



The Australian Rangeland Society

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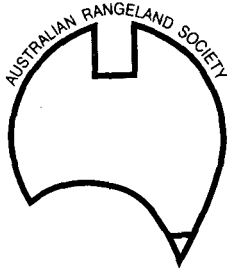
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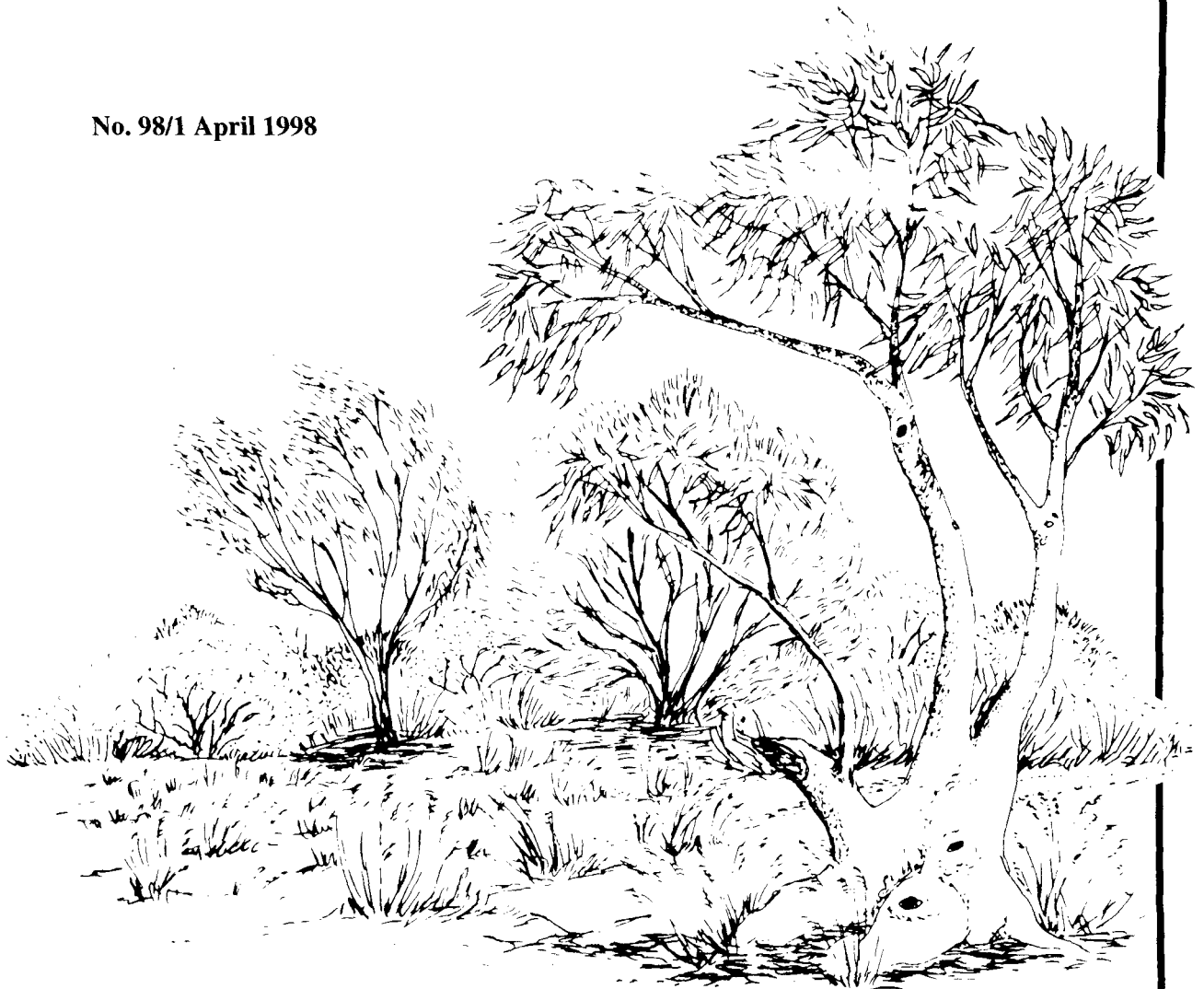


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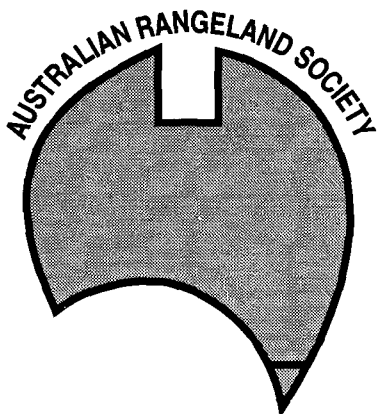
FROM THE EDITOR

Gary Bastin, CSIRO, PO Box 2111, Alice Springs NT 0871

Welcome to the first newsletter for 1998. This issue has reports on two government-supported strategies designed to improve the environmental, economic and social conditions in two large regions of the rangelands. In the first article, Rod Hewitt reports on progress being made towards business and social reconstruction by the South West Strategy in south-west Queensland. In a sense, Rod's article is a report card on the first three years of that Strategy's operation and it is pleasing to read that progress has been made on many fronts. What is also pleasing is that the progress is being measured against criteria that were specified and agreed upon before the Strategy commenced. In the second article, Roderick O'Connor describes the Gascoyne Murchison Strategy which is about to get underway in Western Australia. This Strategy has objectives that are similar to the South West Strategy: to improve the profitability of pastoral enterprises and the condition of the land on which those businesses are based. I will watch with interest for a similar report card on the progress of this second strategy in two to three years time.

The remainder of the newsletter has reports on past research, reports on recent conferences and overseas trips, and news from Council. In the last *Range Management Newsletter*, Carolyn Ireland gave us a very well written account of her research into the ecology and management of western myall (*Acacia papyrocarpa*). In a similarly well-written article in this issue, Fleur Tiver describes her studies into the effects of grazing by sheep, goats and rabbits on tree and shrub dynamics. Fleur reports that the conclusions from some of her observations are different to that reported by Carolyn for western myall. Both Carolyn and Fleur were awarded PhDs as a result of their studies and in the next issue I hope to have an article from Ian Watson, yet another recent PhD recipient. So, other recent PhD awardees be warned, I will be contacting you for similar articles!

I am sure that you will find something of interest in this issue. As usual, feel free to respond with any comments you may have, and please keep your contributions coming. I am particularly happy to receive contributions of a different nature. My deadline for the next *Range Management Newsletter* is mid June.



THE SOUTH WEST STRATEGY

Rod Hewitt, Manager, South West Strategy, PO Box 282, Charleville QLD 4470

The South West Strategy was implemented in 1994 to address issues of economically sustainable production, natural resource management, social aspects and regional development in a holistic manner. The Strategy was designed to allow and facilitate full community ownership and direction setting in south-west Queensland through an independently chaired community and government consultative group. It is this aspect which has seen the Strategy viewed as a model for rural recovery Australia-wide. When the Strategy was launched, it was anticipated that it would require three lots of three-year funding to address many of the problems faced by the region. Our first period of three years has finished and in that time, a great deal has been accomplished. However, many challenges remain.

Three integrated components were originally created to address the issues outlined in the first paragraph. Descriptions of these components follow.

Enterprise Reconstruction Component

Inadequate property size is one of the reasons for land degradation and the severe financial plight of many graziers in south-west Queensland. The objective of the Enterprise Reconstruction component is to facilitate rural adjustment which contributes to enhanced viability of farm enterprises within the region. This will be achieved by:

- improving the long-term sustainable profitability of enterprises through increased farm productivity, property build-up and/or on-farm development,
- encouraging producers without prospects of sustainable long-term profitability to make an orderly exit from the farm sector in a manner which improves their ability to adjust to life after farming,
- facilitating the amalgamation of properties,
- encouraging effective property management performance from the farm sector, and
- encouraging environmentally sustainable resource use.

The above goals are being addressed through the South West Queensland Rural Adjustment Strategy. This strategy provides:

- Support to assist producers to implement sustainable resource management initiatives and/or enhanced resource use. This support is through interest subsidies of between 50% and 75% to a total of \$30,000 per year for periods of 3 to 5 years. The subsidy is to assist with property build-up, property development, debt/capital restructuring, partnership restructuring, purchase of interest (i.e. buying out a partner's share) and property leasing.
- Support to assist those producers without prospects of long-term profitability and who have decided to leave primary production, through the provision of re-establishment grants to aid property sale and relocation.
- Training grants and professional advice to assist producers to improve their skill and knowledge levels in relation to rural management and/or sustainable resource management strategies.

This assistance is applied for through the Queensland Rural Adjustment Authority's (QRAA) representative located at the Resource Centre in Charleville. The Resource Centre is a 'one stop shop' providing professional advice about QRAA, the South West Strategy, financial counselling issues and social issues. The continued alliance between the Resource Centre and project leaders of the South West Strategy is ensuring that service delivery to clients in south-west Queensland is both meaningful and focussed.

Although the initial rate of applications for assistance was slow, improving seasonal conditions in some areas and improvement in commodity prices have seen a steady increase in applications for assistance. We expect many more applications now that interest subsidies have been removed under the Federal Government's Agriculture Advancing Australia package (which has replaced the Rural Adjustment Scheme).

A review of the Enterprise Reconstruction component was undertaken by Mac Drysdale in 1997. Mac is a well-respected grazier from the south-west, the immediate past chairman of the International Wool Secretariat and Director of the "Country Road" clothing company. The purpose of the review was to identify issues which should be addressed to improve the success of the various programs. Following the review, AGB Nielson McNair was commissioned to undertake a survey of graziers in the south-west on different aspects of the Strategy. A report has been provided and a working party is presently reviewing the results and will make recommendations to the Strategy group for their consideration.

The significant difference between assistance under the old Rural Adjustment Scheme and assistance through the South West Strategy is that in the latter, support is linked to improvements in the long-term sustainability and profitability of rural enterprises. Properties receiving interest subsidies undergo a Safe Grazing Capacity assessment and may be subject to amalgamation of titles where applicable to prevent the future sale of unviable units. Annual assessments are then carried out to ascertain if the condition of the country is being maintained.

Although early days yet, results are promising, with the first 12 annual reviews showing a 20% reduction in stocking rate and a 21% increase in wool production. Lease amalgamations have seen 110 original titles combined into 64, representing 42 saleable units.

Natural Resource Management Component

This project has the objectives of:

- Promoting property management principles that ensure the long-term sustainability of our natural resources and profitability of the grazing industry.
- Reducing resource degradation through improved water, stock, pest and pasture management by improved planning and infrastructure development.
- Promoting and encouraging the adoption of nature conservation principles at a property level.

- Promoting maintenance of the Great Artesian Basin (GAB) water resource by converting bore drains to piped systems (up to 95% of water is wasted in bore drains).
- Ensuring that the management options developed are cost-effective, both on property and regionally.

Actions within the Strategy to achieve these objectives include:

- Property management planning to integrate human, natural, livestock and business/finance resources into a flexible and sustainable property plan for the individual.
- Nature conservation planning - protection and management of ecosystems and habitats at a property level.
- Improved water management - water management as a part of whole-property planning to reduce land degradation and reduce wastage of water from the GAB.
- Economic studies into resource-related issues to ascertain the impact of different management options.

In 1997 the South West Strategy Natural Resource Management group, the Warrego-Paroo Catchment Management Association and Landcare groups amalgamated, with the aim of '*one group, one direction, a strong focus*'.

Now that many projects under this program have reached the end of their first period of funding, the Federal and State governments commissioned the Centre for International Economics in Canberra to undertake a review of the Natural Resource Management component of the Strategy. The review recommended that funding should be committed for a further three years and also made other recommendations for future improvements. The Strategy group have generally accepted the majority of these recommendations and many have already been implemented.

Achievements from this component include:

- 125 properties have participated in Safe Grazing Capacity assessments, leading to enhanced landholder knowledge of their properties and improved stocking decisions.
- Replacing 420 km of bore drains with 640 km of pipeline to 311 watering points. This has saved an estimated 10.8 million litres of water per day, resulting in a pressure increase of up to 30% in artesian bores.
- Holding 25 property management planning workshops with landholders. These workshops have concentrated on developing land and water management plans.
- Developing a Nature Conservation Working Group and commencing work on a Strategy for Nature Conservation following detailed consultation with landcare groups, integrated catchment management groups and Local Government authorities.
- Numerous economic analyses to determine how financial assistance available through Strategy projects has improved enterprise management and resource use.
- Improved drafting and map production to assist all areas of natural resource management.

Integrated Regional Development Component

This component encourages leadership and action, responsive to community needs and aspirations, to maintain local and regional economies and achieve sustainable growth of benefit to all residents, for present and future generations.

Better known as the South West Regional Development Association Inc., it comprises up to five representatives from each of the four south-west Queensland local governments, namely; Bulloo, Paroo, Quilpie and Murweh Shires. Membership of the Board includes the Mayor and Chief Executive Officer of each of the local governments plus representatives from up to three business or community organisations from each area.

The organisation employs three staff members: a Regional Business Adviser, an Economic Development Officer and an Economic Project Officer. Staff are currently located at Charleville, Quilpie and Cunnamulla, working out of the Council offices. The Association and its officers have continued to promote the region internally and externally, assist new and existing businesses, develop tourism, coordinate education and training and assist in the development of industry. Examples of this work include:

- The proposed new Small Business Guidelines, which are being re-submitted to the government for consideration on a regional basis. This will provide small businesses with similar assistance to that which is available to primary producers.
- A wool storage and handling facility at Cunnamulla.
- A Small Business Study to examine debt and customer spending habits.
- Assistance to O.B.E. Beef, who will hopefully become the largest supplier of organic beef in the world.

The Future

The future for the South West Strategy is promising and hopefully this will involve improving seasonal conditions and commodity prices. A part of this future will be better information and technological opportunities. The South West Strategy has recently formed an Information and Technology sub-group to ensure that the south-west receives a standard of information and technology comparable to that in those areas closer to the coast. There are many small groups in the south-west attempting to access this new technology and part of the group's charter is to provide a focus to these attempts and maximise the benefits to this region.

The overall success of the Strategy will be judged by this community many years from now, however initial results are promising and the Strategy will continue to develop and evolve in all areas in response to community needs.

GASCOYNE MURCHISON STRATEGY

Roderick O'Connor, GMS Manager, Rural Adjustment, PO Box 108, Meekatharra WA 6642

Introduction

The Gascoyne Murchison Strategy evolved out of concerns for the pastoral industry and the effect on the resource base from an industry that has experienced long term declining terms of trade and a series of poor seasons occurring over much of the Gascoyne area in 1993 and 1994.

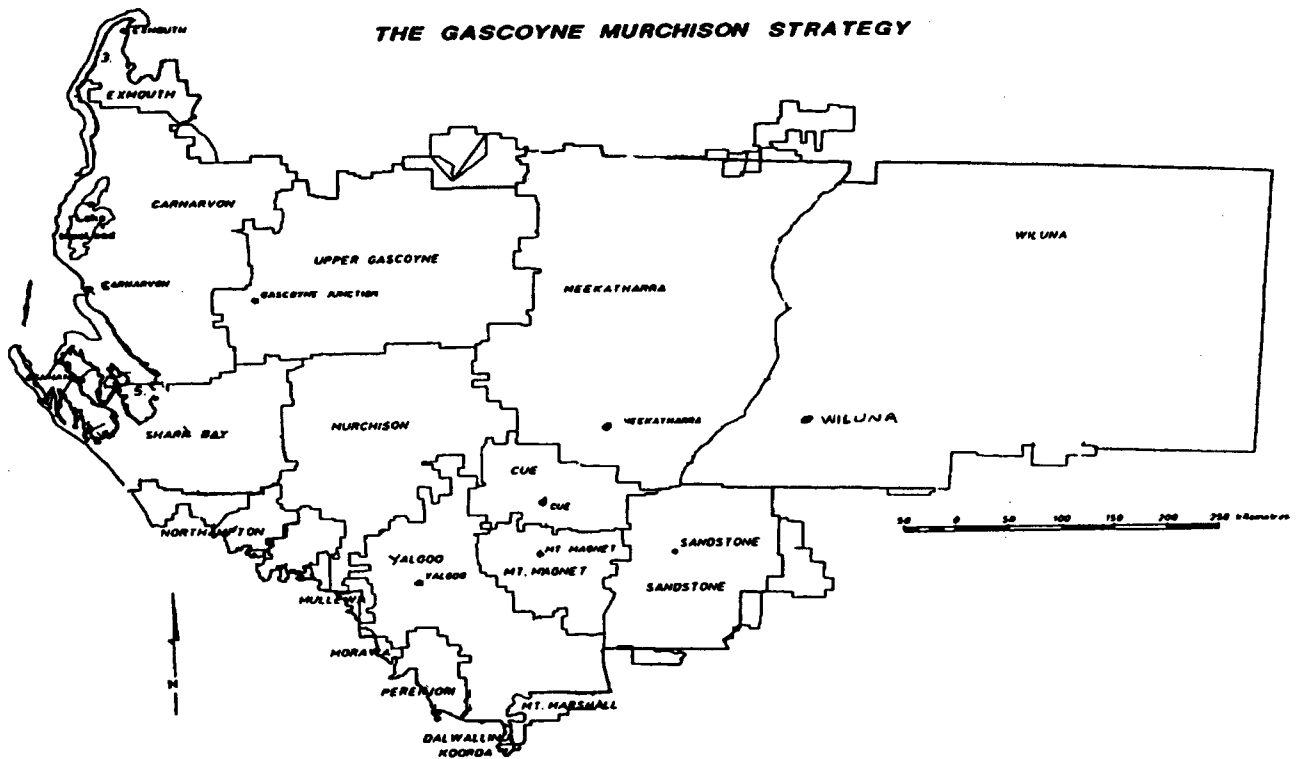
The pastoral industry in Western Australia had been the subject of a number of investigations and reports, the most recent of which was the 'Opportunities for Regional Rural Adjustment' (Barson *et al.* 1993). Other reports include the 'Pastoral Wool Industry Task Force' (Robertson *et al.* 1993) and 'The Present and Future Pastoral Industry of Western Australia' (Jennings *et al.* 1979). These reports highlighted the difficulties being faced by the pastoral industry and all made similar recommendations designed to address the issues.

In May 1995 the Western Australian Government, in consultation with industry representatives, initiated the Gascoyne Murchison Rangeland Strategy. A steering group was appointed to develop the Strategy to address issues impacting on the long-term future of sustainable rangeland occupation.

The Strategy area contains the shires of Exmouth, Carnarvon, Shark Bay, Upper Gascoyne, Murchison, Meekatharra, Cue, Mt. Magnet, Yalgoo, Wiluna and Sandstone and 20 adjoining properties in the shires of Dalwallinu, Mt. Marshall, Morawa, Mullewa, Northampton and Perenjori (see map on following page).

Consultation Process

The Steering Group, under Chairman Ian Laurance and with member representatives from the pastoral and mining industries, aboriginal interests and conservation groups, conducted a number of well-attended workshops throughout the Gascoyne Murchison area. Through these workshops and on the basis of written presentations the Steering Group identified over 1000 issues defined by stakeholders as being relevant to their future. The Strategy then developed these issues into recommendations for future action. Government considered these recommendations and an endorsed action plan was developed and resourced under the umbrella Rural Partnership Program. The following outlines that endorsed action plan.



THE GASCOYNE MURCHISON STRATEGY

Gascoyne Murchison Strategy (GMS)

The Gascoyne Murchison Strategy aims are to assist and support the development of existing and new industries to increase the capacity of people and businesses in the rangelands to become self reliant and sustainable into the future.

The GMS has the support of both the Federal and Western Australian Governments in funding fifteen measures (grouped into three categories) aimed at achieving the goals of the Strategy. In Western Australia eighteen government agencies are involved with a commitment of about \$37 million, over three to five years, to assist the implementation of the following measures.

1. Activities directed to an individual business:

- Business Planning (\$1,988,750)
Grants to access business management and planning expertise and learning opportunities for managers of pastoral enterprises.
- Implementation of Business Plans (\$3,895,000)
Grants for implementation of station business plans to increase business productivity, profitability and sustainability.
- Voluntary Lease Adjustment (\$3,477,000)
Brokering process that enhances adjustment of lease size and ownership to achieve more profitable and sustainable land use.
- Total Grazing Management (\$2,150,000)
Cost-sharing arrangements to install approved Total Grazing Management Systems and components on pastoral leases.

- Remote Area Power Supplies (\$435,000)
Additional assistance to install 24 hour power supplies for remote homesteads to increase accessibility of communications, education, information and business services.

2. Activities directed to industry:

- Access to Commercial Finance (\$40,000)
Investigation of access to commercial finance and new finance options for pastoral businesses.
- Industry Self Management (\$1,475,000)
Investigation of opportunities, strategies and requirements for increased industry self-management; experimentation with new management and production systems.
- New Technology (\$450,000)
Research into electronic control and monitoring of stock and water supplies for pastoral production systems.
- Climate Forecasting (\$891,000)
Research into regional climate variability, climate forecasting and use of climate information in rangeland management.
- Rangeland Awareness (\$80,000)
Enhancement of local and wider community awareness of rangelands and rangeland industry issues.

3. Activities directed to the region:

- Regional Alternatives (\$2,943,000)
Resources to research and develop new enterprises, industries and activities which enhance and diversify the regions' economic base; and coordination of major industry and resource development projects including groundwater, horticulture, aquaculture and tourism development.
- Conservation Reserve System (\$13,300,000)

Identification, establishment and management of a system of representative conservation reserves and off-reserve conservation agreements.

- Carnarvon Artesian Basin (\$4,044,000)
Rehabilitation and reticulation of artesian bores to achieve sustainable and efficient management of water supplies in the Carnarvon Artesian Basin.
- Rangeland Environmental Objectives (\$760,000)
Define objectives, assessment criteria and objectives for the range of land management categories.
- Identify biodiversity levels and high conservation value ecosystems across landscapes.
- Develop and monitor the range of biodiversity management systems and biodiversity conservation measures.
- Achieve market-driven sustainable production systems based on biodiversity management systems and principles.
- Strategy Support and Evaluation (\$1,565,000)
Effective planning, implementation and management of the Gascoyne Murchison Strategy.
- Monitoring progress and evaluating projects for use in other rangeland areas.

Following the expected launch of the strategy in April 1998, the GMS will publish a manual explaining:

- the complete details of all fifteen measures,
- the process by which an unique competitive subsidiary grant system will operate, and
- other necessary information, including the requirements for applications and the assessment criteria for determining successful projects.

Conclusion

The Gascoyne Murchison Strategy has many challenges ahead. However, the integrative nature of its component parts will allow considerable leverage to effect change. We believe this is the strength of the strategy.

For further information, contact:

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EFFECTS OF HERBIVORES, WOODY WEEDS AND THE SUSTAINABILITY OF PASTORALISM IN THE SOUTHERN AUSTRALIAN RANGELANDS

Fleur Tiver, School of Environmental Management, University of South Australia, The Levels SA 5095

This article was prompted by Carolyn Ireland's article (Ireland 1997) in the November Newsletter. Her Ph.D. results suggest that for the western myall (*Acacia papyrocarpa*), rabbits appeared to be more of a threat to seedlings, and hence survival of the species, than sheep. She suggested that reducing stocking rates or spelling after recruitment events would not improve the situation for western myall.

My Ph.D. (Tiver 1994, Tiver and Andrew 1997) investigated regeneration of 59 species of trees and shrubs with various grazing histories in the Yunta/Olary district of South Australia between 1988 and 1993. The results show that the response of western myall to grazing by sheep and rabbits is by no means typical of arid trees and shrubs, so management practices suitable for it are not necessarily applicable to other species. I will summarise my findings here and comment on their significance for the ecological sustainability of the southern Australian rangelands.

I located sites of known grazing history by four large herbivores; sheep, rabbits, goats and kangaroos. Regeneration success in populations of trees and shrubs was recorded as a percentage of "young mature" adults present. These are individuals which have been able to survive through seedling and juvenile stages over a number of years to become successful reproductive members of the population. A level of 17% or higher of these indicates that there is sufficient regeneration for the population to survive in the long term. Any less and the population is senescent, skewed to large and mature trees with no replacement saplings (Pickard 1991).

Relative Effects of Different Herbivores

The results show that for 41 of the 59 species, increased levels of sheep grazing is associated with lowered regeneration levels. Only a few species are affected by rabbits or goats, and not to critical levels. Kangaroo grazing is comparatively unimportant, as would be expected from a co-evolved herbivore. Seven species are most at risk: mulga (*Acacia aneura*, see Figure 1), native pine (*Callitris columnellaris*), two subspecies of desert cassia (*Senna artemisioides coriacea* and *S. artemisioides platypoda*), bullock bush (*Alectryon oleifolius*), sugarwood (*Myoporum platycarpum*) and spiny saltbush (*Rhagodia spinescens*). Moderate to heavy sheep grazing (such as found within 5 km of watering points) can reduce their regeneration to levels where populations cannot be maintained. These findings support those of Crisp and Lange (1976; 1978) for mulga. However, these seven species do appear to be able to regenerate at sites with intermittent or very light grazing, such as those found in back corners of paddocks.

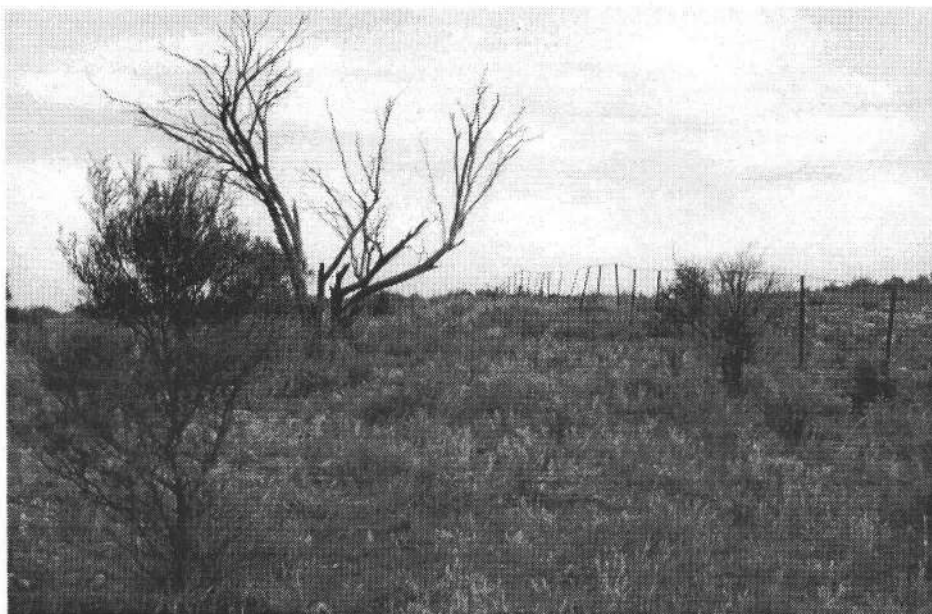


Figure 1: Mulga (*Acacia aneura*). Juveniles approximately 20 years old on a Barrier Highway roadside reserve 12 km east of Olary. The site has had large numbers of rabbits present, indicated by the presence of several large warrens, but has been protected from sheep grazing since 1965.

A possible reason for the greater long-term effects of sheep than goats or rabbits are the different population dynamics of domestic livestock compared with feral and exotic animals. When seasonal conditions deteriorate, both sheep and rabbits are forced to switch from ephemeral to shrubby species. Rabbits certainly do eat seedlings (Cooke 1987) and occasionally ringbark shrubs and trees at the end of good seasons, but they are unable to cope with a woody diet, and populations die off rapidly at the onset of dry conditions (Ratcliffe 1936). On the other hand, sheep are restrained by the fencing system and management aims of the pastoralist, and numbers can artificially be kept high in spite of deteriorating forage conditions as long as water is available, and long after rabbits have ceased to have any impact (Reid 1993). It appears that the occasional rabbit plagues, though spectacular, have a lower overall effect on regeneration than the steady and complete disappearance of juveniles caused by sheep. Previous literature (Norris *et al.* 1991) suggests that rabbits are the most significant herbivore in reducing shrub regeneration and it is possible that the much larger populations of rabbits present and frequency of plagues before myxomatosis was introduced in 1950 were sufficient for rabbits to have a greater effect than they do now. It is also quite likely that rabbit plagues are more frequent and severe in sandy country and may have more significant effects on tree and shrub regeneration there (McCarter 1988).

The lesser importance of goats may be due to their browsing habit. Canopy grazing is less of a threat to recruiting seedlings, and though visually obvious at various times, must not be sufficiently harmful to cause long-term effects to the population structure.

It was encouraging to note that most of the chenopod bush species such as bladder saltbush (*Atriplex vesicaria*), blackbush (*Maireana pyramidata*) and low bluebush (*M. astrotricha*) do appear to be able to regenerate successfully under the present grazing regime. It seems then, that existing grazing management will permit the maintenance of present bush cover.

“Woody Weeds” and Importance of Historical Events

“Woody weeds” are loosely defined as undesirable species capable of rapidly increasing in response to grazing. My results show that regeneration of nearly all species is negatively affected by sheep grazing, and that there are no true “increaser” species. This suggests that there is an overall reduction in total numbers of woody perennial individuals in the landscape. It is still possible that some species are less affected than others, giving the false impression that they are increasing in absolute terms. This means that “woody weediness” is not an absolute characteristic of a plant species, since the changes seen over a whole landscape are due to the relative susceptibility to grazing of the species and varieties present. This explains why plants such as *Senna artemisioides platypoda* and *Acacia aneura* have been cited as woody weeds in western New South Wales, but were found to have absolute reduced regeneration in my study area.

Another explanation for the perception that woody weeds are rapidly encroaching is that past severe grazing pressure may have caused dramatic transition changes to the landscape as described by Westoby (1989). Relatively non-susceptible species such as turpentine bush (*Eremophila sturtii*) and nitre goosefoot (*Chenopodium nitrariaceum*) have been able to preferentially invade areas where populations of highly susceptible species such as bladder saltbush and desert cassia were destroyed by over-grazing during the droughts of last century.

Conclusions

Present management practices do not appear to affect critically the regeneration of most of the chenopod shrubs, so economically sustainable pastoralism should be an achievable goal (Friedel *et al.* 1990). However, the recommended pastoral management technique of locating additional watering points and reducing paddock sizes to spread stock more evenly in the southern rangelands may actually be detrimental to certain highly grazing-sensitive species of trees and shrubs. A network of small ungrazed reserves as suggested by Stafford-Smith

and Morton (1992) may be a more appropriate means of conservation for these and similar species. Relying on rabbit control alone will not be sufficient to ensure survival of these species. "Woody weeds" are a symptom of overall changes to vegetation composition in response to grazing rather than a problem caused by individual species. Therefore, management practices such as grubbing, burning, and mass-grazing with goats (Green 1983) to remove "woody weeds" are unlikely to be successful and may even exacerbate the perceived problem. It is highly important to avoid deleterious transition events such as severe overgrazing which can alter the vegetation to a more "weedy" state as these transitions may not be practically reversible.

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REGENERATION OF MULGA GROVES: Drought, Death and Clearing

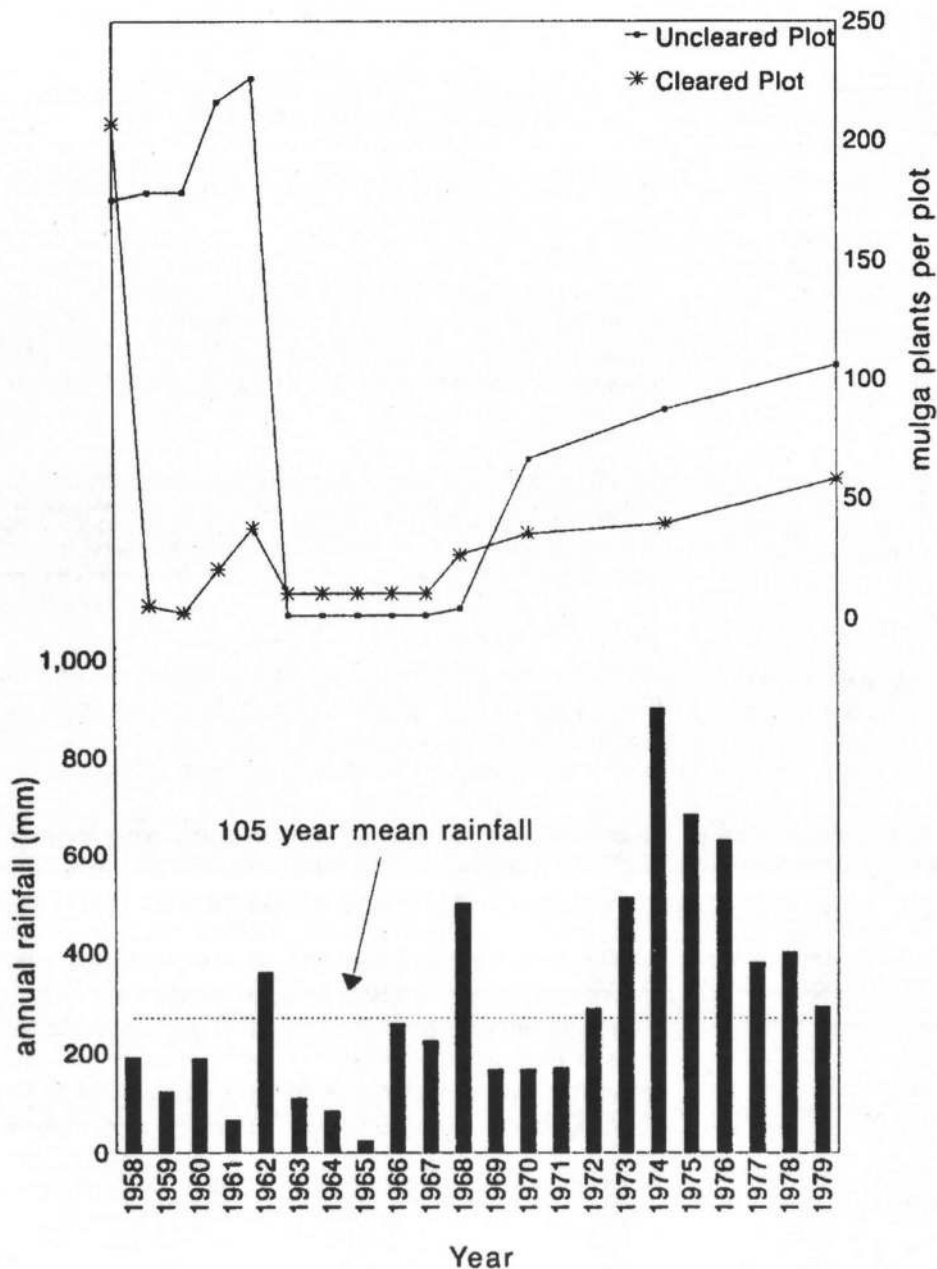
Bob Winkworth, 28 Dalhousie Street, Haberfield NSW 2045
(formerly CSIRO, Alice Springs)

In the second issue of the *Range Management Newsletter* last year (RMN 97/2, pp. 3-7), I described how we sought, and failed, to find a way to improve desert country for cattle production. During the same period, we were observing plots of mulga (*Acacia aneura*) country with the same optimistic aim. In particular, we worked on the Burt Plain just north of the MacDonnell Ranges in central Australia where the pattern of banded groves, separated by about equal areas of bare soil, depict a contour map of about 1-2 cm height interval over a large plain. Both the hard spinifex (landscape for the previously described study) and mulga country were struck by the fearsome drought of 1958-66 and the record deluge of 1973-76, and each plant emerged as a local hero. So if you think, as I do, that the stability of the mulga plain is important to the integrity of neighbouring productive pastures, then the general gist of the results, as summarised below, will interest you.

Each of our plots encompassed part of a grove lying centrally to, both up and down slope, of a piece of intergrove. The mulga were felled by hand; one set of plots was furrowed and another set was left untreated. During the drought years, one reasonable rain ranging from 55 to 109 mm fell each year except 1964 and 1965. These rains promoted a small growth of the herbage layer at each occasion. It was not until the heavy rains of 1968 that an appreciable growth of mainly kerosene grass (*Aristida contorta*) was measured and seen to be exceptional compared to the usual quantities produced by good rain in this type of country. Despite torrents of rain falling through the 1970s (see figure on following page), grass production fell away. It was not worth measuring as a grazing proposition. Buffel grass (*Cenchrus ciliaris*), sown in the furrows, germinated in 1962 and was written off as a failure when the seedlings died in wet soil.

I had noticed mulga seedlings appearing after any reasonable rainfall in the early years of the drought. They were on all plots, whether cleared or not. It prompted us to continue to count and measure mulga. This regeneration and the growth of original mulga nearly came to an end between 1962 and 1965. On the untreated plots, every mulga except two of the original trees died. On the felled plots, an average of ten seedlings per plot survived (see figure). The area around the plots had an estimated 95% mortality of mulga and was one of the patches of mulga country more severely affected by the drought.

Regeneration of mulga got underway again in 1968 with new seedlings being found each time we measured the plots. Within 11 years, the number of mulgas on the uncleared area had returned to 60% of the original, compared to 30% on the cleared plots. Also in that time, five plants per plot had grown to heights of 5 to 6.5 metres, the maximum seen in the area. At the beginning, the groves had equal numbers of mulgas in size



Annual rainfall during the study period and numbers of mulga (*Acacia aneura*) on cleared and uncleared plots.

groups of less than 0.5 m, 0.5 to 1 m, 1 to 2 m, 2 to 4 m and the "trees" from 4 to 6.5 m. In fact the size distribution of the plants was shaping up to something like the original, except for the dearth of the smallest and youngest - perhaps the seed bank was running out, not surprising since there had been no seed produced since before 1958. The point is that these groves have a long-term replacement program with seeds of different germination potentialities lying snugly under an intact litter layer waiting for their germinating rain. The worst drought of the century nearly wiped out the stand but the system was in place to enable recovery - and it worked.

The regeneration of mulga plants from seed did not seem to depend on having more than incident rain whereas survival of intact groves, and possibly seed formation, seems to need additional water. This water comes from intergroves where, during heavy rain, the relatively impermeable soils induce considerable runoff to the groves. There it infiltrates until the soil is saturated. Continued rain then spills water to the lower intergrove and so on downslope to the shallow channels which drain the plain. Here I see a system where the survival of

mulga in groves depends on runoff and where the stability of the intergrove surface needs the windbreaks and flow modulation given by the groves.

The danger is that disruption of the flow of water across the intergrove would lead to a deleterious effect on the whole system. For example, our contour furrows became barriers to runoff. Measurement of grass and forb yields in 1968 showed that furrows had become niches for growth in the intergroves at the expense of much reduced growth in the former groves. Yields from the furrowed plots were less than from other plots, where 95% of their growth took place in the grove area. This situation did not last. Furrows not breached during rain in 1968 were thoroughly destroyed in the 1970s when the intergroves returned to good, smooth, bare surfaces. Longer lasting obstacles might lead to death of mulga, groves filled by erosion from the intergroves and a community of small plants scattered sparsely over the area or concentrated at the obstacle.

My virtual sign reads **KEEP OFF THE INTERGROVES.**

RANGELAND DESERTIFICATION WORKSHOP IN ICELAND

David Tongway, CSIRO, PO Box 84, Lyneham ACT 2602

Most Rangelanders will not associate Iceland with deserts or soil erosion. But in fact Iceland has suffered rangeland degradation since it was settled in 870 AD. Now, almost one third of the country is almost bare of vegetation and is severely eroded. Iceland has one of the earliest established Soil Conservation Agencies in the world, 1907. Participants in the Desertification Workshop held between September 16 and 19 last year were able to see the quality of the rehabilitation work that has been done over that time. Much has been achieved in the agricultural areas where grazing and hay-making are active, intensive processes. There is a 60-day period in Spring/Summer when pastures grow and are converted into hay reserves before climatic conditions become too cold with the onset of late Autumn.

The workshop was sponsored by the European Union and the World Association of Soil and Water Conservation (WASWC) and was attended by 80 delegates representing 30 countries. There were several Australians present, among them David Sanders, President of WASWC, Ian Hannam, NSW Agriculture, Rod Gallacher, FAO, Rome and John Ludwig and myself. I felt proud to be an Australian, as our contribution to the workshop was out of proportion to our population.

I went on a pre-conference tour to Husavik on the north eastern coast of the island. On our flight there, the aircraft circled within the crater of an intermittently active volcano. The cabin filled with sulphurous fumes from a smoking cone! Open access grazing during the summer has denuded the rangeland of vegetative cover and resulted in a "black desert" comprised of young, sand-sized basaltic material, which is mainly glacial till. This soil has the cohesiveness of loose ball-bearings. We could see an offshore island which marked the Arctic circle. There could hardly be a bigger contrast in soil age between two countries than between Australia and Iceland. They are dominated by very young volcanics with minimal weathering. One piece of excitement was getting our bus stuck in a deep snow-drift just on dusk, 40 km from our hotel. Our driver had a well-practiced technique which got us out eventually at 10 PM.

The conference had an unusual arrangement. There was a single day of plenary and diplomatic style presentations in Reykjavik, followed by a full day field tour ending at Klaustur, a small town about 350 km to the east of Reykjavik. A two-day workshop was held here on technical and social aspects of desertification. The field tour emphasised the immense soil conservation problems and the very successful, but crippling expensive, soil conservation measures needed. John Ludwig and I presented our ideas about evaluating the basic nature of desertification and what might be done about it. The conference papers are to be published in a book by Kluwer Academic.

I really enjoyed the experience of seeing the Icelandic landscape. Our hosts were extremely hospitable, with some very nice personal touches, such as the Director of Soil Conservation driving 150 km to meet me at the airport and take me to the hotel in Reykjavik!

ELECTRONIC CONTROL OF GRAZING CATTLE

Robert R Rouda, Agriculture Western Australia, PO Box 522, Carnarvon WA 6701

Abstract

Unregulated access of animals is a serious cause of land degradation. At current profit margins, most pastoralists are reluctant or unable to invest in costly fencing. Electronic technology may prove a cost effective alternative. A prototype system, developed and tested in the US, involves a radio transmitter that signals a receiver eartag which deters pre-conditioned animals, using audio then electric stimulation, as they approach a designated exclusion zone, without significant effect to animal welfare. The device must be further developed to reduce size and weight of the eartag and increase its durability. Development should include a transportable, solar-powered device capable of confining animals within an area rather than merely keeping them out. This is a unique opportunity for Australia to develop, manufacture and market this breakthrough in land management technology. Progress is being made to this effect.

Introduction

Severe overuse of pasture by livestock for extended periods can result in vast and irreversible environmental degradation. Traditional methods of controlling the movement of grazing livestock include herding or shepherding and the installation of physical barriers. The cost of implementing each of these methods over extensive areas is often prohibitive. Much of the early work aimed at overcoming this dilemma focused on developing various forms of permanent or semi-permanent wire fences. More recent attempts have included the control of grazing movement using water, salt and/or post burn vegetation as lures. Despite their great appeal, each has inherent limitations under certain environmental conditions. For example, the effectiveness of water is affected by a multitude of factors such as the frequency and intensity of precipitation, temperature and the amount of moisture and salt contained in vegetation. Likewise, the effectiveness of mineral supplements as a lure is greatly influenced by the concentration of salt in vegetation and stock water. In arid areas, lack of fuel and the erratic occurrence of rains crucial for germination and resprouting often limit the use of fire.

American Pioneering

Driven by the need for a cheaper means for keeping cattle away from sensitive river frontage, scientists with the US Forest Service developed technology that may prove practical and cost effective. The device uses a combination of remotely activated audio and electrical signals (Quigley *et al.* 1990, Tiedemann and Quigley 1994). Two consecutive field tests were conducted. The first involved yearling steers on irrigated coastal Bermuda grass pasture in Texas and the second was in

Nevada using yearling heifers on a riparian area dominated by conifer and aspen with small, interspersed openings of sagebrush grassland. Treatment animals were placed in paddocks divided into grazing and exclusion zones. The partition was achieved through the emittance of radio signals from transmitter boxes within the paddocks (range approx. 150 m) to eartag receivers worn by treatment animals whenever they approached the exclusion zone. Once signalled, the eartags (sized 8 by 15 cm and weighing 100 g), delivered a sequence of audio then electrical stimuli. A positive result was recorded when animals were observed turning away and walking in the opposite direction. If the animal failed to change direction after a sequence of four consecutive audio warnings and mild electric shocks, the mechanism locked up in the interest of animal welfare. A device located at water within the grazing zone electronically unlocked the eartag so the animal again received the audio/electrical stimulus on subsequent approaches to the exclusion zone. The large number of correct responses observed during these trials (between 80-93%) indicated the technology worked on trained (pre-conditioned) animals. However the inventors were keen to mention it was imperative a smaller, lighter and more durable eartag be developed before the technology could be commercially applied.

In a third trial, the effect of electronic diversion from riparian areas on livestock grazing behaviour, nutritional physiology, stress physiology and performance was assessed (Keim *et al.* 1994). Control animals gained 19% more weight than treatment animals and selected diets higher in crude protein ($P < 0.05$). However, no differences ($P < 0.10$) were observed between the two groups in body condition and serum hormone levels (used as an indicator of physiological stress). Nor were there any differences between groups for dietary nitrogen and fibre components ($P < 0.10$) and it was concluded the minor effects electronic diversion had on animal performance were probably related to changes in available diet quality.

Australian Application

In terms of our cattle industries' needs, few would dispute the revolutionary impact such technology could have on our current grazing management practices. The development of a durable and recoverable ear stud roughly the size of a 20 cent coin and capable of receiving signals from a solar-powered transmitter located five kilometres away is not inconceivable, according to CSIRO engineers I have consulted. Animal movement or access to vulnerable vegetation could be effectively controlled by simply relocating the transmitter. No more over grazing or related pasture degradation. If the transmitter's signal could be progressively relocated closer to herd yards, mustering costs could be greatly reduced. Only a property's boundary fence would need to be of conventional wire.

Progress to Date

In August 1996, the Land and Water Resources Research and Development Corporation (LWRRDC) and Agriculture WA

jointly funded a study tour to the US where I met with Scientist Emeritus Arthur Tiedemann and purchased a prototype device. Thanks to additional funding provided by Environment Australia, LWRRDC and Agriculture WA, I am in the process of conducting a nation-wide review of extensive and intensive beef and dairy enterprises to identify the costs currently associated with conventional control management (i.e. fence installation, monitoring and maintenance; mustering costs; management opportunity costs; reduced productivity as a result of pasture degradation etc). This information will then be used as an indicator of what various producer groups may be prepared to pay for an effective electronic alternative. Once this price range has been established, I will endeavour to determine whether electronic eartags can be developed to market expectations, by whom, where and at what cost. I hope to complete this current feasibility study by May 1998. If the outcome is favourable, I hope to identify developers and funding partners, present them with the information collected and invite them to undertake the commercial development of the technology.

Future Implications

This work has led me into a new and exciting field of animal production. Our livestock industries are crying out for electronic technology that will make their production more efficient. Electronic animal identification, remote sensing of infrastructures such as waters and electric fences, the use of electronic tracking and control devices are destined to become standard animal management tools early in the 21 century.

I invite anyone requiring further information to contact me on (phone) 08 9956-3333 or (email) rrouda@agric.wa.gov.au.

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MEET THE REST OF THE NEW COUNCIL

In RMN 97/3 we met most of the new ARS Council members. In this issue, the two Vice Presidents introduce themselves.

Peter Johnston - Vice President

I am employed by the Sheep and Wool Institute within the Queensland Department of Primary Industries and work across western Queensland. For eleven years I was based at the Charleville Pastoral Laboratory. I am now based in Brisbane and maintain an overview of rangeland research, development and extension (RD&E) for the Sheep and Wool Institute. The DPI has maintained a strong rangeland RD&E team since the 1960's and in conjunction with industry funds has contributed much to the understanding of rangeland ecology in Queensland.

My work is focussed on the productive use of rangelands. This has included native pasture primary productivity studies, computer modelling of forage growth and utilisation, production and harvesting of native grass seed, the development and application of methodologies for estimating 'safe' livestock carrying capacities on individual properties and the management of RD&E for Queensland's grazing industries. I am particularly interested in linking the practices of sound land managers with ecological principles to promote the financial and environmental benefits of sustainable grazing land management.

I feel privileged to be a Vice President of the Australian Rangeland Society and will attempt to address rangeland issues in an open and objective manner.

Fleur Tiver - Vice President

This is a late entry in the biographical stakes - so I have had the advantage of reading all the others first which makes my job easier!

I was brought up on the family sheep and cattle property at Yunta in the north-east saltbush country of South Australia. We were twenty miles from the nearest town so all primary schooling for the three of us was by correspondence, School of the Air and Mum. Poor Mum got the worst of that deal, she had so many other interesting activities to compete with. Many a time she had just settled us down for the afternoon, then Dad would bring a mob of sheep past the house and we would all disappear for the rest of the day!

Those balmy days came to a dramatic end with boarding school in Adelaide. However, my early experiences of life in the bush have stayed with me and shaped my subsequent career. From school I went to Roseworthy Agricultural College (as it was then, now part of the University of Adelaide) for a Diploma in Agriculture. Whilst enrolled there, I realised that I wanted to continue with further study in the biological sciences, so I converted the Diploma into a Science Degree at the University of Adelaide, majoring in botany and zoology.

At Adelaide I studied with Dr Bob Lange, who has been responsible for unleashing so many young range scientists onto an unsuspecting world. I caught the research fever, completed an honours degree, and started a Ph.D. looking at the effects of grazing on populations of trees and shrubs in the chenopod shrublands. After Bob's retirement, I was fortunate enough to be taken on by Dr Martin Andrew who had just moved back to South Australia, so I have had the advantage of being helped along by two of the more prominent figures in rangelands research in Australia.

After a year on the post-doctoral trail at the Smithsonian Institution in Washington DC, I returned to Australia and had the privilege of working with Joel Brown, Tony Grice and Andrew Ash at CSIRO in Townsville. Some of you may have encountered me there while I was working on prickly acacia, an introduced woody weed in western Queensland. From there I moved back into academia at the School of Environmental & Recreation Management, University of South Australia. Here I still am, teaching biology, ecology, and continuing my research into shrub population dynamics in the chenopod shrublands.

What do I see as a future for the rangelands? I once heard Steve Morton end a talk with the words "If we can't get it right, with such a large continent and such a small population, then nobody can". I like the combination of optimism and challenge contained in those words. In this country we have rangelands researchers and managers who are at the forefront of their fields worldwide. We have a well-educated, relatively wealthy population to whom environmental issues are a concern. Not only do we have the best chance of getting it right, we have a responsibility to do things right and take a leadership role in rangeland management worldwide. I also agree wholeheartedly with Eda Addicott that the responsibility for landcare must be shared by the whole population, not just those in immediate positions of care. I think the diverse profile of membership of the Rangeland Society is one of the things that promotes this approach of joint care most effectively.

NEWSLETTER COVER

Gary Bastin, Editor, CSIRO, PO Box 2111, Alice Springs NT 0871

Do we need a new cover for the *Range Management Newsletter*? It has been suggested by some that it is time we updated the design of our front cover. If you have any suggestions for a redesigned cover, then I invite you to submit a drawing plus a short explanation of why your design should replace our existing cover.

NEWS FROM COUNCIL

Manda Page, Treasurer, Department of Natural & Rural Systems Management, University of Queensland, Gatton College QLD 4345

The Council would like to announce and congratulate Allan Wilson on officially becoming a Fellow of the Australian Rangeland Society. This award is made to members of the Society who have rendered distinguished service to the Society - see the separate article by Bruce Alchin's describing Allan's distinguished service.

Thanks to Ken Hodgkinson for having been our representative on the Federation of Australian Scientific and Technological Societies (FASTS). Our new representative will be Jim Noble. We thank Ken for doing a sterling job and Jim for volunteering to be our representative in the future.

We would also like to call for expressions of interest for a group to organise and run the 11th Biennial Conference in the year 2000 or 2001. Submissions should include some information about the group, the venue, the timing of the conference, and a possible theme or themes. All submissions are required by mid May. Please address your submission to:

Eda Addicott (ARS Secretary)
Department of Environment
PO Box 731
Toowoomba QLD 4350

At our last meeting we discussed two new initiatives to be undertaken this year that I thought I would share with you. Firstly, a Web Site for the Society. This idea has been tossed around for some time and we have decided to act upon it. If you have any ideas for the type of things that should or could be included on a Web Site please feel free to contact Bruce Alchin (Subscription Secretary). The second initiative is a Membership Survey. We propose to survey past, present and potential members of the Society to gain an understanding of the future direction and composition of the Australian Rangeland Society. We want to know what members think about the biennial conference, the newsletter and the journal. A proposal for this project is currently being put together so we will keep you posted.

Finally I would like to thank all those who attended the 10th Biennial Rangeland Conference here at Gatton last December. I found the conference to be both informative and enjoyable, I hope you all did too. It was nice to finally put faces to those names. Thanks for your support.

DR ALLAN WILSON - ARS FELLOW

Ed. Dr Wilson was made a Fellow of the Australian Rangeland Society in 1997. The nomination in support of his award was printed in RMN 97/2. Here, the ARS Council pay tribute to Allan's contributions to the Society over the years.

Allan is a foundation member of the Society and has served the Society since that time through positions of leadership and sound academic and realistic contributions on many issues of rangeland management. His balanced approach to conflicting issues (e.g. kangaroo harvesting) is testimony to both the breadth and depth of his knowledge and understanding of the complex interactions involved in rangeland management. Recognition of his past contributions is clearly indicated by the ongoing demands for his input in a wide range of commercial, conservation, research, academic and organisational matters. Allan's contribution to the Society for over two decades has ensured a sound foundation for the Society to play a valuable role in the now high profile issues of rangeland management.

NOTICE OF ANNUAL GENERAL MEETING

Peter Johnston, QDPI Animal Research Institute, Locked Mail Bag 4, Moorooka QLD 4105

The 1998 Annual General Meeting of the Australian Rangeland Society will be held at 7 PM on Friday 22 May 1998 at the Gatton Campus of the University of Queensland, Gatton. The campus is approximately one hour from Brisbane on the Toowoomba Road. The AGM will be in the Tea Room on the ground floor of the Rural and Natural Systems Management Studies building.

The agenda will include:

- Council report,
- Audit report,
- Council report on election of Vice-Presidents, Honorary Treasurer and Honorary Secretary,
- correspondence,
- and general business.

NEW BOOK

The Biology of Australian Weeds Volume 2

Edited by F.D. Panetta, R.H. Groves and R.C.H. Shepherd
328 pages, \$59.50 plus \$10.00 postage in Australia

The publication of *The Biology of Australian Weeds Volume 1* at the end of 1995 reviewed sixteen of Australia's worst weeds. Seventeen more of these weeds are now reviewed in the newly published *Volume 2*. These plants are responsible for significant land degradation and threaten farms, waterways and park land. They contribute significantly to Australia's weed costs of over \$3 billion per year.

The Biology of Australian Weeds Volume 2 is another essential text for research staff, students, consultants, naturalists and others interested in weeds and the environment. The book is based on a series of papers by some of Australia's foremost weed scientists, that were first published in the *Journal of the Australian Institute of Agricultural Science* and more recently in *Plant Protection Quarterly*. The papers, published over a period of 17 years, have been brought up to date by either the original authors or by other highly qualified researchers.

The detailed text has been edited by three of Australia's leading weed scientists: Dane Panetta, Alan Fletcher Research Station in Sherwood, Queensland; Richard Groves, CSIRO Division of Plant Industry in Canberra; Ros Shepherd, an entomologist originally from the Keith Turnbull Research Institute, Frankston and now pursuing a career consulting on weed related topics.

Each weed is reviewed in considerable detail and information on its name, description, history, distribution, habitat preferences, growth and development, reproductive processes and hybridisation, population dynamics, importance in Australia, legislative restrictions and methods of management are examined in detail. The reviews are complemented with line drawings, maps, graphs and photographs.

The weeds described in this book are problems over a wide variety of areas in Australia. Cabomba (*Cabomba caroliniana*) and common reed (*Phragmites australis*) are weeds of aquatic areas. Parthenium weed (*Parthenium hysterophorus*), rubber vine (*Cryptostegia grandiflora*), lantana (*Lantana camara*) and prickly acacia (*Acacia nilotica*) are weeds of tropical pastures and natural ecosystems. Sifton bush (*Cassinia arcuata*), doublegee (*Emex australis*), catsear (*Hypochoeris radicata*), European blackberry (*Rubus fruticosus*), fireweed (*Senecio madagascariensis*), gorse/furze (*Ulex europaeus*), squirrel-tail fescue (*Vulpia bromoides*) and rat's-tail fescue (*Vulpia myuros*) are weeds of temperate pastures. Doublegee (*Emex australis*), soursob (*Oxalis pes-caprae*), wild radish (*Raphanus raphanistrum*) and the *Vulpia* spp. are weeds in cropping areas while boneseed/bitou bush (*Chrysanthemoides monilifera*), broom (*Cytisus scoparius*) and European blackberry (*Rubus fruticosus*) are problem weeds in temperate bushland areas.

The Biology of Australian Weeds Volume 2 is printed on quality paper and is section sewn for strength. With 328 pages, it is conservatively priced at \$59.50 plus \$10.00 postage in

Australia and \$25.00 postage overseas. Prices are in Australian dollars.

Both volumes of *The Biology of Australian Weeds* are available direct from the publishers:

R.G. and F.J. Richardson, PO Box 42, Meredith, Victoria 3333, Australia

Phone/Fax +61 3 5286 1533, email robfiona@iaccess.com.au

NEW MEMBERS

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Perth WA 6000

PRESENTATION SKILLS AND MEDIA SKILLS WORKSHOPS

Jenni Metcalfe, ECONNECT, PO Box 734, South Brisbane
BC QLD 4101

Presentation Skills Workshop

The aim of this workshop is to help participants to communicate their message effectively to a range of audiences.

Over two-days the workshop teaches scientists to:

- give presentations with confidence,
- structure talks in a logical way,
- handle the unexpected question, and
- use visual aids to add impact.

Specific topics include:

- structuring and preparing an effective presentation,
- framing the message,
- overcoming nerves,
- using body language, voice and gestures,
- analysing the audience,
- making the best use of audio-visual aids, and
- dealing with questions.

Media Skills Workshop

The aim of this workshop is to help scientists control their media appearances.

The practical two-day workshop teaches you to:

- give your message to the media with confidence,
- practice your interview technique with working journalists, and
- get your message out accurately.

Improve your interview skills through practice sessions in front of the camera and microphone. Work with journalists to shape your story ideas into a format to interest media.

Specific topics include:

- answering questions from television, radio and newspaper journalists,
- turning good science into good media,
- making the big announcement,
- knowing what to do when a journalist knocks on your door,
- emphasising the important message,
- handling the difficult questions, and
- organising a good media release.

The Presenters

Toss Gascoigne and Jenni Metcalfe have backgrounds in journalism, science communication and education. They work in close daily contact with scientists and have been running these Workshops for six years across Australia.

For further information contact :

Jenni Metcalfe at the above address or Ph: (07) 3846 7111,
Fax: (07) 3846 7144 or Email:
jenni.econnect@b022.aone.net.au.

The Land and Water Resources R&D Corporation will provide support for scientists working on their projects to attend these Workshops.

Contact the Workshop organisers or Glenn Conroy, Phone: 02 6257 3379, Fax: 02 6257 3420 for more information.



AUSTRALIAN RANGELAND SOCIETY MEMBERSHIP APPLICATION FORM

Please complete and return to the Subscriptions Manager, Rob Richards, PO Box 235, Condobolin 2877 NSW.

I, [name]

of [address]

.....

..... Postcode

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/institution* for the calendar year 19.....

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|---------------------------------|-----------|--------------|----------------------|
| Individual or Family - | | | |
| Full (Journal + Newsletter) | \$60.00 | \$70.00 | \$80.00 |
| Part (Newsletter only) | \$30.00 | \$35.00 | \$40.00 |
| Institution or Company - | | | |
| Full (Journal + Newsletter) | \$90.00 | \$100.00 | \$110.00 |
| Part (Newsletter only) | \$45.00 | \$50.00 | \$55.00 |

Note -

Membership is for the calendar year 1 January to 31 December. All rates are quoted in AUSTRALIAN currency and must be paid in AUSTRALIAN currency.

For Office Use Only:

Membership Number.....

Date Entered in Member Register.....

Date Ratified by Council.....

