**The Australian Collaborative Rangelands Information System (ACRIS): Reporting Change in the Rangelands**

© Commonwealth of Australia 2013  
This work is copyright. Apart from any use as permitted under the Copyright Act 1968, no part may be reproduced by any process without prior written permission from the Commonwealth. Requests and enquiries concerning reproduction and rights should be addressed to Department of Sustainability, Environment, Water, Population and Communities, Public Affairs, GPO Box 787 Canberra ACT 2601 or email [public.affairs@environment.gov.au](mailto:public.affairs@environment.gov.au)

Disclaimer

The views and opinions expressed in this publication are those of the authors and do not necessarily reflect those of the Australian Government or the Minister for Sustainability, Environment, Water, Population and Communities, or other governments of participating agencies.

While reasonable efforts have been made to ensure that the contents of this publication are factually correct, the Commonwealth does not accept responsibility for the accuracy or completeness of the contents, and shall not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of this publication.

RANGELANDS: THE HEART   
OF AUSTRALIA

More than 75% of Australia is defined as rangelands. This area includes a diverse group of relatively undisturbed ecosystems such as tropical savannas, woodlands, shrublands and grasslands. Rangelands extend across low rainfall areas and variable climates, including arid, semi-arid, and some seasonally high rainfall areas. Extensive grazing on native pastures occurs across the rangelands while broadscale cropping and cultivation generally do not take place.

Australia’s rangelands are home to many communities, including around 150,000 Indigenous people, and have a strong emotional or cultural attachment for most Australians.

Rangelands are important in terms of:

biodiversity – representing the largest group of the nation’s ecosystems remaining in a relatively natural condition

income – much of Australia’s mineral wealth is derived from the rangelands – cattle, sheep and wool production, and tourism also generate income

social and cultural heritage – through their connection to country, Aboriginal people have deep emotional attachment to land while for non-indigenous Australians, the rangeland landscape is an intrinsic element of the social heritage of urban and rural folk alike

groundwater sources and major river systems – large artesian and sub-artesian water sources and iconic river systems sustain a diverse range of ecosystems and support production

clean and green food and fibre production – mainly through the absence of chemical additives and from the harvest of wild animal and plant products

carbon storage – contributes to meeting Australia’s international obligations for climate change and greenhouse gas emissions.

Value of rangelands to business and conservation

mining: the major revenue source (greater than $10bn a year) but difficult to accurately quantify its value to the rangeland economy)

tourism: approximately $6.1bn a year

grazing: occupies approximately 55 per cent of the rangelands

conservation: approximately 16 per cent of the rangelands are formally managed for conservation

countless heritage sites

home to many iconic plants such as mulga and spinifex and animals including the feral camel and bilby.

THE ROLE AND VALUE OF ACRIS

The Australian Collaborative Rangelands Information System (ACRIS), established in 2002, is a partnership between the Australian Government, CSIRO, Ninti One Ltd and those government agencies in Western Australia (WA), South Australia (SA), the Northern Territory (NT), Queensland (Qld) and New South Wales (NSW), responsible for natural resource management (NRM) and biodiversity conservation.

It collates and synthesises monitoring data describing change in the rangelands. This information assists the Australian Government, state agencies and rangeland NRM groups in meeting reporting obligations, planning investments to facilitate change and evaluating the effectiveness of their investments. ACRIS reporting is a useful education resource and a source of up-to-date data for researchers and the wider community with an interest in the environmental health of the rangelands.

ACRIS combines environmental, social and economic data contributed by its partners and other sources (for example the Bureau of Meteorology and the Australian Bureau of Statistics) to provide a more complete understanding of change in the rangelands, irrespective of state and territory borders.

Vegetation change between 1993 and 2011 at a grazed pastoral monitoring site in the Broken Hill Complex bioregion of South Australia.

The 2011 photo illustrates the loss of shrubs from 1993, likely due to drought conditions, at the same time grasses responding to good rains.

ACRIS has developed techniques for separating seasonal variation as a driver of change to determine the effects of grazing management on land condition.

Role in Australia

At the national level, ACRIS’ interpreted data provide useful context at regional to national scales for evaluating the success of programs such as Caring for our Country and the Biodiversity Fund to improve the health of the rangelands. As a simple example, maintaining acceptable levels of ground cover minimises atmospheric dust emanating from the rangelands that can adversely affect human health and economic productivity in coastal and urban areas.

State and territory governments benefit from the ACRIS partnership by:

seeing their monitoring investment, skills and data contribute to   
rangelands-wide analyses and syntheses beyond jurisdictional borders - experience has shown that this integrated  outcome is more useful for planning and evaluation than the common alternative: an often poorly connected set of individual reports

having improved access to the intellectual property of collaborating agencies - this can facilitate development of additional shared intellectual property such as the recent progress in objectively determining management-related change in remotely-sensed ground cover across large areas

greater consistency in monitoring programs as partners appreciate the benefit of more uniform and systematic methods.

ACRIS data has been used in national State of the Environment Reports in 2006 and 2011 and is considered to be an essential information source for future reports.

ACRIS reporting provides useful context for NRM groups’ assessments of outcomes from regional investments to address land management issues. Examples include: a standardised approach to ranking seasonal quality; regional indices of components of total grazing pressure; and recent fire histories. All can be important drivers of environmental change additional to investments targeted at changing land management practices and it is essential to understand such effects when evaluating the success of practice-change investments.

The Rangeland NRM Alliance, a partnership between 13 NRM agencies operating in the rangelands, has used ACRIS information to increase government and public awareness of the rangelands.

“The Rangeland NRM Alliance appreciates the support and involvement of ACRIS in its activities to promote and generate greater collaboration in natural resource management for the rangelands of Australia. ACRIS provides the Alliance with an excellent link to the best/only national collated information available on the state of Australia’s rangeland environment.” Kate Forrest, Coordinator for the Rangeland NRM Alliance

Our international role

ACRIS reporting provides relevant information to show Australia’s progress in meeting its international obligations, particularly the United Nations Convention to Combat Desertification (UNCCD) and the Convention on Biological Diversity (CBD). ACRIS offers a model for increased scientific rigour in assessing and monitoring desertification under the UNCCD. The publication, Rangelands 2008 – Taking the pulse, demonstrated the ability of ACRIS to assemble often patchy and disparate datasets, conduct higher-order analyses and synthesise resulting information into an integrated assessment of recent change in Australia’s rangelands. Recognising the success of ACRIS’ collaborative approach, there has been international interest from member countries within regional groupings of the UNCCD in adopting collaborative reporting approaches similar to the ACRIS model.

The ACRIS partnership approach to the collection and synthesis of data provides experiential lessons that can be adopted by other organisations. These include: initial activity must be focussed, facilitated and may require funding to support engagement; initial efforts must provide results that benefit partners so they continue with the collaboration; it takes time for partners to see the value in the process; and trust builds as results accrue and the process continues.

Dynamic and threatened systems

Rangeland environments respond to considerable climate variability which is a major driver of change in natural resources like soil, water and vegetation.

While rangeland ecosystems remain largely intact, past land use practices have a lasting effect and there is a continuing threat of the environment being further degraded, for example from:

poor grazing management of domestic stock

feral and native herbivores damaging and grazing vegetation

inappropriate fire regimes

weeds and other invasive species such as cane toads

introduced predators such as cats and foxes.

Much of the rangelands has multiple values, both monetary and non-monetary. For example, sustainable grazing of native pastures can maintain biodiversity, enhance aesthetically-pleasing landscapes that have ecotourism appeal and provide opportunities for carbon sequestration.

Maintaining and improving the ecosystem services that underpin these multi-functional values is now an important part of natural resource management. Ecosystem services provided by the rangelands include:

provisioning services – producing products such as forage for livestock and bush foods for Indigenous communities

regulating services – services that benefit other areas – for example, clean air above major coastal cities as a result of maintaining rangeland ground cover to reduce dust storms

cultural services – the strong cultural and emotional attachment that Aboriginal people have to country and continued cultural practices contribute to better health. Non-indigenous Australians experience iconic outback landscapes like Uluru and Kakadu National Park as part of a sense of identity

supporting services – the underlying ecosystem processes that allow provisioning, regulating and cultural services to be provided - examples include net primary production, habitat for biodiversity, soil formation and nutrient cycling.

What and How ACRIS reports

The Australian Government, rangeland states and the Northern Territory, and NRM groups conduct environmental monitoring for specific purposes, such as reporting on the management of pastoral leases. Collated data from these monitoring systems can provide information about ecosystem health.

ACRIS reports by bioregion: large, geographically distinct areas of land with common characteristics such as geology, landform patterns, climate, ecological features and plant and animal communities.

We use a simple framework for measuring and reporting rangeland changes. The framework (represented on page 9) includes three broad elements:

key drivers of change

effects on landscape values and ecosystem services

resulting effects on, and feedbacks from, socio-economic outcomes

The pulse of the rangelands

*Rangelands 2008 – Taking the pulse*, was a definitive report published in 2008. It brought together a range of disparate datasets to report change in Australia’s rangelands between 1992 and 2005.

More recent updates to this diverse information include:

pastoral land condition based on two indicators (landscape function and critical stock forage)

seasonal conditions as context for better understanding management effects on the rangelands

levels of grazing pressure from livestock (sheep and cattle), kangaroos and feral goats

fire history

atmospheric dust as an indicator of wind erosion rates and

change in protected area (areas reserved for conservation).

Rangelands 2008 – Taking the pulse and more recent information updates are available from: www.environment.gov.au/land/rangelands/acris/index.html.

ACRIS: A NATIONAL APPROACH TO RANGELAND ASSESSMENT

Governments agree that science is an important input to evidence-based policy.

Land managers using, protecting and restoring land need to know that what they are doing is making a difference.

Investors in land management programs, including government, need to know that they are spending money in the right areas to achieve better land management outcomes.

ACRIS contributes to these important activities through providing accurate, timely and relevant data and information. The ACRIS community is also actively addressing major information gaps so that it can continue to improve its understanding of change in the rangelands for the betterment of Australia.

Further information

To facilitate rangelands assessment, ACRIS collects, analyses and reports a multitude of information, too detailed for inclusion in this publication. Visit the ACRIS website at www.environment.gov.au/land/rangelands/acris/index.html to view recent information updates and Rangelands 2008 – Taking the pulse.

For further enquiries contact the ACRIS Coordinator, Gary Bastin, CSIRO Alice Springs. Ph: 08 8950 7137. Email: gary.bastin@csiro.au

More detail on some of the science underpinning ACRIS is available in the following papers:

Bastin, G.N., Stafford Smith, D.M., Watson, I.W. and Fisher, A. (2009). The Australian Collaborative Rangelands Information System: preparing for a climate of change. The Rangeland Journal 31, 111–125. doi: 10.1071/RJ08072

Bastin, G., Scarth, P., Chewings, V., Sparrow, A., Denham, R., Schmidt, M., O’Reagain, P., Shepherd, R. and Abbott, B. (2012). Separating grazing and rainfall effects at regional scale using remote sensing imagery: A dynamic reference-cover method. Remote Sensing of Environment 121, 443–457. doi: 10.1016/j.rse.2012.02.021

Eyre, Teresa J., Fisher, Alaric, Hunt, Leigh P. and Kutt, Alex S. (2011). Measure it to better manage it: a biodiversity monitoring framework for the Australian rangelands. Rangeland Journal 33, 239–253. doi: 10.1071/RJ10071 CSIRO