broadly using the framework established within ACRIS.

References

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Further information

Further information is available at <http://deh.gov.au/land/management/rangelands/acris/index.html>