



The Australian Rangeland Society

RANGE MANAGEMENT NEWSLETTER

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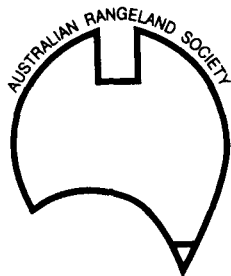
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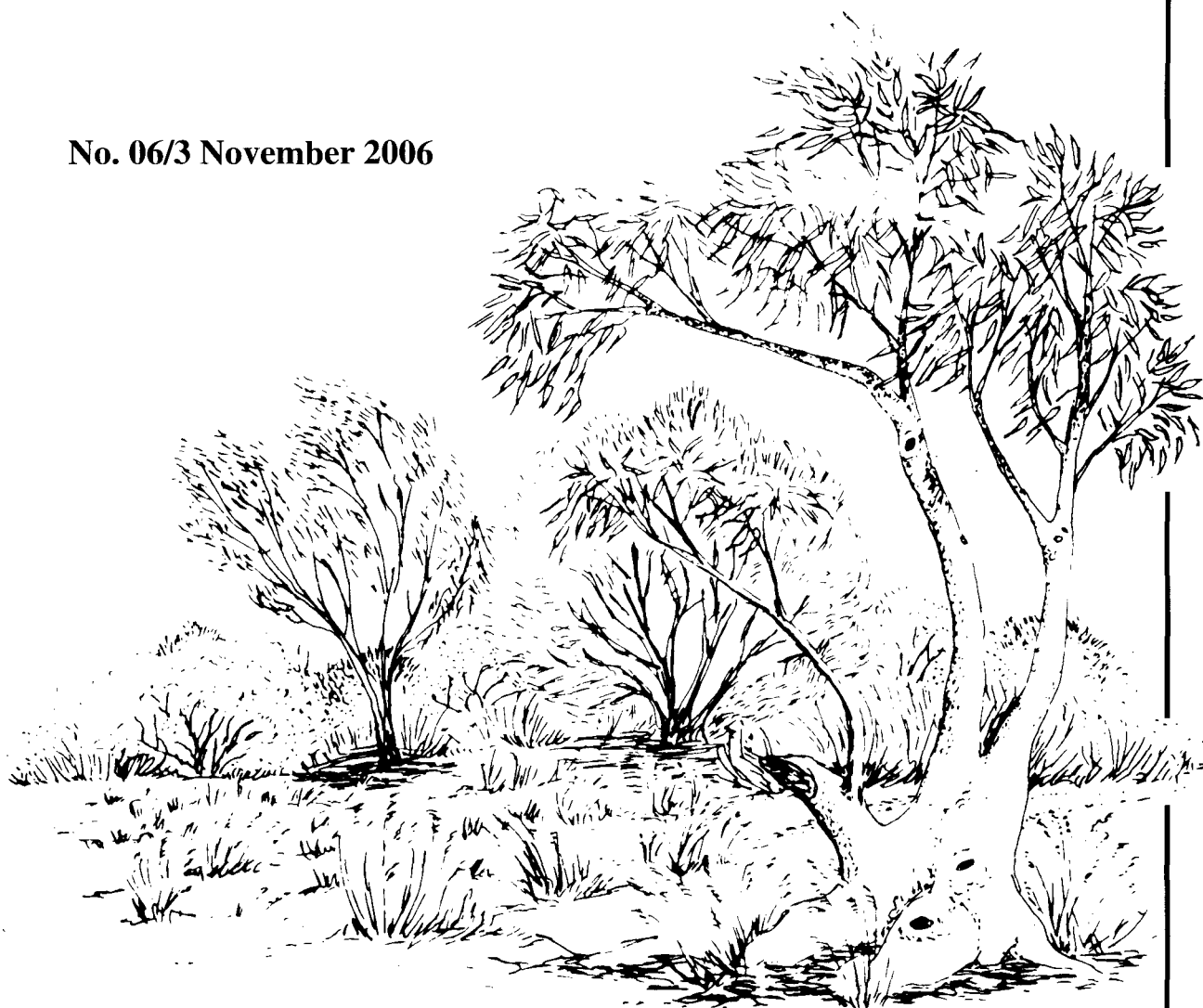
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FROM THE EDITOR

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Welcome to the November edition of the *Range Management Newsletter*.

This issue begins with an introduction of the new President of the Australian Rangeland Society, Dr Peter Johnston. Find out who he is and what he hopes to achieve during his term as President.

New technology targeted for use in the Australian rangelands is the subject of this issue's major article. Andrew Turk and his colleagues are currently investigating the application of a TV-based messaging system for use in remote desert communities. They are hoping that their system will be used in the future to assist in the dissemination of community information such as emergency messages (eg storms, bushfires etc), visits from agency members to local communities (eg health and legal workers) as well as sports and cultural information. This interesting article begins on page 2.

This issue also includes two articles relating to the ARS Biennial Conference, held in Renmark, South Australia back in September. The first article is the full transcript of the closing session of the conference. This session captured many of the major issues discussed at the conference – several delegates suggested that the transcript be included in the *RMN* for the benefit of those members who could not attend the conference. As a non-attendee myself, I certainly found it an interesting read! Additionally, there is a report from Robert Pearce, who was awarded an ARS travel grant to attend the conference. Robert, who works for the Natural Resources Conservation Service in California, gives some interesting 'outsider' perspectives on the conference.

Following on from this, I have included a number of short reports as well as the regular items. The reports include a very interesting review undertaken by Ben Norton of a book examining the Ecology of South Africa's Karoo Veld. Additionally, the Biodiversity Sciences group (part of the Queensland EPA) have submitted outlines of three current projects examining a range of issues relating to biodiversity (biodiversity values, condition assessment and management). Leilani Weier, from the Department of Primary Industries and Fisheries in Longreach, summarises the outcomes from the implementation of Environmental Management Systems in western Queensland.

The next issue of the *Range Management Newsletter* is due out in March 2007. To allow time for editing and printing, I would appreciate receiving your contributions by late January.

I hope you all have a happy and safe festive season. See you in 2007!

FROM THE PRESIDENT

In the closing stages of the Society's 14th biennial conference in Renmark, David Wilcox announced that I would be taking on the role of President of the Australian Rangeland Society. This followed one of those iconic ARS conference bus tours sitting next to David, enjoying his company and talking about all manner of things. I can remember at least two topics we discussed were the differing schools of thought on climate change and the lack of people rushing forward to take on the role of President. This short article is to inform the Society's membership that I accepted the role of President and to tell you a little about myself.

Who is Peter Johnston?



I work for the Queensland Department of Primary Industries and Fisheries and have been a member of the Society for about 20 years. My background is in pasture science and I spent much of my active research career working from Charleville, Queensland. This work involved the development of approaches to estimate the growth and use of native pastures, the estimation of livestock carrying capacities on individual properties and the harvesting of seed from native grasses. I gained a PhD in 1997 based on the livestock carrying capacity work.

I moved from Charleville in the late 1990's and after a short stint in Brisbane my family and I headed south to the Falkland Islands. Here I worked for the Department of Agriculture on pasture development as a means of increasing farm profitability. The environment was not too dissimilar to rangeland Australia (apart from the peaty soil, low temperatures and constant wind). A while later I took on the role of Director of Agriculture in the Falkland Islands, overseeing all aspects of rural development, agricultural biosecurity and the health certification of fish and meat exports. While only a small community (88 farms) and a small department (22 staff), we handled the same range of issues as any nation. It certainly taught you how to be resourceful.

In my current and less-active role I drive a desk in Brisbane's CBD in the small Research and Development

Strategy group that oversees the Department of Primary Industries and Fisheries investment in research and development. In this role I oversee R&D investment in the forestry and intensive animal areas (quite different to previous experience). Other interests lie in the development of collaborative approaches to solving multiple land use issues - my membership to ARS being a key to remaining in touch with the rangeland dimension of this area. I am also interested in the role of food within families, communities and the economy in both developing and developed countries. I am married and have two young children.

Hopes for the Society

These are challenging times for the survival of small societies and associations as memberships decline or at best remain static. Members and potential members are faced with many competing interests and are increasingly mobile in terms of career paths and industry pursuits. For me, the ARS has four key elements that have sustained my interest, making it a society that I believe is worth belonging to. These are the conference, the journal, the newsletter and the network.

The conference is pivotal as it is the main occasion when members and colleagues can meet face-to-face to share ideas, concepts and approaches to addressing issues facing Australia's rangelands. The conference establishes, nurtures and reinvigorates the network and is small enough to effectively achieve this. It brings together a diverse range of people and a diverse range of views and experiences. This diversity is a strength of the Society as there are few other forums that cultivate such diversity. The fact that the Society cannot always form a consensus view on a topic is a strength. The strength lies in the fact that a discussion has been had and that a range of views have been aired.

Between conferences, the journal and the newsletter provide the formal links in the network. Of equal importance are the informal networks between those who have an interest in Australia's rangelands are effective in sustaining. As President my goal is to work with the Society's Council and membership to build on the strengths of the Society - the conference, the journal, the newsletter and the networks, and to continue to utilise new means to do so. I welcome your ideas on how to achieve this.

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DIRT RESEARCH PROJECT TRIALS SYSTEM TO SEND MESSAGES TO TV SETS IN REMOTE INDIGENOUS COMMUNITIES

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Overview

The Desert Interactive Remote Television (DIRT) project is a collaboration within the Desert Knowledge Cooperative Research Centre (CRC) of the University of Wollongong and Murdoch University. In the early stages of the project, assistance was also provided by Imparja TV and OPTUS.

The DIRT project seeks to address current problems in sending effective messages to remote desert communities. It fosters innovation by bringing together market needs and resources; new technologies and infrastructure; and interdisciplinary research and development expertise. The market in this case consists of remote Australian desert communities. The new technologies are satellite television broadcast and satellite broadband access, currently deployed across Australia. The researchers have brought to the project expertise in telecommunications and television broadcasting, Australian Aboriginal community development, and human computer interaction. The goal of the project was to combine and apply these elements to answer the question: Can new satellite TV broadcasting and broadband access technologies be used to increase the sustainability of remote Australian desert communities?

There are hundreds of remote communities in Australia, mostly Aboriginal and ranging in size from a couple of hundred people to very small, sometimes temporary, communities of a few families. Residents of these communities have very poor access to services and communication (especially about health, education and economic activities) is a key aspect of community sustainability. For example, it can take a few days and a few thousand dollars to send a doctor to a remote community; so it is important that as many people as possible are aware of the visit. There is also considerable need for messages to be sent between communities and within larger communities, for example, to arrange cultural "business".

The research started from the premise that TVs are more common in remote communities than computers, and hence could be a more available and more easily

used messaging medium. The project work sought to investigate the viability of this proposal by understanding stakeholder needs and developing and evaluating a prototype messaging system which addresses these requirements in an efficient and effective manner.

TV Reception in Remote Indigenous Communities

Remote desert communities receive television in three ways. The first is Direct to Home (DTH), sent over the Optus Aurora platform and received via individual satellite dishes and Set Top Boxes (STBs). DTH is used in very small communities, e.g. eight houses or less. The second method is community re-broadcast (CRB), used in larger communities. Here satellite TV programs are received at one central satellite dish, then re-broadcast over analog channels by low power transmitters. The third method is satellite pay TV, which provides pay TV (Austar or Foxtel) programming to a limited, but increasing number of viewers. For this project, our key focus has been community rebroadcast (CRB), as it is by far the most common delivery method for remote indigenous community TV. Figure 1 summarises the DTH and CRB approaches.

Survey of Media Use

A key part of the project has been identifying and establishing relationships with suitable and interested remote Aboriginal communities. The Ngaanyatjarra Lands communities of Irrunytju and Kanpa in the remote eastern part of WA (see Figure 2) agreed to participate. Irrunytju is a larger community (about two hundred people) where the Ngaanyatjarra Media operations are located and in-community rebroadcasts (CRB) are used for TV. Kanpa is a much smaller community, utilising DTH TV reception. Working with these two communities provided a balance of circumstances for review of the DIRT messaging prototypes. Approval was sought and obtained for this research collaboration from the Ngaanyatjarra Council

Current communication problems and potential solutions were investigated through workshops, interviews and observations. Community residents, administrative staff, and external agencies and service providers were involved.

Given the near-complete lack of knowledge of Aboriginal TV viewing habits, a survey was undertaken to:

- understand current communication practices and problems;
- understand existing TV viewing practices and preferences;
- gain a deeper appreciation of relevant cultural issues (including language) applicable within the communities;

- establish relationships of trust with members of the community; and
- raise the profile of and community interest in the DIRT project.

Among the most interesting results of the survey about viewing habits in the remote communities was the finding that, although respondents enjoy a diverse range of programs, content featuring local people and activities rates most highly. TVs are often left on for most of the day, and people often watch in groups of five or more. The survey also investigated communication “channels” (methods) that people in the remote communities use for a range of typical messages. TV viewers receive almost no information on the topics identified in stakeholder consultations as the most relevant to community messaging needs.

Figure 3 shows the range of relevant message topics (out of a total of 8) communicated over each potential messaging channel. Very few messages are currently sent via TV. This demonstrated that there is great potential for using TV as a means of presenting messages. In remote communities, the proposed television-based system may have significant advantages over internet, fax, and community notice boards, for example:

- TV is in people’s dwellings, while other communication means are not;
- TV is familiar, alternatives less so;
- TV is immediate, increasing impact;
- TV may be more suited to oral cultures because it can deliver messages in spoken voice format, along with relevant images/video;
- TV messages are delivered to groups of people (those watching a given television set), where email and fax tend to be delivered to individuals (although faxes are sometimes displayed on community noticeboards);
- Notification of TV messages occurs in the course of daily activities (watching TV or activities in the house with the TV on) whereas other mediums need development of new habits of actively for checking information outlets;
- TV messages can be coordinated with TV content in order to target specific audiences (e.g. people interested in football, people interested in culture, people interested in music, etc).

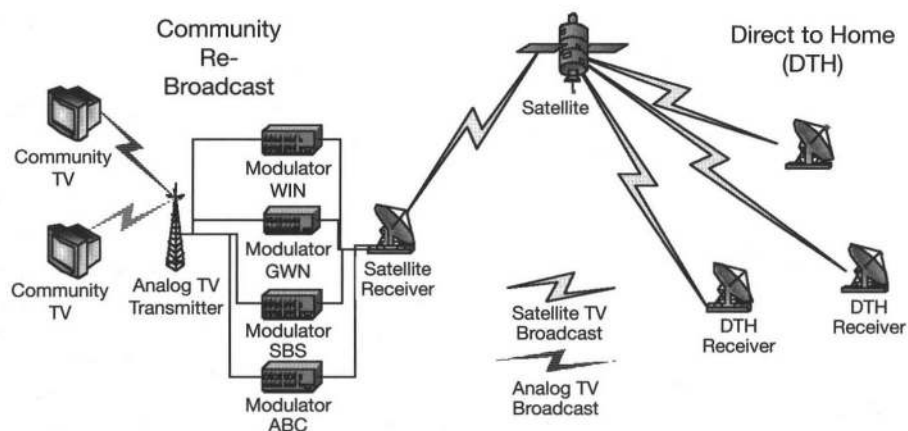


Figure 1. Community rebroadcasts (CRB) and Direct to Home (DTH) TV Reception

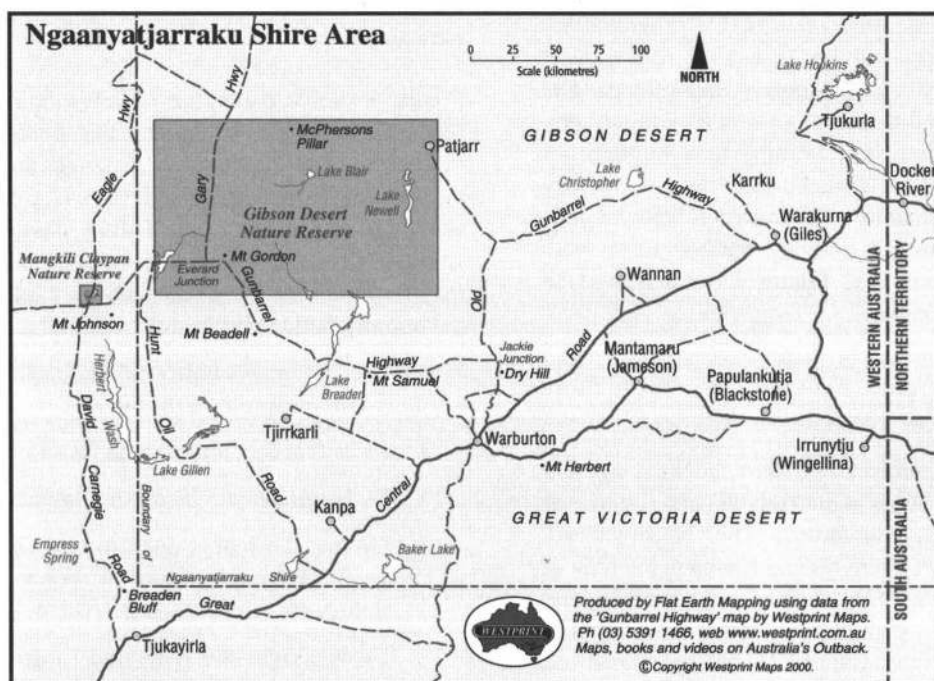


Figure 2. Ngaanyatjarra Lands (map supplied by Westprint – www.westprint.com.au).

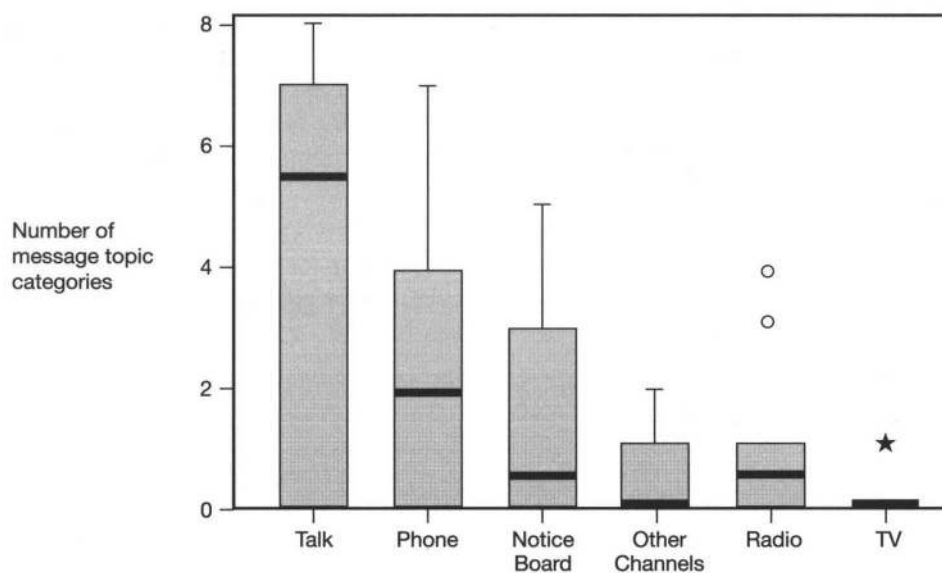


Figure 3. Communication Channel Use for Range of Message Topics

Trial of Prototype Messaging System

In response to the identified messaging needs, the researchers developed a prototype system called "GoDot," the key aim of which is to provide a low-cost messaging service viewed on remote community TV sets. Messages can be generated locally, within communities, or remotely by agencies or service providers, then delivered to television broadcast points via satellite broadband (or terrestrial broadband, where available). The messages incorporated in the initial 'GoDot' prototype are of four basic types, as follows:

- **Emergency Messages:** These messages would be generated by emergency management organisations (Bureau of Meteorology; fire service; police; etc) to alert remote communities of potentially dangerous situations (e.g. severe storms; bush fires).
- **Agency Messages:** These messages would originate from government agencies (e.g. Department of Health and Community Services), or other organisations registered with the 'GoDot' system (e.g. community support NGOs). They would relate to the delivery of services to particular communities (e.g. providing details re a forthcoming visit by health workers or legal case managers; etc).
- **Sports and Culture Messages:** These messages may come from sporting associations (e.g. regarding a forthcoming football carnival) or could be generated by a community group wishing to advise others about a cultural or other type of community event (e.g. concert; funeral).
- **Targeted Advertisements:** These could be government advertising messages (e.g. health promotions), ideally community (or language group) specific - using appropriate language and featuring people and places familiar to the community. The impact is further improved if the community participants are involved in the creation of these messages.

The system used for viewing the messages on community TV sets has two key elements:

- An incoming message alert system, comprising transparent icons (or "bugs", similar to station IDs) overlaid on to the broadcast channels. The format and timing of these icons will be controlled by the DIRT system.
- A separate analog channel, which carries the actual messages, in a continuous loop.

To view and hear the messages, users switch to the separate messaging channel, wait until the desired message has been played, before returning to the previously viewed channel. This provides a basic level of interactivity, where the users view and hear messages due to prompting from the overlaid icons on the broadcast channel. The audio/video content of these messages is a big improvement on text only messaging, as many Aboriginal people understand spoken English and spoken Aboriginal languages much better than text. Audio can be provided in the local language. A set of 4 or 5 main languages should cover the majority of people in the central Australian region, although there are many more local languages (at least 15), since most people are multi-lingual, at least to some extent.

Standard TV broadcast equipment does not allow to combine icons and other message alerts, delivered via the Internet, with off-air satellite TV broadcast. Hence custom infrastructure to do this has been designed and built at the University of Wollongong. The key component of this equipment, the Hauppauge Nexus satellite receiver card, provides the required reception, conditional access, MPEG decoding and TV signal generation capabilities. These cards fit with standard PC infrastructure and are relatively cheap to implement. Figure 4 summarises the technical infrastructure for message insertion at the TV re-broadcast station in a remote community.

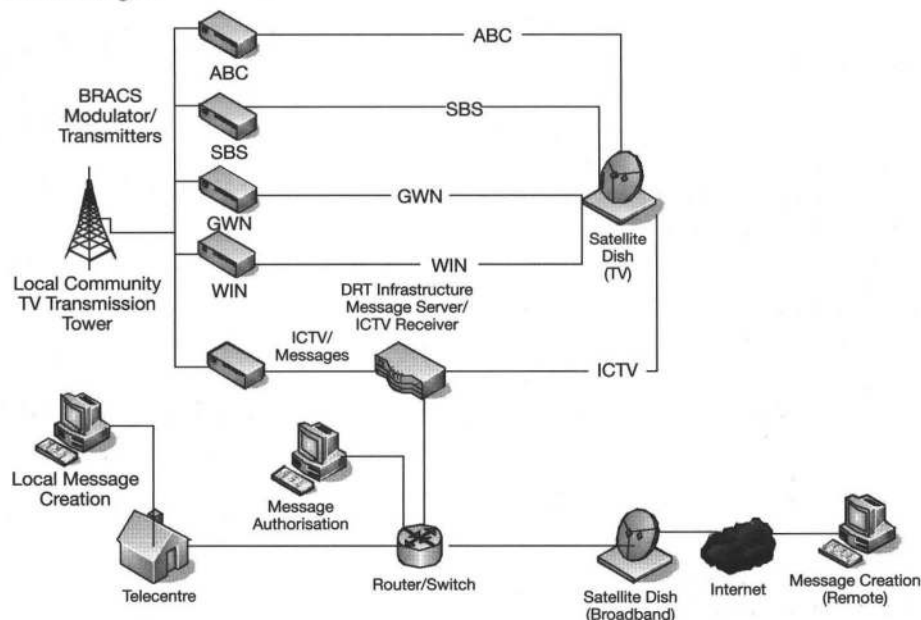


Figure 4. Infrastructure Used for Message Insertion

Within a community rebroadcast context, however, the overlay of icons on to existing broadcast channels raises significant licensing issues, as the community rebroadcast license (currently) specifically prohibits changes to content. Hence the researchers have also developed a simpler approach, where messages are seen on the Indigenous Community TV (ICTV) channel only. This channel is covered by a community license, which allows this local message insertion. The timing of message insertion would be determined by the communities, not the ICTV broadcaster. The proposal is that actual ICTV broadcast is delayed locally (i.e. stored in a similar manner to a Personal Video Recorder) while messages are played out, resuming after the messages are finished. As a result, viewers do not miss ICTV content. There would be a once per day correction to the local ICTV broadcast, done when viewers are unlikely to be affected (e.g. 3 am), to return the receiver to real time reception.

In November 2005, the researchers visited Irrunytju to conduct trials of the prototype TV messaging system and a further trial was conducted in March 2006 at both Irrunytju and Kanpa. Feedback from community members and administrators was positive, indicating that a messaging system would be quite useful, provided it was low cost and easy to use. It was clear that the DIRT system has good potential to improve both the reception of messages (from external agencies) by community members and the generation of messages within communities.

The generation and co-ordination of messages from external agencies will be facilitated by a shared easy-to-use communication 'clearing-house'. The 'GoDot' system proposal was developed by the researchers to assist such collaborative messaging by incorporating standard message formats and data entry via a website. The proposed message composition and distribution facility is called "GoDot Central". Messages of various types could be sent to this website by external agencies and Aboriginal communities, with details of when the message should be sent and to which community or communities.

Proposed Future Research

Although the project has provided 'proof-of-concept', further research is required to develop the community rebroadcast (CRB) messaging system to the stage where widespread implementation can occur. The additional research will include:

- development of a message creation and distribution website ("GoDot Central");
- extended pilot study incorporating real-time message creation by stakeholders (sent to multiple communities);
- further development of system hardware and software; and
- study of appropriate protocols for message generation and authorization.

Funds are available from the Desert Knowledge CRC to permit this proposed further research activity, provided matching funding is available from another source. This additional funding is being sought. In addition, if new funding was sufficient, follow-on research could develop the potential Direct-to-Home (DTH) TV messaging system, which would be able to target individual TV sets.

Conclusions

The research carried out to date under the DIRT project has identified a number of communication-related factors which impact on the sustainability of remote Aboriginal communities. The prototype system development and trials carried out to date indicate that the proposed TV-based messaging system has the potential to significantly improve communications in key areas. It is likely also to enhance collaboration between government agencies servicing remote communities, and possibly also between those agencies and NGOs and commercial organisations. This would be part of the function of the GoDot Central. The expected outcomes of this system are increased social capital within the region, developed through more efficient and effective communication, leading to enhanced sustainability of remote communities.

Don't Forget!

The VIII INTERNATIONAL RANGELAND CONGRESS

is on from
29 June – 5 July 2008
in Huhhot, China

Further details are available from the
conference website –
www.igc-irc2008.org

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14th BIENNIAL ARS CONFERENCE, RENMARK, SEPTEMBER 2006

Transcript of the Closing Plenary Session Chaired by Dr Carolyn Ireland

[Ed. – Many conference attendees suggested that a transcript of the closing plenary session be included in the Range Management Newsletter. They felt that this session captured many of the directions and viewpoints expressed during the conference. The transcript has been edited slightly to improve readability.]

Carolyn Ireland (Session Chair; SA Arid Lands NRM Board and Pastoral Board of SA)

What a marvellous time it's been, listening to everybody talking about Rangelands and all the things that go into making it such a special place. I've invited two of our three daily musterers and a scientist to join Barney and I on the stage today.

Paul Williams will start from a pastoralist's perspective. George Cooley will follow him with the Indigenous peoples' perspective on this Conference. From a scientist's perspective Ian Watson will conclude this part of the session. Barney Foran, who opened the Conference, will give us a wrap-up for about 10 minutes with his perspective on where we've come, from Port Augusta and from the beginning of this Conference. He has a few worries to present to you and also a few very positive things to say.

Paul Williams (Sturt Vale Station, SA)

Yes, it was interesting and is always interesting and very thought-provoking to come to these things. I certainly enjoyed the session this morning and I'd like to state that I think I've got the message. I don't know whether that's being a bit simplistic, but I do get frustrated sometimes when people continually try to find excuses when the evidence is before our eyes about what's happening, and, sure there is always going to be erosion, it's part of the natural ecosystem, and there are going to be run-on areas and run-off areas and lack of nutrients at the top of the catchment. I can't understand how anyone can't see that the cloven-hoofed animals that we manage are an integral part of speeding up that process, or at least have some effect on that process.

However, I think as long as we're all prepared to open our minds to the other person's perspective and point of view, and maybe modify and come to some compromise, it's all worthwhile.

George Cooley (Alinytjara Wilurara NRM Board)

Thank you, people from all over Australia. All of the Rangelands, no matter where you are, don't get offended. When we finish the Conference, remember it, because in two years' time it will be several hundred people ... maybe the same ones ... but maybe different.

Reflecting on the past few days, networking is people. I spoke to quite a few people I've met, and there are many more that I've not met. Making contact with people, for me as an Indigenous person, that's something that needs to happen a lot more. We have our own Indigenous forum where we all meet each other. On the other hand, the few white people who attend, they feel frightened the same as I feel. We need that contact to continue, especially for the next Rangelands Conference.

I'm not an academic or a technical person but the things that I do know best is to tell you in the way Indigenous people do – in fables. Another word for fables is dreamtime stories.

I'm going to tell you – just a brief thing, and hope that you can get the picture when I tell you this little fable. It goes like this: when I look at everyone here and think – what a great and wonderful bunch of fruits, raisins and nuts! When I look at myself and my people, with this bunch of fruit and nuts and raisins, there is an ingredient missing, and that's flour. There's flour missing. I look at myself as the flour, my people as the flour. I'm baking a cake here, and you don't need imagination about what sort of cake I'm baking. I'm baking a fruit cake ... can you see the picture?

The last three days we've mixed our cake. We've mixed all these ingredients, this wealth of information and innovations that we have. We're mixing this cake. I believe many of my people are the flour. The reason I say that is, that in this country, in the area of the Rangelands, Aboriginal people are probably forgotten. Aborigines tell us that we are the earth, we have a relationship with the earth, the environment, bio-diversity – it grows upon us. You can see that – and so, that's where we are and that's the reason why I'm baking this little cake to describe it in a little parable. The thing is, the wave that is coming in this cake, in this ingredient and things that are happening in the future, in baking that cake people are becoming more helpful in that area and people are tending to go for and develop or bake multigrain bread, and us being the flour, the multigrain bread that they're baking is probably brown bread! And what I'm saying is that if you don't add us and mix us into the ingredients, we won't have this wonderful cake, the Rangelands Cake. You can see the little story now?

I see in the whole area that we've baked these cakes, and in the next couple of years till the next Conference happens, we're going to cook it! And we're going to see how it comes out in a couple of years' time. Whether it's going to be overcooked or undercooked, or what ever.

The other thing is that, if you don't mix these cakes together, these ingredients together, you're just going to be a plain sponge cake. When I talk about sponge cakes, there's a couple of territories that are probably sponge cakes in this country. I won't mention the name Canberra!

Ian Watson (WA Department of Agriculture and Food)

My brief, as I understood it, was to comment on the quality of the science presented at the conference. This

task was given to me at Banrock Station last night so, I went around the room and asked a number of people what they thought of the quality of the science presented here.

The answers were all fairly similar. A lot of them said, "Not much". Some said, "What science?" A couple of people said, "Do you want me to be honest or not?" So that's not such good news, but I guess there are a few reasons for that. Maybe (1) not much really good science is being done in the Rangelands any more, or maybe (2) the Rangeland Society Conference is not where it's being presented, or maybe (3) the presentation of the science was clouding the quality of it, because of the need to provide to a much broader audience. The answer of course contains elements of all three.

I think we are going through a natural cycle. Some years ago I think the science was outpacing the application of the science. A lot of it was good quality science but it wasn't particularly useful and it wasn't being applied particularly well. So I think we're now much better at applying the science and doing science which is almost immediately relevant to practitioners, if you like. We are doing a lot less of the "airy-fairy" stuff, but the downside is, we're probably dropping a bit in terms of the quality of the science, and it's a matter of balance. Someone said to me last night that they thought that the science was falling between two stools (classical vs applied), and I must say I agree with them.

Having said that, my impression is that we're much, much better at what I suggest is integration science, or multi-disciplinary science, and probably not doing anywhere near as much of that classical replicated science. Replication and other reductionist techniques on their own don't guarantee good science but they're indications that people are doing that more classical stuff. We are doing a lot of reporting and describing, but not so much explanation because of a lack of mechanistic (often reductionist) science.

A few people said that there is some pretty good evidence that there is disrespect for the scientific process. Because something worked in a single spot or a single place, therefore it should work everywhere, i.e. no need for the science to be repeated under different conditions. There were a number of anecdotes told to me last night of science being repeated, stuff that had been done 10 or 15 years ago is being recycled. Someone said to me that if scientists couldn't find old stuff on the internet, it never happened! It didn't exist!

The reason for this disrespect is, to some extent, that the State agencies have stopped doing a lot of the basic science and science is not important to them. Several people also said to me that they were being "ground down" by funders. Funding obligations placed onerous pressures on scientists; short term funding meant short term trials and therefore no chance to test over a long period of time through different seasonal sequences and that sort of thing. A few academics told me that the work loads on academics in terms of their lecturing has meant that they don't have the time they used to have to put into the post-graduate students; therefore we may be getting less well trained post graduates coming through.

I read somewhere once that you don't win Nobel prizes for providing the right answer, you get Nobel prizes for asking the right questions. I don't think at this Conference, we saw too much in the way of paradigms being shifted, and in fact, there are not too many paradigms being challenged. A few others said that we're becoming too nice. That we've lost a bit of the "mongrel" that we used to have. We're not arguing enough about the science. We're not questioning the results. We're not questioning the methods.

Yet others have said, in terms of suggestions for the next Conference, that this sort of forum makes it difficult to ask those really hard-nosed questions, because it's a bit intimidating with an event this size. It would be good to have a session, an argument session if you like, where it's safe to be combative without being rude.

So I guess I'm labelling the new science "quick and dirty" science, and the old stuff, bullet-proof. We used to do lots of replicates and really well done classical science, but that bullet-proof science is costly, it's time consuming, it's often long-term. The results might be bullet-proof but they don't necessarily meet the needs of the practitioners and they don't fit particularly well within an adaptive management framework. Someone made the point to me quite late in the night that actually, this "quick and dirty" stuff is a good way of fitting into the adaptive management framework. It is quick and dirty but it throws up, in a sense, more hypotheses.

An observation by someone else was that to some extent, the high-tech solutions that people are using these days have replaced the time and the energy and the funds and the people that used to be put into doing the classical science. I think it's one of the trends we've observed. The classical science is to some extent being replaced not by people doing it, but by people using the high-tech solutions.

To finish up, someone else said to me, towards the end of the evening that they thought the quality of the science was better in the posters than it was in the presentations. I had a quick spin around there this morning and I think that may be right, that my more negative views were probably formed by sitting in the audience listening to the presentations. Actually, we're still doing it properly and the posters prove it, there are post graduates coming through and we're just going through a different phase of Rangeland science.

Carolyn Ireland (Session Chair)

Thanks to all of those speakers. I do want to promise you that all of you are going to have a chance to join in after Barney's had his say. What we're going to do is run it much as conversations between all of us so if you've got someone out there that you'd really love to ask a question of, then go for it!

Barney Foran (Centre for Resource & Environmental Studies, ANU)

Almost before I start, I have some random advice to presenters. If you've got 10 minutes, that's 10 slides. Get over the method and bloody quickly get into the results,

give us some meanings and don't be timid. You've got nothing to lose but your job and your research funding!

First of all, I thought from my overview, which was my job, that there were eight areas that were *simply wonderful*. This is a broad sweep.

First of all there was the monitoring in the Rangelands. There were at least 15 areas of talks and posters, and I think we've come a long way, especially in the spatial exposition of what's going on.

Secondly, and Ian has already said it, the posters and products in the stands were of uniformly high quality and many of them are backed up by extensive websites and all those sorts of things.

Third area; "Livestock Studies in Northern Australia", I thought that was a great session. There was a huge amount of stuff that, unless we got to the posters, we didn't see, taking it right down to the plant and the tiller. The big question, "How are we going to get that out?" I had a note that if we can do "Lantana the movie", on a bloody weed, then "Mitchell Grass the movie" has got to be a bloody winner!

The fourth area is that I think that our integrating approaches are going very well. We started on the first day with the AEMS farm solution thing, environmental management systems, PaddockGRASP by Hacker and Thompson, and I love the saying by Ron Hacker's co-developer, "The day I buy them is the day I sell them as well." There's a huge amount embodied in that little one liner.

The fifth area; systems of governments and influence. I was particularly impressed by Russell Gorrard's paper, "Markets for Bio-diversity Outcomes" and the way he put a simple scheme that was linked dynamically to the state of the Rangeland and what system you were at. Philip Young this morning and "Sharpening the Saw" with Angus Whyte and his co-drivers when performed succession planning - there was a whole theme there of governance and influence underneath.

The sixth area I'm calling "Impediments and Perversities". I loved Alan Padgett's paper on the way we really are two systems of what property rights are in this country, and the perversities and how we can get away with it in a modern world. "Fences" by John Pickard and the paper on bio-mimicry and so on; there are a whole lot of random, strange things that we don't have control of yet. It's absolutely essential to get them.

The seventh area; there are still some great process studies being done. They were in the posters. There was one I particularly took to which was "Cyano-bacteria and nitrogen mineralisation", but there was a lot of stuff in there, back to Ian's point, the science underneath this broad scale is obviously going on at the moment.

The eighth area is what I call "Philosophical Status and Rigor". I loved Annabel Walsh's initial paper in which she was talking about what's driving my whole system and myself and my family and so on.

A quick element from Craig Miller when he was talking about resilience theory and finally putting some numbers

on it for some big questions, and I thought the first session today, where we were re-examining the paradigm and making ourselves feel uncomfortable ... I thought that was really well done.

I have six major worries and I have primed three people in the audience. The first point was, I think we're losing our historical knowledge, and there's a lot of reinventing the wheel going on. I talked a lot to John Taylor about that, and Rangelands Australia, with its new courses is actually re-focusing and re-framing a lot of our knowledge, but there's a key issue there that I think is a problem.

We've just had that first session this morning, and someone said to me, the more we know about land condition the worse our landscape's becoming, and I was going to call on David Orr from the Eastern side of Australia to jump up and say something pithy and hard-hitting.

David Orr (Department of Primary Industries and Fisheries, QLD)

I've been around in Rangelands for over 30 years and I think we've developed a fair body of knowledge about how the arid land ecosystems work, and as I drive around the countryside, particularly in Queensland, I'm amazed that the level of knowledge we've got is going up, and the condition of the land is going down. We've got to address that disparity.

Is it not knowledge limited

Barney Foran (Centre for Resource & Environmental Studies, ANU)

We continue to be locked into the old paradigm; the Rangelands as seen through the sheep's mouth. Where are the new modes of activity and the real way in which we try to start to build a totally new Rangelands? I asked Mark Stafford Smith to give us a few sentences on that one.

Mark Stafford-Smith (CSIRO Sustainable Ecosystems)

I think that it has struck me in this meeting that in some ways I feel we've withdrawn slightly from the attempts to broaden the scope of the issues that we face. Listening to George just now, that multigrain bread seems to me to have three broad ingredients:

- one of them is recognising what the competitive advantages of these landscapes are and trying to think about how one captures those in a much wider sense than we do at the moment.
- From that comes the second thing - thinking more about the businesses that one can derive from the competitive advantages, which absolutely has to have sustainability and engagement across cultures and everything in it. But the bottom line is that people have got to have a livelihood or a living out there.
- Thirdly, behind all of those things are the communities, agencies and all sorts of alliances and networks that create critical mass, so that we can have a voice, so that we can reach out to markets, and we can do all sorts of things that were talked about in that previous session.

Barney Foran (Centre for Resource & Environmental Studies, ANU)

My fourth point is; who runs the Rangelands these days? What institutional structures should we be looking to as the new repository of both the short and long-term skills and implementation?

Rory Treweek (Western Catchment Management Authority)

Thank you, Barney. I think the creation of the regional Natural Resource Management (NRM) bodies right throughout Australia are probably going to be the leaders in the field in the future. There are a couple of aims that we want to get through to both State and Federal Governments, and I think we're getting there. One is that NRM is a long-term activity. It needs to become a line item in both State and Federal Government's budgets. It cannot bounce up and down on three-year funding. It just doesn't work. We've had the lesson recently of the gap between Natural Heritage Trust-1 and NHT-2 and that virtually lost all of us credibility wherever we worked throughout Australia. One of the things we're hammering away with our funders, the State and Federal Governments, is we've got to have monitoring, evaluation and reporting systems that match across areas, so that when somebody, at the property level, is reporting on a project that feeds up to the catchment level, to the State level, to the Federal level, there is something we can work on right across Australia. But I do think that the NRM model is accepted by the Federal and State Governments now and the Regional bodies, I believe they will be leaders in the future.

Barney Foran (Centre for Resource & Environmental Studies, ANU)

My fifth worry actually very nicely comes after that and it's a scientific one, the way I put it, "Where are the Engines of Inference?" How we draw all of this stuff together and bring it out to big rules of thumb that are really deep in science but really wide in applicability. I thought Ian Watson's paper on WARMS Monitoring was simply terrific. Conversely, Hugh Pringle says all the sites are in the wrong place. They've got a piece of good news and a big piece of bad news; that's the way we go forward.

My last point, I think Ian already brought it out as well, that we're losing our passion and our influence. I know at a previous Rangelands conference, the one in Kalgoorlie, one of my co-combatants king-hit me in the pub, such was the level of passion. Perhaps it was backed up by testosterone as well in those days.

Carolyn Ireland (Session Chair)

Some thought-provoking things there, and if that hasn't stirred up some questions then I'm ashamed of you all.

Angus Whyte (Wyndham Station, NSW)

I'd be interested to know how many people have done a Low-stress Stock Handling School? It's about dealing with living animals, including humans. The way you move a mob, flock, herd, community, is you guide and

support the leaders and take a predatory approach to the tail. This approach can work within our community, however we always look at taking the predatory approach to the tail, not guiding the lead. That will guarantee us a minimum standard.

There's very, very little focus on lots of things we do, about guiding and supporting for leaders and giving them the confidence for moving in a shared and agreed direction. So, with that sort of thinking, we'll have to throw out there to people, how do we encourage land holders to accept some of the things that Hugh Pringle and Angus Hopkins were talking about, because I agree with them immensely, and it's only through accepting that that's where we are, that's enabled us to change and move forward. How do we encourage people to do that?

It's like Alcoholics Anonymous - like George mentioned, and maybe there are plenty of us here that should move in that direction anyway, but we just need that sort of comforting support and encouragement for people to make that really, really difficult decision. Yes, they are in a degraded state. Let's move on. So I'd like to throw that out to people that will need to think like that.

Paul Williams (Sturt Vale Station, SA)

Well, I always tell my blokes, the mob will only move as fast as slowest sheep, because if you keep dropping off the tail, you'll only end up with one in the end. So I don't know about this predatory approach to the tail, are we talking the same speak from a different angle or what?

If they're weak and they're crippled and they can't walk any faster, which a lot of us are being forced that way economically, I suppose, do they get dropped off and get eaten? The second part of your question was the support that needs to be given for people to be nurtured and headed in the right direction, so I think the heading in the right direction bit, I totally agree with. I don't know how we get around to eating them or nurturing them. It's one or the other, isn't it? I suppose if you fatten them up enough, then you can eat them!

Joe Pappalardo (Department of Natural Resources, Mines and Water, QLD)

Just a general question along the lines of what's being said, I'm interested from Hugh and Angus, I think one thing that didn't come out in their presentation - the EMU projects had a whole lot of really good implications and stopped dead. The real issue was, what was the impact on those land holders in that area?

Angus Hopkins (Department of Conservation and Land Management, WA)

We dealt with about 17 million hectares of pastoral country and the 60 odd properties that were involved; all of them became incredibly enthusiastic. All of them, without exception, changed the way they thought about the land and about the way they actually managed. A lot of them began de-stocking when the drought came along. A lot of them began projects like fencing off the entire frontage of the Murchison River. Some pastoralists were fencing populations of rare plants. Amazing things

began happening. The best thing about it was that they all became incredibly optimistic. They all saw that through this process of change, they had a future.

We did a thing called "A Rangeland's Resource Atlas", so on line, all of those pastoralists and other people interested in going to the Rangelands could access information that told them about where trucking industries were, where the abattoirs were and all of those sorts of things, and things began to change. Unfortunately we did get cut off at the pass and a lot of the pastoralists have become incredibly frustrated by this "stop – go, stop – go" kind of thing. It would be nice to imagine we could pick it up, but at the moment there's not much prospect, and I feel very sorry for those people who've been given a ray of hope, then abandoned at the end.

Paul Williams (Sturt Vale Station, SA)

I think following on from what Angus has said, we need to inject passion over profit, we need to engage and empower and educate people about making them feel good about doing the right thing. Maybe I'm too young and too naïve and haven't been knocked down enough to not think that that's still a possibility.

Chris Ferguson (Myrnong Station, NSW)

I wanted to point out on Angus' comments that that frustration is Australia-wide with producers. We're involved with Enterprise-based Conservation in New South Wales which had proved phenomenally just how well it's going and yet, we're coming towards the end of it and there's no more funding. Nine out of 10 of the producers involved want to keep going and we have no Government support, even though people within agencies are really willing to support us, and you guys are the sorts of people that would support it, but it's a Government financial issue which is pretty frustrating all around.

Wal Whalley (University of New England)

I just want to carry on from that last comment about being young and knocked down so that you don't become an optimist. Now I think I'm possibly the oldest person here and I'm still an optimist, and I would like to draw a parallel between what was happening in pastoral areas of New South Wales and Australia, with the Chinese erosion pictures we saw this morning. The pictures you get from the 1930s – I don't know how many of them are on the internet – but I remember being in Sydney when I was about 12 or 13, and having dust storms roll over four or five times every summer. Now that doesn't happen anymore! We get one dust storm in Melbourne in 10 years, and there's a hell of an outcry. I think someone is doing something better than was done in the 1930s, and I think it is the pastoralists among you.

Greg Campbell (S Kidman and Co Ltd)

I'd just like to raise the issue of peak oil and fuel prices and their potential impact on our Rangelands. I think that in attracting research and collaborating with other researchers within Australia there ought to be an interest from those with Rangeland science interests to looking at the effect that high oil prices could potentially have on the mining industry, the pastoral industry and tourism. Also the support we need from urban environments towards the kinds of systems that we have in place at the moment

with Government funding, support for remote Indigenous communities, etc., because I feel that something external to our own Rangelands is going to have some dramatic impacts over the next generation, that we ought to be taking a look at our research activities from here on.

Brendon Lay (Pastoral Land Management, Department for Water, Land and Biodiversity Conservation, SA)

While these sessions have been on, I've talked to a number of people about what the challenges are, and there's one thing that hasn't been mentioned as such. I think it follows from Wal's point, and that is, it's all about people, and people was the first issue mentioned in the theme. We can't do anything out there unless we have people that have the passion or are even just there to do it. One thing that we in Government seem to share with pastoral managers is the difficulty we're now finding in just getting good people, the next generation, the Generation Y and maybe Generation X if they haven't moved somewhere else, to work in this country. In fact, I'd just like to share that I have five kids and every one of those kids I've taken out to the Rangelands hoping that maybe the genes might have sloughed off a bit and they might be interested in this line of work. They've all moved somewhere else and gone in other directions, and the reasons given are that, well really, it's easier to make a living away from the Rangelands – too many flies, too remote, you can't get the Gameboy out or whatever. I just put it to perhaps to Barney; he talked about the things that have changed. Now I don't think that's changed quickly, but it's certainly an issue for the sheep producers anyway, to get good station people to live out there.

Carolyn Ireland (Session Chair)

And I think that ties in quite nicely with what Greg's saying about the power and the peak oil – these could be big problems in the future. People, high oil prices, they're really big things that we have to look at. Would Barney like to respond?

Barney Foran (Centre for Resource & Environmental Studies, ANU)

The Savannah CRC is very active in doing work on demography and people who were themselves trying to bring these things together. These things are now open to considerable and complex science, and the big question is – who oversees this for the Rangelands?

Glen Scholz (Department for Water, Land and Biodiversity Conservation, SA)

I have some comments about what was talked about earlier about the science in Rangelands getting soft. I used to work in the Broken Hill district and there was a land holder who had a chat to me and it's something I've never forgotten. He said, "The problems with you scientists is that you spend 90% of your time trying to understand the 5% that you don't understand, while we ignore everything we don't understand and work with what we do understand." So, given that the world has shifted now more towards power going towards NRM Boards and CMAs, the future funding of research will be targeted towards their more pragmatic priorities and objectives.

Ken Harrison (Western Catchment Management Authority)

I probably need to go back and re-acquaint myself with the aims and objectives of the Society are, but there's been a casting around about future directions and what we do. I've actually found the programme this last few days to be exceptional in the way that the various sessions have focused on and given a good overview from different perspectives on the one issue. The "Lake Eyre" session was great and "The Northern Pastoral" one was great as well. I guess I'm just making that comment to the organisers of Charters Towers, that to me, it's been quite a good format. As to the science side of things, perhaps there needs to be a drop in each one of those session, or perhaps there does need to be one panel along those lines, but we've cast around how we can draw more people into these conferences from an applied perspective and I don't think going back to a pure science format is the way to do that. It's a mixture of application and perhaps that's what the Rangelands Society needs to be doing, in pitching where the conferences come from.

Beth Greenfield (Rural Solutions, SA)

Just following on from what Brendon was saying and from a South Australian perspective, there are a lot of people coming into the Rangelands now, for instance with the mining boom, and I think when we next have a Rangelands Conference in South Australia, there will be a lot of different issues that have not been touched on at all during this Conference. There are a lot more people, perhaps coming into the South Australian Rangelands with no connection to the region at all, living in mining camps, and to the detriment of pastoralism in South Australia, managers are trying to manage their places with back-packers. It doesn't give them a lot of time to contribute to NRM in the region. I'm not sure how it's fixed, but I think we need to engage the mining community more, and have at least their input at these sorts of forums because they have large responsibility in attracting people into the region and how those people will be managed.

Carolyn Ireland (Session Chair)

Just in answer to that, I don't know if he's still here, but we did have Trevor Whitelaw from Santos Ltd here for two or three days of the Conference.

Don Burnside (URS Australia)

One of the things that I think is missing, and we continually miss, is all the linkages between all of those entities inside and outside of the Rangelands. There's been the standard talks about we need more funding, we need more resources, but the Rangelands is a massive net exporter of resources to the rest of Australia. We have mining companies making literally billions of dollars out there. We have seen significant amounts of money being made in the pastoral industry in parts of Australia, and in the tourism industry. Much of that money leaves the Rangelands and goes somewhere else! I don't think we understand the flows of money and resources, and if we did, we'd find out that our requests for funding to come into the Rangelands are just a mere fraction of the amount of money that's actually going out of the Rangelands all of the time.

Not to mention the massive transfers elsewhere. A few years ago I looked at the input into transfer payments into Aboriginal economic and community development in the Kimberly. It was something like \$238M a year - at least three times as much as the pastoral industry generates, yet where's the representation here of how that money might go to the best use?

Finally, we have mining companies who are constrained by the regulations about where they can invest their environmental management dollars. In Western Australia companies are being required to spend hundreds of thousands of dollars annually on researching and monitoring subterranean fauna occurring in a very small area, in an environment where I believe that money could be spent so much more wisely at broad based landscape scale rehabilitation. But that's the law, and they do it because they need to obey the laws, and yet the whole thing just does not add up as a whole.

Margaret House (Fortuna Station and Desert Uplands Committee, QLD)

I'm a beef producer and a landholder in Queensland. I just want to say, obviously we need to reduce the number of cloven hooves in the Rangelands area, so why not pay the land holders to produce environmental outcomes rather than pay us solely for food and fibre?

Don Blesing (Blesing Strategy)

I have a question for Paul. Yesterday we drove around pastoral lands and I made a judgement based on what I saw and what I heard, that it would be great if those Rangelands had less sheep on them.

Paul Williams (Sturt Vale Station, SA)

I'm in a fortunate position to have a company that has enough financial backing to allow me to do what I want to do, and they obviously wouldn't be allowing me to do that if it wasn't economic. We might not be getting the peaks of production we once had, but we're getting a level of production that's sustainable. I think getting rid of some of those cloven hoofed animals, I have no doubt that it's entirely feasible - in fact, we're achieving it. But you can make more money running less animals. You just run the animals that do run better in symbiotic relationships with the natural ecosystems. If you're going to try and fight it or modify it to increase production ... there is a hell of a lot of advantages in what we produce. We have a unique environment and we don't market the uniqueness of the flavoursome meat. The way the community's growing with the conservation angle, if we can tie that in with what we're producing and as part of the story of what we're producing, we don't want to compete with the fat lamb producers and the feed lot producers; we want to produce Rangelands meat that grows in a natural relationship with the vegetation, and that's got it's own unique marketing advantages. I think that could answer some of these economic problems.

Carolyn Ireland (Session Chair)

Thank you, Paul. It's been a great session. Thank you very much, everybody.

THANK YOU TO THE AUSTRALIAN RANGELAND SOCIETY

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I want to express my sincere appreciation to the Australian Rangeland Society for awarding me their Travel Grant which allowed me to attend the Biennial Conference in Denmark.

I have been fascinated with Australia for as long as I can remember and the opportunity to visit Australia was a great experience for me and fulfilled one of my life's goals. Stories about the large Australian cattle and sheep stations have always fascinated me. Growing up on a cattle ranch in the U.S. I always dreamed about visiting Australia and learning more about the grazing operations. It seems I have always been surrounded by people who have had ties to Australia. Several local rancher friends of mine have at one time, or still have, sheep operations in Australia. My major professors at Colorado State University and Texas A&M also had ties to Australia. Everyone I ever met from Australia, or who I talked to that travel there, always had many interesting stories to tell, and had wonderful comments about the country. I also love wide open spaces, which Australia has in abundance. So it was only natural that my own curiosity about Australia would grow. As I sit here in my office I wish I was still in Australia taking in all the wonderful new sights and adventures.

I had three goals for attending the ARS conference, those for myself, those for ARS, and those for my employer. First, in my application for the Travel Grant I stated "By attending the conference I will be able to better understand the varied and competing uses of rangelands in Australia". It was my hope that by attending the ARS conference I would gain more information about natural resource management, cattle and sheep management, ecological challenges, current research, and political aspects on Australian rangelands. My personal expectations were fully met. Second, as I stated in the Travel Grant application, "...my presentation will add to the multi-disciplinary cooperation between rangeland interests on two continents." I wanted to be able to provide conference attendees and the ARS something valuable for my receiving the ARS Travel Grant. My desire was to share information about what we do in my agency through our presentation and poster; and through personal interaction, to meet new friends, develop lasting relationships, and to share with individuals my own thoughts and ideas about rangeland management in the U.S. I think the broader our professional contacts and personal friendships are the better off we all are as professionals and individuals. I hope the presentation and poster I had at the conference provided some useful and interesting information to attendees. I received a variety of input from various members, and all who talked to me about the presentation and poster had inquisitive

questions about how the Natural Resources Conservation Service (NRCS) functions in the U.S. I found that most people seemed to have a good grasp of what our agency does, and some stated they wished I had talked more about the specific projects we work on in my area. I found myself in a quandary when organizing my talk; I wasn't sure how many members would be familiar with NRCS, so I tried to balance a bit of background information with specific projects. For me, my presentation opened the door for dialogue with conference attendees contrasting how the U.S. Government and Australian Governments work with rangeland operators. That dialogue was very informative and helpful for me. Again, I just hope for the most part, that my presentation was informative for conference attendees. Third, I feel the professional development and experiences I gained by attending the ARS Conference, meeting many new people, and travelling around Australia can only make me a better employee to NRCS. I truly believe the more varied experiences we all have, such as what I learned about Australian rangelands at the conference and traveling to a new place, the more we have to offer our local clients. I came back from the conference rejuvenated and excited about what I do here at home.

From my perspective I found the ARS conference stimulating and interesting. I am still amazed at how friendly everyone was to me. I want to thank everyone in the society who helped me with my travel and welcomed me to the conference. I especially want to thank Sarah Nicolson, Sandra Van Vreeswyk, Tim Ferraro, Peter Marin, Andrew Martin and Damien Pearce who answered a multitude of questions prior to the trip. I also want to thank Sharlene Martin of the Chaffey Theatre for her help with shipping my poster from the U.S. to Australia. Special thanks go to Manda Page who over the years has helped me develop an appreciation for the Australian Rangelands and who has become a good friend to both my family and me. There were many others, too many to mention individually, who also helped me before and during the conference. It goes without saying that I appreciate everyone who contributed to my receiving the Travel Grant or assisted me with travel and the many questions I had about the conference, travel and the travel grant.

It was also fun for me to see that many of the ARS members have connections with Range Professionals in the U.S. who I also know. It makes it clear to me that concerns for rangelands are truly international in nature. Our flora and fauna may vary upon different continents, but the overall natural resource concerns are very similar.

As a first time attendee to the ARS conference I found the presentation sessions informative and interesting. The poster sessions covered topics from management issues to research and provided stimulating topics. I thoroughly enjoyed the pasture tour (even if we did get off track and went until after dark). The morning and afternoon tea sessions were a great chance to visit and meet new people. I think, for me, the most beneficial part of the conference were the social events. I got to meet a wonderful group of people, not only from Australia, but also from South Africa and Iran. I will always hold dear the memory of

the many people I had the chance to visit with during the conference. Often it is the people we meet and the different perspectives we get to hear at conferences that are the most valuable aspects of professional meetings.

I heard discussions from some attendees, and was involved in conversations, regarding concerns about the conference format, lack of scientific presentations, and some other issues. Many of those topics were discussed during the closing session (which I thought was very beneficial). I would like to say from my perspective, having never attended an ARS conference, that I found the entire conference experience uplifting. I regularly attend Society for Range Management conferences in the U.S. and I often find myself being critical of the sessions, format, and topics (the old say "familiarity breeds contempt"). However, I will then hear first-time attendees (often young students) speaking amongst themselves about how great they think the conference is and how much they like the experience. I think it is good that those of us with long records of Society involvement be critical of our conferences and try to always improve, but at the same time it is good to listen to those who are first time attendees, because they see the conference through new and unbiased eyes. My experience at the ARS conference was overwhelmingly positive.

In summary, I can not express enough gratitude to the ARS for providing me the Travel Grant. My trip to Australia was my first time out of the U.S., and attending the conference and the week vacation I took after the conference, were real adventures for me. I feel extremely privileged and fortunate that I was awarded the Travel Grant. My travel through Australia only further whetted my appetite to learn more about Australian Rangelands. With any luck I will see you again in Queensland in 2008!



Photo 1: Robert enjoying the koalas at Cleland Conservation and Wildlife Park in the Adelaide Hills, South Australia.

QUEENSLAND BIODIVERSITY SCIENCES UNIT PROJECTS

Biodiversity Sciences is a centre for scientific research and information on Queensland flora, fauna and plant communities and is a unit within the Environmental Protection Agency. Its principal focus is researching, documenting, monitoring and disseminating information on flora and fauna species, and ecosystems and ecology of Queensland.

Several of the projects carried out by the Biodiversity Sciences group are of relevance to those with rangeland interests. Three relatively new projects currently being undertaken by the group are described below. Questions about these projects or other aspects of the group can be directed to Dr Teresa Eyre, Principal Ecologist, Biodiversity Sciences, Environmental Protection Agency, 80 Meiers Road, Indooroopilly QLD 4068. Phone: 07 3896 9834, Email: teresa.eyre@epa.qld.gov.au.

Biodiversity Values and Functional Ecology of Regrowth Vegetation in Modified Landscapes

Successional stages of vegetation are part of plant community dynamics in every ecosystem. In landscapes where this dynamic has changed as a consequence of agricultural/pastoral development, there may be reduced opportunities for species, communities and processes that rely on successional environments. This may have conservation and broader ecological consequences, and critically affect long-term sustainability of land management and the provision of ecosystem services.

In Queensland, regrowth vegetation is defined as woody non-remnant vegetation that is not mapped as remnant vegetation for the purpose of the *Vegetation Management Act 1999*. Although regrowth may not provide the entire functionality of remnant vegetation, it is thought to play an important role in the provision of habitat for biodiversity, salinity mitigation and improving soil condition. However, quantitative information regarding the ecological role of regrowth in semi-arid woodland landscapes of Queensland is limited. Therefore, a new project has recently been granted funding by Land & Water Australia, to address this gap in our knowledge. Project partners include state agencies Environmental Protection Agency, CSIRO, Department of Primary Industries and Fisheries, Department of Natural Resources South-West Natural Resource Management Inc, and the Queensland Murray Darling Committee.

The landscapes to be studied include Mulga woodlands in the Mulga Bioregion and, if possible, poplar box woodlands in the Brigalow Bioregion; these being representative of the extensive pastoral systems of inland and northern Australia. In these landscapes regrowth can provide a cost-effective solution to targeted revegetation, once information on the functionality of regrowth in the landscape is known. The project will aim to address the following objectives:

1. Increase ecological knowledge of Queensland's semi-arid woodlands through quantitative assessments.
2. Quantify the role of regrowth vegetation in maintaining biodiversity values, soil condition, ecological function and net primary production at the property and landscape scales.
3. Establish key flora and fauna species responses to variation in native vegetation age structure and disturbance levels in semi-arid woodlands at the property and landscape scales.
4. Derive and test predictions of ecological function from surrogate indicators that can be used in property and landscape (sub-catchment) vegetation management planning.
5. Provide scientific underpinning for more effective policy and management of native vegetation in the target ecosystems and landscapes.
6. Provide practical recommendations for cost effective property planning and restoration of degraded and fragmented habitat.

The project is made up of a team of scientists from the Environmental Protection Agency, CSIRO and Department of Primary Industries and Fisheries, and commenced July, 2006.

Biodiversity Condition Assessment for Grazing Lands

The importance of land condition for sustaining both production and biodiversity has long been recognised (Ash *et al.* 2002, James *et al.* 2000, Whitehead *et al.*, 2000). Meat and Livestock Australia, working with a range of partners (Queensland Departments of Primary Industries and Fisheries, Natural Resources and Mines, Northern Territory Department of Business Industry and Resource Development, and CSIRO Sustainable Ecosystems) has developed the Grazing Land Management (GLM) education package to promote assessment of land condition as a key part of sustainable management of grazed lands in northern Australia (Chilcott, *et al.*, 2003; Quirk *et al.*, 2002).

The assessment of land condition is an integral component of the GLM education package, with respect to both conceptual understanding of rangeland ecology, and assessment of pastoral resources for property planning and management. Assessment is based on the 'ABCD' land condition framework, which was constructed to allow landholders to assess land condition and determine the consequences for carrying capacity in different land types. Land condition is defined as the ability of land to respond to rain and produce useful forage, reflecting the maintenance of landscape function. Assessments are undertaken based on vegetation and soil descriptions, allowing land condition ratings from A (excellent carrying capacity for the land type) to D (very low carrying capacity relative to the land type's potential). The framework was constructed from existing knowledge of grazing land ecology and relies on data from long-term grazing trials to assess land condition relative to the livestock carrying capacity for different land types (Ash

et al., 2002; O'Reagain *et al.*, 2003). This framework is one of the conceptual elements that underpin the GLM education program and related extension activities currently being undertaken with industry, government and regional NRM bodies.

However, the land condition framework was not designed to account for assessment of conditions relevant for the maintenance of biodiversity values. Increasingly, landholders will face the challenge of managing their properties to demonstrate a duty of care, and meet market and regulatory requirements for environmental protection, including biodiversity conservation. The development of robust, simple, and repeatable methods for assessing biodiversity condition of grazing lands will allow landholders to:

- demonstrate their environmental credentials in terms of duty of care, market, and regulatory requirements;
- describe the biodiversity condition of their property
- bid competitively for funds to conserve biodiversity on private land; and take advantage of incentive programs for conservation management, such as the Nature Conservation Refuge program.

Recently, Meat & Livestock Australia have provided funding to the Environmental Protection Agency and Department of Primary Industries & Fisheries to develop and test a prototype procedure for the assessment of biodiversity condition of grazing lands, to complement the land assessment framework used by the Grazing Land Management education package. The project will build on relevant procedures such as Habitat Hectares (Parkes *et al.*, 2003), BioMetric Decision Support Tool (Gibbons *et al.* 2005), BioCondition (Eyre *et al.* 2006), and BioGraze (James *et al.* 2000), and surrogates identified by Fisher *et al.* (2004).

The project will combine aspects of the GLM ABCD framework with these recent initiatives on biodiversity assessment, to develop a framework that can accommodate both production and biodiversity components of condition in Queensland. It will also test the assessment procedure to ensure its practicality and quantify relationships between condition (as rated by both the production 'ABCD' framework and biodiversity assessment components) and elements of biodiversity.

By the end of the project in 2010, the project will aim to:

1. Provide a prototype toolkit, for assessing biodiversity conditions on grazing lands that is compatible with the land condition (ABCD) assessment framework used in the GLM education package.
2. Specify a set of surrogate indicators of condition for biodiversity on grazing lands, and their benchmark values, for a range of regional ecosystems occurring on grazing properties in the Southern Brigalow and Mulga regions of southern Queensland.
3. Establish relationships between the surrogate indicators and selected elements of biodiversity

(e.g. persistence of identified decreaser species or species groups, for a range of flora and fauna) in the study regions.

4. Produce a Manual "Land and biodiversity condition assessment" for southern Queensland.

For further information regarding the project, please contact Dr Teresa Eyre or Dr Chris Chilcott (chris.chilcott@dpi.qld.gov.au).

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Sustainable Management and Conservation of Grazing Lands in Queensland's Rangelands

Compiled by David Akers – QPWS Longreach, QLD

Desert Channels Queensland in partnership with Department of Primary Industries and Fisheries and Queensland Parks & Wildlife Service has secured funding through the Natural Heritage Trust (NHT2) to deliver a project titled "Sustainable Management and Conservation of Grazing Lands in Queensland's Rangelands. This project incorporates four NRM regions - Desert Channels Queensland, Southern Gulf Catchments, South West NRM Group and the Northern Gulf NRM group.

Aim of the project

Landholders are faced with the challenge of managing their properties to demonstrate a duty of care and meet market and regulatory requirements for environmental protection including biodiversity conservation. A key objective is to convey to producers that maintenance of natural systems to deliver both environmental and production outcomes is the preferred action over remediation, as the return is far more viable per dollar value invested.

This three-year project aims to help meet these challenges by:

- Assisting landholders to integrate biodiversity management into grazing land natural resource management initially through the development of a nature conservation and biodiversity workshop module through other extension and incentive programmes in conjunction with the regional NRM groups.
- Developing a simple, repeatable method for assessing biodiversity condition of grazed rangelands and an associated management framework to improve biodiversity conservation on grazed rangelands
- Building capacity through the establishment of a biodiversity grazing lands extension program within the region

How we plan to achieve this

- Development of a broad based and region specific biodiversity training package customized to landscapes in each of the four Natural Resource Management regions (accounting for all the bioregions);
- Intensive Sub-Catchment case studies (at least 2 per region) of a continuous improvement process for extensive grazing lands including impacts on biodiversity and natural resources; this will provide the localized science based knowledge behind the training package
- Further case studies in each region working with graziers that have demonstrated effective conservation measures consistent with regional

biodiversity targets including the impact of improved land condition on biodiversity and management needs of wetlands and endangered regional ecosystems; this will provide local best – practice examples of landscape management for retention of ecological diversity.

- Integration of the above activities into a Grazing Land Management package and delivery of the package through regional workshops incorporating field - based activities as much as possible.

What has been achieved so far?

- Established a list of collaborating landowner/managers and case study sites across the four Natural Resource Management Regions
- Completed biodiversity surveys and land / biodiversity condition assessments at case study sites in the Mitchell grass Downs and Desert Uplands bioregions. Channel country and Mulga sites are to be completed before the end of 2006.
- Applied Stocktake assessment to each case study site - this may identify attributes common to biodiversity and production condition ("Stocktake" is an objective procedure used to assess the condition and potential production of a grazing system)
- Begun working to develop "benchmarks" for biodiversity condition in key ecosystem types
- Begun working with collaborative landholders to gain a background in nature conservation issues, what works, what doesn't, what people are concerned about and what people would like to know more about.
- Collect data and personal communications & begun distilling it down to what is useful or relevant

What remains to be done?

- Continue development, trailing and publication of learning materials for the Desert uplands, Mulga lands, Channel country, Southern Gulf and Northern Gulf bioregions
- Continue field work at case study sites and development of biodiversity index
- Commence delivering training workshops. The first draft of materials for the Mitchell Grass Downs bioregion is due for presentation to the technical panel by the end of September 2006

The project team comprises scientists and extension staff from the Environmental Protection Agency and CSIRO. A Technical Advisory Panel to support the project has representatives from CSIRO, Department of Primary Industries and Fisheries, Tropical Savannas CRC, Agforce, Meat and Livestock Australia, the pastoral industry, Desert Channels Queensland and Far North Queensland NRM board.

BOOK REVIEW

Karoo Veld: Ecology and Management by Karen J. Esler, Sue J. Milton and W. Richard Dean (Eds), 2006. Briza Publications, Pretoria, South Africa. ISBN 1 875093 52 4, 214 pp. Price: Rand 169.95 from Briza Publications, equivalent to approximately AU\$29.50.

Among rangelands around the world, the closest ecological analogue to Australia's southern pastoral zone is found in the South African region called the Karoo. The Karoo veld (rangeland) lies in the dry western side of South Africa, covering about one quarter of the country between the Kalahari in the north and the fertile coastal districts of Western Cape Province to the south. The Karoo veld is generally dominated by shrubby vegetation with high species diversity in a climate of low and irregular rainfall. Unlike Australia's outback, however, there is a variety of indigenous large herbivores comprising various kinds of antelope, the most easily recognisable to Australians being the springbok.

Three hundred years ago, Dutch settlers spread northeast from Cape Town into the vast Karoo region with herds of livestock, followed by British colonists a century later. European traditions of livestock grazing management were not sensitive to the semi-arid environment, and stocking rates tended to be inflexible and optimistic. The long history of grazing in the Karoo has left its mark in a form familiar to observers of rangeland degradation in North America and Australia. Grasses and other palatable perennials decline, woody plants increase, more bare ground is exposed, surface run-off increases and topsoil is lost. This scenario is well documented in *Karoo Veld: Ecology and Management*. The book views the Karoo ecosystems from a firm conservation perspective, reflecting the interests of the sponsoring organisations and the professional orientation of the three editors and dozen contributing authors.

This is not a text on rangeland ecology and management in the conventional sense. There is little reference to the work of scientists who are mainstream authors in the *African Journal of Range and Forage Science*, for example. And it makes no attempt to compete with *Veld Management in South Africa* (1999) edited by Neil Tainton, which in any case tends to focus on South Africa's higher-rainfall grassland and savanna regions in the eastern half of the country. Although the editors are not explicit about the kind of audience they are addressing, they are obviously targeting lay readers who are already familiar with Karoo plants, and can recognise their common names. The book will delight the avid Karoo naturalist, and guide the grazier attuned to the ecological health of his land and its resources. The language has been carefully crafted, and the editors have achieved a consistency of style and expression that masks the individuality of contributing authors. I could not help admiring the skill with which ecological phenomena are described without jargon, in readily assimilated sentences. For example, instead of cryptogamic crusts the authors use "living crusts" and describe them without ambiguity. Rather than "population dynamics" the authors refer to growth and shrinkage of the plant family. The book is a joy to read, full of

illustrative photos and well-drawn figures. Sub-headings are frequent and helpful. It is easy to navigate around the text, but I wish there had been more use of page referrals. When I am advised on page 23 to consult the Adaptive Management section, it would be nice to know that I can find it on page 87. I also wished for references in the text to key published literature. I accept that the authors did not want to clutter an essentially layman's book with scientific citations; nevertheless, references could easily have been inserted inconspicuously using a numbered superscript format with full listing in an Appendix. Notations in the book along these lines would illuminate the relevance of those publications already listed in the Appendix, allow the list to be expanded, and increase the potential audience.

The text is rich in biological detail, especially of the Karoo flora. Common names of plants and animals are used exclusively in the body of the text, with scientific names confined to lists in the Appendices. The treatment is comprehensive. Nearly 200 plant names appear in the main text, and over 400 species in Appendices. However, the use of common names carries with it some of the difficulties inherent in the vernacular approach. In more than a dozen cases, two common names cited in the text refer to the same species, and in more than thirty cases an individual common name applies to more than one species, often to species in more than one genus. A South African naturalist may recognise these names and be able to visualise the plants to which they refer, but an outsider is liable to be confused. The primary stumbling block for an Australian reader, however, is that the great majority of common names are of local origin and totally unfamiliar, such as Beesdubbeltje (*Tribulus terrestris*) and Roi-bessiebrak (*Atriplex semibaccata*). To this extent the book is unfriendly to rangeland ecologists outside South Africa. But this potentially discouraging feature also serves to make other South African texts more accessible to us, because the authors provide a thorough, cross-referenced list of 500 vernacular names with their Latin equivalents. We should know more about the South African rangeland ecosystems so that we can better understand our own, and compare solutions to similar problems. *Karoo Veld: Ecology and Management* is a handy reference for any student of the South African veld.

The book is divided into three parts. The first and largest part describes the ecology of the Karoo. The surprise for me was to discover how diverse the Karoo region is. On the eastern side, grasslands predominate under summer rainfall of more than 400 mm annual average. Succulent vegetation characterises the driest zone along the Atlantic coast to the west, where rain falls mainly in winter and the annual average drops below 100 mm. In between, rainfall amount and seasonality are highly variable, yet, as in Australia, the biota is well adapted to seasonal uncertainty. The core of Part I is a broad coverage of Karoo vegetation, soils, plants and animals, and the changes that occur in response to climate and land use. Sections on grazing capacity and veld condition are concise and explicit, yet avoid the trap of over-simplification. The text is peppered with vernacular terms and local names. I found myself

repeatedly referring to the Glossary and the Index of common names, but that inconvenience is compensated by the attraction of excellent colour photos and figures on every page. The Glossary is limited, however, and could easily have been expanded to assist the foreign reader. I'm still not sure what a "morgen" is or what "fynbos" means, and the use of "vlaktes" to signify plains can be inferred only from context, but not at first appearance. The authors assume readers know that in South Africa a paddock is called a "camp".

Part II focuses on management issues, largely from a livestock grazing perspective but also for game ranching. It leads with the land ethic of Aldo Leopold and a risk-averse approach to land use to construct a philosophy and practice for ecological progress compatible with livestock production. The relevant South African legislation sets the terms of reference. This part of the book presents conceptual models for livestock-veld interactions, followed by a cogent presentation on grazing systems, their merits and limitations. However, like just about all textbook treatments of grazing systems, it fails to consider the spatial distribution of grazing and its potential for manipulation, in spite of a reference early in Part I to management options for more even use of the landscape. There is also an assertion that more intensive grazing, i.e. at higher density in a rotation, is more labour-intensive and more costly, which is not necessarily the case, particularly in semi-arid environments where infrastructure maintenance on extensive areas at low stocking rate may not be cost-effective. Game ranching in Africa might appear to be an obvious alternative to domestic livestock, but the authors argue otherwise in a rational, balanced treatment of the subject. Ventures into game ranching tend to be ill-informed, and attempts to manage game have often caused ecological damage (ostrich are prominent offenders). Caution, careful planning and expert advice are called for. The final section of Part II is a commentary on veld and wetland rehabilitation, with recommendations for prevention and cure. As the reader by now expects from this book, the scope is broad and the language is clear and concise.

The third Part is concerned with rangeland assessment, record-keeping and monitoring. The book recommends a relatively quick scoring method on permanently marked belt transects of 100 by 2 m. Guidelines and a monitoring form are provided for scoring categories of vegetation cover, forage value, grazing intensity, disturbance, perennial-plant seedlings, and soil health. The numbers of species (not their names) encountered in the transect are listed by life form (trees, grasses, etc.). Suggestions for location of monitoring sites are also given. The approach is proven and practical, leading to a ready reckoning of veld condition score. It requires no equipment or expertise, apart from an ability to differentiate plant species and to recognise the ones animals prefer. *Karoo Veld: Ecology and Management* can help with plant recognition of common species; 136 species have colour photos. The book also provides photos of 4 states of veld condition for ten different land systems.

On the livestock side, a method for estimating grazing capacity in ha/LSU is presented, based on more detailed

vegetation sampling to determine the percent canopy cover for each species. Percent cover is multiplied by the species' grazing index value to obtain a veld condition index, and the sum of veld condition indices is inserted into a formula to calculate grazing capacity. The Appendix assigns a grazing value index to 400 Karoo species that have been grouped into five palatability classes. I found this methodology intriguing. It would be interesting to test it on Australian rangelands.

Although this book has been written for laymen, it has appeal for researchers and academics as well as naturalists. South African rangelands are an ecological partner to Australian rangelands, and South African ecologists are a source of experience and wisdom from which we can benefit. *Karoo Veld: Ecology and Management* is an excellent introduction to understanding rangelands in South Africa's semi-arid region, for its own sake if not for providing a context for assimilating more technical information. Veld assessment and monitoring methodology is a case in point. Furthermore, this book presents ecological concepts and range management principles and practices with such clarity and simplicity of language, and so well illustrated, that it is a sheer delight to read. Just don't be put off by discovering that *Blinkblaarboesmangras* is a species of *Stipagrostis*.

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EVALUATING ENVIRONMENTAL MANAGEMENT SYSTEMS IN WESTERN QUEENSLAND

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Over the last two years, 31 livestock producers in western Queensland implemented a Pastoral Environmental Management System (EMS) under a project co-funded by the Australian Department of Agriculture, Fisheries and Forestry and the Queensland Department of Primary Industries and Fisheries. EMS is a continuous improvement process based on the international standard ISO 14001, and provides a framework for businesses to better demonstrate their environmental, production and/or marketing strategies.

The 31 producers in the project developed their EMS to varying levels. Producers' top three reasons for implementing an EMS were: (1) to improve environmental management, (2) to strengthen their ability to address environmental issues and, (3) to demonstrate sustainable property management.

Twenty seven of the 31 producers were considering ongoing use of their EMS, but this depended on whether they were likely to receive a significant benefit (such as

a marketing or financial incentive) for investing time into the process. Without a tangible benefit, few felt the process was worthwhile.

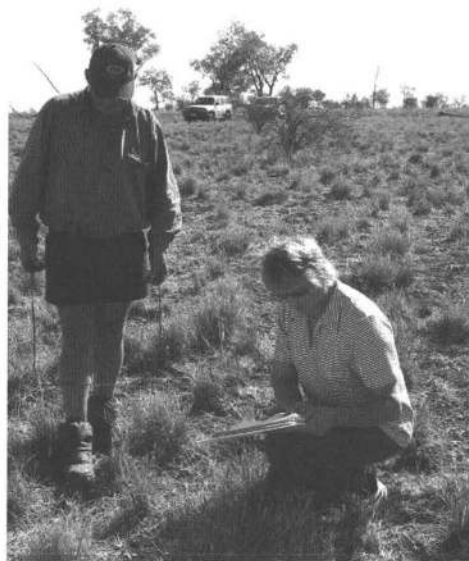


Photo 1: Augathella producers, Sue & Michael Lyons, monitor their pasture, contributing to their property's Environmental Management System (EMS).

Twenty-three of these producers said they would recommend EMS to other producers in their industry, but generally only if there were more direct benefits, while 19 of the 31 producers would recommend EMS for widespread adoption. If EMS was promoted widely, over half of these producers felt that government should be responsible for the management and funding of EMS implementation, in preference to industry or regional NRM groups.

Apart from 2 producers, all reported their involvement in the Pastoral EMS project to be worthwhile, citing benefits such as: gaining ideas from other producers during group work, learning what EMS is about, and being able to seek assistance from Departmental extension officers. With these benefits in mind, 23 of the producers would do the process over again.

Some general comments about EMS included:

"EMS gave us a structured and documented plan that might help us down the track"

"By doing EMS we have developed a better record keeping system"

"There is little value in EMS when we consider the time taken to do it and the few benefits we received"

The Department of Primary Industries and Fisheries hopes that these results will help producers, producer organisations and others to better anticipate the likely value from participation in an EMS process. If you would like to know more about EMS or the above results, please contact Leilani Weier, DPI&F Longreach on 4658 4419 or Nicole Sallur, DPI&F Charleville on 4654 4220.

CORRECTION FROM RMN 06/2

The last *Range Management Newsletter* (July 2006) included an article by Richard Silcock discussing changes at monitoring sites in south-west Queensland. Unfortunately, due to a printing error, an incorrect photo pair was shown for Photo pair 1a; the correct photos are shown below.



Photo Pair 1a: Photographs taken from monitoring sites in the mulga shrublands located in south-west Queensland near Quilpie. Quilpie run-on area 1980 (top) and 2006 (bottom) with huge growth of a mulga tree.

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INFORMATION SNIPPETS

Tropical Savannas CRC Wind Down Activities

Earlier this year the Tropical Savannas CRC submitted a business case to the CRC Secretariat for a new CRC for Tropical Savannas Futures, but despite making it to a short list of 20 proposals, the case was not successful in meeting the stringent commercial criteria required for funding.

Consequently funding from the CRC programme will cease in July 2008. Those associated with the CRC will endeavour to ensure that the collaborative, cooperative approach to research the CRC has fostered and the networks it has built will continue.

The Board met in November to discuss the decision, and there is a possibility of exploring other funding sources to continue some CRC activities.

Funding continues at its present levels until July 2007, after which the CRC will start to wind down its activities.

The new CRC would have created opportunities for NRM and environmental service-based industries and enterprises across northern Australia. The aim was to enhance sustainable land management, as well as the economy of north Australia. This would have been done with four research programs:

- Sustainable beef production - This program aimed to enable high standards of resource stewardship and increased production, improved product recognition and value.
- Resource access and offsets for major developers and land managers - This program would have developed options for commercial delivery of environmental services (such as the West Arnhem Land Fire Management Agreement). These services would have produced regional social, economic and environmental benefits, principally through the mining and energy sectors.
- Indigenous and remote community livelihoods - This program aimed to build new and stronger enterprises and employment opportunities for remote communities and Indigenous people.
- Indigenous engagement and capacity building - This program would have matched the above activities to Indigenous aspirations and capacity, and designed projects to increase opportunities for Indigenous participation and individual and group development.

There is still a need for research that addresses these areas, particularly now that there is a new focus on the agricultural potential of north Australia given the dry conditions further south. Research is needed that develops and applies innovative technologies and knowledge systems; identifies and analyses economic opportunities arising from provision of environmental services; informs

policy and institutional arrangements; builds knowledge, skills and human capability to support regional economic growth; and assesses employment opportunities for local people, and education and training implications.

The Tropical Savannas CRC has shown that this research can be very productive if it is driven by end-users and built around practical experiences in northern Australia, and if it draws on people from different sectors, regions and internationally, and structures research programs to accommodate regional differences.

The CRC has achieved a great deal over a relatively short time, the Centre for International Economics estimating that it has generated over \$140M of value in helping deliver better natural resource management in northern Australia. The real value, however, has been in the network of relationships that have been built across borders and cultures in north Australia and that have allowed innovation and practical, collaborative research to flourish. The setback in funding should now be seen as an opportunity to build on this achievement and ensure it continues.

More information about the CRC is available from the CRC website (<http://savanna.edu.au>). The information in this article was supplied by David Garnett, Acting CEO of the CRC (david.garnett@edu.edu.au).

The Jill Landsberg Trust Fund

The Ecological Society of Australia has recently established the Jill Landsberg Trust Fund to honour the life of an eminent Australian ecologist -Dr Jill Landsberg – who passed away prematurely in May 2005. This fund will support an ongoing postgraduate scholarship in the field of Applied Ecology. Donations are tax deductible.

More information about the fund and how to donate is available at the Ecological Society of Australia's website –www.ecolsoc.org.au.

Managing for Biodiversity in the Rangelands Summary Reports

The Federal Department of the Environment and Heritage recently released a number of summary reports relating to the topic of Managing for Biodiversity in the Rangelands.

Individual summary reports are available for the following areas of interest:

- Assessing Financial and Environmental Impacts of Management Options
- Fire Management
- Industry Guidelines for Sustainability
- Management of Total Grazing Pressure
- Weed Management

Each of these reports can be downloaded directly from the DEH website (<http://www.deh.gov.au/land/publications>) or can be ordered as a hard-copy.

New Book on Australia's Mammal Extinctions

A new book examining the extinctions of Australia's mammals was released this month. The book, entitled *Australia's Mammal Extinctions. A 50,000-Year History* was written by Chris Johnson and was published by the Cambridge University Press

The Publisher describes the book as follows "Of the forty mammal species known to have vanished in the world in the last 200 years, almost half have been Australian. Our continent has the worst record of mammal extinctions, with over 65 mammal species having vanished in the last 50 000 years. It began with the great wave of megafauna extinctions in the last ice-age, and continues today, with many mammal species vulnerable to extinction. The question of why mammals became extinct, and why so many became extinct in Australia has been debated by experts for over a century and a half and we are no closer to agreement on the causes. This book introduces readers to the great mammal extinction debate. Chris Johnson takes us on a detective-like tour of these extinctions, uncovering how, why and when they occurred".

Further details about the book, including ordering information, are available from the publisher's website at: <http://www.cambridge.org/aus/catalogue/catalogue.asp?isbn=0521686601>).

AUSTRALIAN RANGELAND SOCIETY AWARDS

The Society has two awards to assist members with either:

- travel expenses associated with attending a conference or some other activity, or
- studies related to the rangelands.

Applications for each award will be considered on a yearly basis and close in November of each year. Any member of the Society interested in either award is invited to apply.

Australian Rangeland Society Travel Grant

This grant is intended to assist eligible persons to attend a meeting, conference or congress related to the rangelands; or to assist eligible persons with travel or transport costs to investigate a topic connected with range management or to implement a program of rangeland investigation not already being undertaken. The grant is available for overseas travel and/or travel within Australia. It is not intended for subsistence expenses.

Australian Rangeland Society Scholarship

This scholarship is for assisting eligible members with formal study of a subject or course related to the rangelands and which will further the aims of the Australian Rangeland Society. The scholarship is available for study assistance either overseas or within Australia. It is not intended to defray travel expenses.

How to Apply

Members interested in either award should submit a written outline of their proposed activity. Applications should clearly address how the intended activity (ie. travel or study) meets the aims of the Society. Applications should be brief (less than 1000 words) and should be submitted to the Secretary, Sandra Van Vreeswyk, before **30 November**. An application form can be downloaded from the ARS website at www.austrangesoc.com.au. For further information contact Sandra Van Vreeswyk by phone on (08) 9347 5120 or Email at sandra.vanvreeswyk@dpi.wa.gov.au.

Conditions

Applications for the Travel Grant should include details of the costs and describe how the grant is to be spent. Applications for the Scholarship should include details of the program of study or course being undertaken and the institution under which it will be conducted, and information on how the scholarship money will be spent. For both awards details of any other sources of funding should be given.

Applications for either award should include the names of two referees.

Finally, on completing the travel or study, recipients are required to fully acquit their award. They are also expected to write an article on their activities suitable for publication in the *Range Management Newsletter* or *The Rangeland Journal* as appropriate, and for the Australian Rangeland Society website, within six months of completion of their travel or study.

Eligibility

No formal qualifications are required for either award. There are no age restrictions and all members of the Society are eligible to apply. Applications are encouraged from persons who do not have organisational support.

There is a restriction on both awards for overseas travel or study assistance in that the applicants must have been members of the Society for at least 12 months. The awards can be for Australian members to travel to or study overseas or for overseas members to travel to or study in Australia.

MEMBERSHIP APPLICATION FORM



The Australian Rangeland Society

TAX INVOICE / RECEIPT ABN 43 008 784 414

Please complete and return to the Subscription Manager, Ian Watson, PO Box 483, NORTHAM WA 6401
Ph (618) or (08) 9690 2179: Fax (618) or (08) 9622 1902: iwatson@agric.wa.gov.au

I, [name]

of [address]

Postcode Email address

Phone Fax

apply for membership of the Australian Rangeland Society and agree to be bound by the regulations of the Society as stated in the Articles of Association and Memorandum.

☐ Enclosed is a cheque for \$AU..... for full/part* membership for an individual/student/institution* for the calendar year 2006.

(* delete as appropriate)

☐ Charge my Mastercard VISA Bankcard AU\$.....for full/part* membership for an individual/student/institution* for the calendar year 2006.

Card No.: _____ Expiry Date: _____

Signature:..... Date: Cardholders Name:.....

If you were introduced to the Society by an existing member please include their name here

Please list details of your institution & student number if you are applying for student rates

Membership Rates; GST inclusive

Individual or Family -

	Australia	Overseas Airmail
Full (Journal + Newsletter)/Student	\$85.00/\$65.00	\$105.00/\$85.00
Part (Newsletter only)/Student	\$50.00/\$35.00	\$60.00/\$40.00

Company -

Full (Journal + Newsletter)	\$115.00	\$140.00
Part (Newsletter only)	\$65.00	\$75.00

- All rates are quoted in AUSTRALIAN currency and must be paid in AUSTRALIAN currency.
- Membership is for the calendar year 1st January to 31st December. Subscriptions paid after 1st October will be deemed as payment for the following year.

Australian Rangeland Society Privacy Statement. Consistent with national privacy legislation, the Australian Rangeland Society (ARS) will only use members' personal contact information for keeping its records up to date, and enabling member access to ARS products and services e.g. meetings, events, newsletters, journals and conferences. ARS will not use members' information as supplied to ARS for any other purpose and it will not disclose the information to any other party without the member's consent. This will be achieved through email communication or any other means as appropriate.