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FROM THE EDITOR

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

Almost another year has gone and it's time for the final Newsletter for this year. Perhaps the underlying theme in the feature articles in this issue is "change". In a technical contribution, Simon Reu describes a changing philosophy towards the trialling and adoption of native grass species in pasture regeneration and land reclamation work in central Australia. Under the *South West Queensland Strategy*, there appears to be substantial impetus for structural change in the mulga lands of this region. The background, detail and implications of this strategy have no doubt received considerable publicity in the region (for example through the Charleville *Mulga Line*) and many of you may be familiar with the Strategy. However, because of its attempt to improve the economic viability and pastoral sustainability of a significant area of the rangelands, I felt that the Strategy warranted further publicity through this Newsletter. Rod Williams has therefore kindly described the *South West Queensland Strategy*. Also under the banner of "change", Greg Brennan illustrates the changing fortunes and attitudes of the Kimberley pastoral industry.

This issue has reports on several recent meetings. Although regional in their coverage, these reports together provide a flavour of significant happenings in the rangelands. Ken Leighton and Ron Hacker separately describe the successful promotion of our Society at the recent International Rangelands Congress in Salt Lake City. I also have reports from recent recipients of ARS awards and should be able to include more reports in the next Newsletter.

Please keep those contributions rolling in. My cut off for the first issue of 1996 is mid February. In closing, I wish you a merry Christmas and all the best for 1996.

ASSESSMENT AND USE OF NATIVE GRASSES FOR RANGELAND REHABILITATION IN CENTRAL AUSTRALIA

Simon Reu, Land Conservation Unit, PO Box 1046, Alice Springs NT 0871

Background

During the 1970s, the Northern Territory's Land Conservation Unit successfully employed a range of techniques (pitting, opposed discing and water ponding) to establish extensive stands of buffel grass (*Cenchrus ciliaris*) in a dust control project near Alice Springs.

Following this success, the techniques have been used by the Land Conservation Unit to treat degraded land on parks, pastoral leases and Aboriginal homelands around central Australia. Buffel grass was used almost exclusively in this work because:

- buffel grass seed was readily available commercially,
- buffel grass proved to be the most useful species in the initial dust control project near town (native grasses were not tried),
- buffel grass is a valuable pasture species, and
- the establishment requirements of buffel grass were relatively well known.

Limitations of Buffel Grass

When used in the right application, buffel grass has proved to be a useful rehabilitation species. However, a recent study by Friedel *et al.* (1994) revealed that some of the work undertaken since the 1970s was not successful because it was carried out on heavy soils, on which buffel grass establishes poorly.

Another problem with buffel grass that has also become evident is that it tends to invade areas where it is not desired. Particular examples are sandy river banks and floodouts, where it can change fire regimes and displace native species (Humphries *et al.* 1994). Such invasion by buffel grass is a particular concern in and near conservation areas (such as parks) where maintenance of the natural ecology is important.

Many people believed that some of the local native grasses might provide an alternative to the exotic buffel grass for land rehabilitation. As such, a successful application for funding was made to the Land and Water Resource Research and Development Corporation (LWRRDC) by the Land Conservation Unit in 1988 to assess a range of native grass species for revegetation purposes.

Species Selection

Important attributes for rangeland rehabilitation were identified and used to assist in selecting species for assessment. These attributes included:

- Perenniality, so as to provide year-round cover.
- Good harvest characteristics - i.e. the ability to produce a good volume of seed frequently and in a form that is easily removed.
- Drought tolerance.
- Low water requirement - not dependent on periodic flooding or exceptional rainfall.
- Large basal area and biomass to provide maximum soil protection.
- Palatability, so as to encourage their use by the pastoral industry.

Selected species were *Astrebla pectinata* (barley Mitchell grass), *Bothriochloa ewartiana* (desert bluegrass), *Digitaria brownii* (cotton panic), *Diplachne fusca* (brown beetle grass), *Dichanthium sericeum* (Queensland bluegrass), *Eulalia aurea* (silky browntop), *Enneapogon avenaceus* (native oatgrass), *Enteropogon acicularis* (curly windmill grass), *Enteropogon ramosus* (creek windmill grass), *Eragrostis eriopoda* (woollybutt), *Oxychloris pectinata* (windmill grass) and *Panicum decompositum* (native millet). The selected species do not necessarily possess all of the positive attributes, but they were considered to have good potential for general use in rangeland rehabilitation work.

Seed Harvesting

Initially, seed of most species was hand picked. In some cases, we were able to vacuum seed off the ground with a hand-held motorised vacuum. Harvesting proved to be a time-consuming task and only small volumes of seed were collected.

After some success with small field trials, we realised that mechanised harvesting was required to supply sufficient seed for larger scale trials. In 1991, a vacuum-assisted brush harvester was purchased from an engineering company in Queensland (see box on p.5). This device proved efficient in collecting seed of many grass species with a diverse range of seed characteristics.

Trials

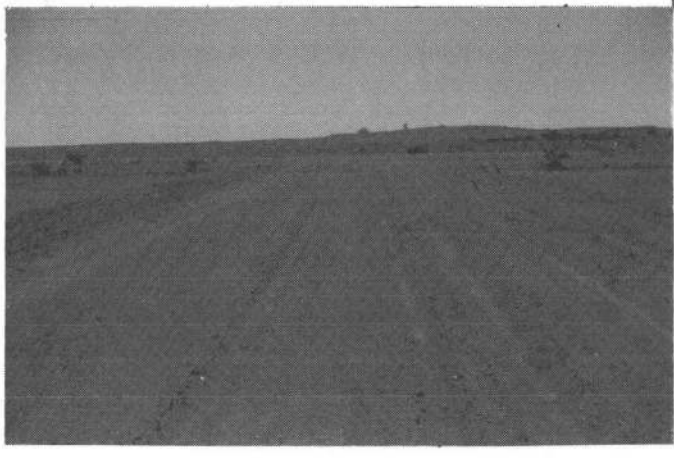
Pot trials indicated that the most appropriate sowing depth for the selected species was 5-10 mm. Germination was much reduced when seed was sown outside of this range, while seed lying on the surface was prone to removal by harvester ants.

Eleven field trials were established on a range of soil types from cracking clay and poorly structured clay loams to alluvial sandy loams. In the first trials seed was broadcast onto ripped soil and lightly covered with either a hand rake or, with larger scale sowings, a piece of mesh towed behind a vehicle. More recently, native seed has been sown through seedboxes mounted on an opposed disc plough and a Paech pitter. All trials were monitored for establishment, persistence and spread of the sown species.

On heavier textured soils, sowings have largely been restricted to the area immediately above ponding banks (Fig. 1), because it is now accepted that water ponding is the only reliable means of improving such degraded soils (Cunningham 1987, Bastin 1991). However, some work has been carried out on sandier soils and well-structured cracking clay soils in the absence of ponding banks.

Figure 1. Native grasses sown above a grader-built ponding bank on a gently sloping calcareous soil. Seed was hand broadcast onto the ripped surface and lightly covered with soil using weldmesh towed behind a vehicle.

The first photo (below) shows the germination response shortly after some rain in December 1993.



The second photo (above), taken 18 months later, shows the good growth of native grasses (mainly native millet with some Queensland and desert bluegrasses and barley Mitchell grass) after rain in January 1995.

Seed is stored for about a year prior to sowing to break short-term dormancy. The seed is sown as intact spikelets at a rate of 150-200 viable (germinable and dormant) seeds/m^2.

Results from Hand Sown Field Trials

The performance of each species is summarised in Table 1. Barley Mitchell grass (*A. pectinata)* and desert bluegrass (*B. ewartiana)* have established and persisted well on surface-crusted clay loam soils which remain unvegetated without treatment. Brown beetle grass (*D. fusca*) and windmill grass (*O. pectinata*) have proven to be useful colonising species on scalded (possibly sodic) and hardsetting soils. A combination of these species should result in establishment of a good vegetative cover on variously degraded, heavy soils.

Native millet (*P. decompositum)* and Queensland bluegrass (*D. sericeum*) both perform well under favourable soil conditions and may be useful in a mix with more persistent species.

Native oatgrass (*E. avenaceus*) germinated well and set seed rapidly when trialled on sandier soils. However, adverse climatic conditions meant that plants were very short-lived. More work is required to determine its performance under more favourable seasonal conditions.

Species selection for a particular project is of fundamental importance when using native grasses because many have very specific requirements in terms of environmental conditions. Therefore, even those species that have performed poorly in the trials may be of use in particular applications. For example, silky browntop (*E. aurea*) may be useful on well-watered sites.

How do Natives Compare with Buffel Grass?

This is a commonly asked question and probably represents a fair benchmark for comparison. On heavy textured soils, natives have often performed as well as, or better than, buffel grass. For example, at a trial on a poorly structured alluvial clay loam, buffel grass was ranked fourth in abundance in the sown area (0.14 plants/m^2) behind desert bluegrass (1.34 plants/m^2), native millet (0.56 plants/m^2) and curly windmill grass (0.2 plants/m^2). Certain native species obviously do offer an advantage here.

Buffel grass generally establishes readily on coarser textured soils. Natives such as oat grass can also be established on these soils but often they are less persistent than buffel grass.

In some grazed situations, the palatability of buffel grass may prevent it from establishing sufficiently to effectively protect the soil against erosion. In such cases, a strongly perennial, drought-tolerant native species with moderate or low palatability is more suitable. Where conservation of the natural ecology is important, native species are the only option.

More Recent Developments

Having determined which native species were potentially useful for revegetation, recent work has concentrated on developing techniques to establish these species over broader areas. The opposed disc plough and Paech pitter, as simple and robust devices, were tried with a range of species. However, inconsistent sowing depth with both implements meant that only a small amount of seed was placed at the optimum sowing depth of 5-10 mm. In addition, the seed boxes did not cope well with the chaffy nature of the seed of many of the species and sowing rates were very low. Even so, there was some establishment from seed sown in this way (particularly from barley Mitchell grass and native millet which can tolerate a greater sowing depth) indicating that the equipment has potential for sowing native grass seed. The ability of these devices to create a niche that harvests water from small showers is a valuable attribute, especially during the establishment phase.

Minor modifications are required to improve the seed delivery system and sowing depth of the two implements. Press wheels are being considered as a means of placing seed more accurately in a firmed niche. It is hoped that these modifications can be implemented and trialled in the near future.

Where to from Here?

The Land Conservation Unit has a seed harvesting program to supply its own needs and we are now using native grasses as standard procedure in our rehabilitation programs. These are mostly on pastoral and Aboriginal lands and the use of native species has been favourably received.

Low seed availability is likely to be the single biggest barrier to widespread adoption of natives by other land managers. Greening Australia Northern Territory (GANT) operates a government-funded seed harvesting program (Clarke 1993) which has made seed of some species readily available, at no cost, to landholders. The significant demand for this seed indicates that there is landholder interest in native grasses when seed is readily available. However, the program is restricted in the volume and species of seed that it can supply.

At this stage, it is doubtful that the demand for native grass seed in central Australia is sufficient to support a commercial enterprise, where seed must be sold at a profit.

Where there is a strong desire to avoid exotic species, such as on Aboriginal homelands and in conservation areas, the concept that native grasses can be successfully established from sown seed for rehabilitation purposes has met with considerable interest. This may provide new scope for rangeland rehabilitation.

The development of smaller and simpler rotating-brush harvesters that can be mounted on a four-wheel-drive vehicle would make seed harvesting a more viable proposition for land managers. This would increase the use of native species in rehabilitation work.

Table 1: Performance of selected species in field trials and their suitability for rangeland rehabilitation

Species	Seed collection	Germination & Establishment	Persistence	Potential for Use in Reseeding Programs
Astrebla pectinata barley Mitchell grass	**Excellent** - grows in large open stands. Ripe seed retained on plant. Seed is easily removed.	**Excellent** - high percentage of germinable seed. Tolerant of variable sowing depth. Excellent seedling vigour.	**Good** - plants tolerate dry conditions and set seed rapidly. Readily recruits from set seed.	**Good** - broad application on heavier soil types. Seed easily obtained.
Bothriochloa ewartiana desert bluegrass	**Reasonable** - dense stands in open areas can be found. Ripening seed drops rapidly. Timing of seed harvest is important.	**Good** - seed fill often low but percentage germination of healthy seeds is high. Germinates readily.	**Excellent** - seedlings will tolerate dry conditions and plants, once established, are very drought tolerant.	**Good** - good establishment rate and persistence on various soils but difficulty in obtaining seed and poor palatability could inhibit its widespread use.
Digitaria brownii cotton panic grass	**Reasonable** - seed is easily removed from plants but open stands are uncommon.	**Poor** - long-term dormancy - seed needs to be stored for an extended period. Seedlings are very moisture sensitive.	**Poor** - no sown plants have persisted beyond the seedling stage.	**Poor** - few plants successfully establish.
Dichanthium sericeum Queensland bluegrass	**Reasonable** - seed is easily removed but ripening seed drops rapidly. Large open stands are uncommon.	**Reasonable** - some degree of dormancy. Seedlings susceptible to moisture stress.	**Reasonable** - persists while conditions remain favourable but disappears during extended dry periods.	**Reasonable** - may find use in a mix with more persistent species.
Diplachne fusca brown beetle grass	**Good** - grows in pure open stands. Seed is easily removed. Plants mature rapidly so timing of seed harvest is important.	**Good** - germinates readily. Matures rapidly.	**Poor** - will persist while conditions remain favourable. Sets seed and recruits from seed readily.	**Good** - establishes well on hard setting clay soils and on saline soils. Good pioneer species. Useful in a mix with more persistent species.
Eulalia aurea silky browntop	**Reasonable** - seed is easily removed but ripening seed drops rapidly.	**Poor** - seed fill is often low. Germination of healthy seed is good but seedling survival is poor.	**Poor** - few sown plants have persisted beyond the seedling stage.	**Poor** - poor seedling survival but may perform better on more favourable sites.
Enneapogon avenaceus native oat grass	**Good** - grows in large open stands. Seed is easily removed but ripening is uneven.	**Reasonable** - seed fill is frequently poor. Seedlings will tolerate dry conditions and produce seed rapidly.	**Poor** - normally behaves as an annual but may persist for longer periods under favourable conditions.	**Good** - one of the few species trialled which prefers coarse textured soils.
Enteropogon acicularis curly windmill grass	**Poor** - seed difficult to remove. Does not occur as open stands.	**Reasonable** - germination percentage usually high. Seedlings intolerant of dry conditions.	**Poor** - mortality during the establishment phase is high and even after flowering, mortality is significant.	**Poor** - seed availability is a major constraint and seedling survival is poor.
Enteropogon ramosus creek windmill grass	**Poor** - seed production is low and seed ripening is uneven.	**Reasonable** - germination percentage is usually high. Seedlings do not tolerate dry conditions.	**Reasonable** - mortality during establishment is high but established plants will persist.	**Poor** - seed availability poor. Poor seedling survival and low palatability are major constraints.
Eragrostis eriopoda woollybutt	**Reasonable** - large open stands can be found. Tiny seed which needs to be separated from chaff.	**Poor** - seed is very difficult to germinate.	**Poor** - the few germinants seen did not persist beyond seedling stage.	**Poor** - germination is too difficult.
Oxychloris pectinata windmill grass	**Good** - occasionally occurs in dense pure stands. Seed is easily removed. Seed forms dense clumps which makes handling difficult.	**Reasonable** - germinates readily. Matures rapidly.	**Poor** - short-lived but sets seed and recruits readily.	**Reasonable** - establishes well on hard setting soils. Useful pioneer species. Will be useful in a mix with more persistent species.
Panicum decompositum native millet	**Reasonable** - large pure stands uncommon. Seed easily removed but needs to be separated from chaff.	**Reasonable** - germination percentage can be low due to seed dormancy. Seedlings have good initial vigour but will not tolerate extended dry conditions.	**Variable** - requires favourable conditions to persist. Seed dormancy means follow up germination is common.	**Reasonable** - may be useful in a mix with more persistent species.

The use of native grass species for broad-scale rangeland rehabilitation will probably increase slowly because it represents a far more significant undertaking than does the use of buffel grass. Buffel seed is readily available and the establishment requirements are relatively well known. Using native species on heavy soil types on pastoral land has created interest and will become increasingly common in the near future, using seed from GANT and other sources of collected seed. Meanwhile, the Land Conservation Unit will continue to develop, demonstrate and promote the use of native grasses for rangeland rehabilitation so that their use is further encouraged.

References

Bastin, G. (1991). Rangeland reclamation on Atartinga Station, central Australia. *J. Soil and Water. Cons.* **4**(2): 18-25.

Clarke, M. (1993). Greening Australia NT's 1993 native grass harvesting program. *Range Manage. Newsl.* 93/3: 7-9.

Cunningham, G.M. (1987). Reclamation of scalded land in western New South Wales - a review. *J. Soil. Cons. NSW.* **43**(2): 52-61.

Dewald, C.L. and Beisel, V.A. (1983). The Woodward Flail-Vac Seed Stripper. *Trans. Amer. Soc. Agric. Eng.* **26:** 1027-1029.

Friedel, M., Cann, B. and Wauchope, S. (1994). Pitting and opposed discing in central Australia; are they worth trying? *Range Manage. Newsl.* 94/1: 1-3.

Humphries, S.E., Groves, R.H. and Mitchell, D.S. (1991). Plant invasions of Australian ecosystems: a status review and management directions report to Australian National Parks and Wildlife Service Endangered Species Program. Project No. 58.

Whitney, R.W. and Solie, J.B. (1994). Fescue seed harvester. *Trans. Amer. Soc. Agric. Eng.* **10:** 195-200.

Rotating-Brush Harvesters

Over the years, a range of mechanical techniques for harvesting grass seed of a chaffy nature has been tried, ranging from simple beater-type harvesters to commercial crop headers - none of which could efficiently perform the task. Finally, work in the United States revealed that a brush, upwardly rotating at the leading edge, was the key to efficiently harvesting a clean sample of chaffy grass seed. This led to the design and construction of the Woodward Flail-Vac Seed Stripper (Dewald and Beisel 1983). The design incorporated a shroud over the brush to increase air velocity at the front of the brush and improve its ability to gather seed. The shroud also directs air and seed into a storage bin located behind the brush (Fig. 1). A second air vent was later added to the bottom of the machine to further improve airflow around the brush (Whitney and Solie 1994).

The design was introduced to Australia and trialled on a range of native and exotic grass species by the Queensland Department of Primary Industries. They found it to be far more efficient than any other technique they had tried. The design was further modified to increase the efficiency of operation in extensive grass stands by incorporating a vacuum to remove seed from the brush and deliver it to a larger storage bin. This machine is called a vacuum-assisted brush harvester.

A vacuum-assisted brush harvester is used by the Land Conservation Unit in central Australia (Fig. 2). The brush is located on the front of a tractor and a power-take-off driven fan creates the vacuum which removes seed from the brush and delivers it to a storage bin located at the rear of the tractor.

Smaller brush harvesters (without vacuum assistance) that can be towed behind a vehicle have also been designed.

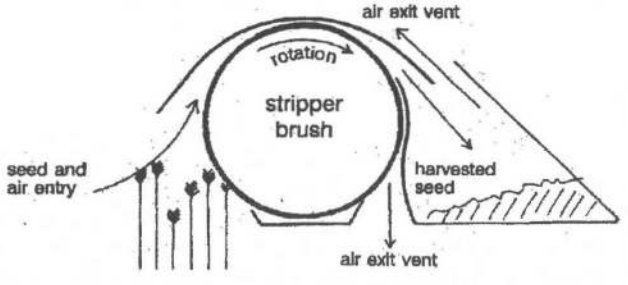


Figure 1. Simplified cross-sectional diagram of the rotating-brush harvester.

Figure 2. A vacuum-assisted brush harvester mounted on a 70 kW tractor. The brush at the front (concealed by a metal shroud) is belt driven by the small petrol motor. Seed is sucked into the rear-mounted bin by a PTO-driven fan.

LETTER TO THE EDITOR
Native Seed For Rehabilitation
A Purist Approach vs Practicality

Margaret Friedel, CSIRO, PO Box 2111, Alice Springs NT 0871

Using native plant species for rehabilitation is a popular idea, especially when biodiversity conservation is part of the goal. Simon Reu, from the NT Land Conservation Unit has been investigating the possibilities in central Australia, with funding support from LWRRDC (see previous article: pp 1-5). In recent conversations, we discussed just how local the supply of native seed should be. He drew my attention to Mike Cooper's article from November 1994, in the *Australian Journal of Soil and Water Conservation*, about seed of local provenance.

Mike Cooper writes about rehabilitation of Tasmanian National Parks, but what he says is relevant to arid zone rangelands too. He suggests that there is no evidence that introducing genetic material of the same species - but from another locality - is harmful. A rangelands example might be using different sources of seed of a particular species of Mitchell grass for rehabilitation.

Mike Cooper says the cost of obtaining little batches of local seed is high, and asks what constitutes a local population anyway? How widely does a local provenance occur?

I wonder if our readership can offer any advice on the subject? Are we really putting environments at risk by using species which occur locally, but obtaining the seed from a different locality? One could argue that in areas of high value for biodiversity, only the local material should be used. But what of the broader-scale rehabilitation of grazing lands - do we use the cheaper, non-local seed source or does this present a real risk of introducing a conservation 'weed'?

THE SOUTH WEST STRATEGY
An Integrated Regional Adjustment and Recovery Program for South West Queensland

Rod Williams, Dept. Primary Industry, PO Box 282, Charleville QLD 4470

Background

Since the 1960s it has been recognised that significant areas of south west Queensland are experiencing major economic, social and natural resource problems. Moreover, these problems are occurring at a time when government and community attitudes toward the management and use of semi-arid natural resources are undergoing profound change, with greater emphasis on resource sustainability and self reliance.

Over the past three years, extensive consultation and planning has been undertaken to develop a program to address the escalating problems of the region. This process commenced in 1991 with the Mulga Land Use Advisory Group, a group comprising representatives from rural industry, Government departments, financial institutions, and community interest groups. The advisory group was successful in establishing the Land Degradation Voluntary Property Build-Up Scheme (commonly known as the 'Mulga Build-Up Scheme'), which was launched during 1992. This scheme provided loans at concessional interest rates to eligible landholders for:

- property build-up involving the purchase, in whole or part, of additional properties; and
- property development occurring in accordance with an agreed property management plan.

In addition a Mulga Position Paper was compiled in January 1993 and at the request of Cabinet, eight interdepartmental working groups were established to further address the problems of the south west.

Findings

The working parties identified that the individual issues of economics, resource degradation and social problems were inter-related and that any future action to address these problems should be integrated. Assistance packages should aim to improve landholder self-reliance, so as to achieve land management which maintains long-term productivity and environmental values. Such assistance should also be regionally based, to encourage real change in property adjustment and resource management.

It was also identified that the problems in south west Queensland extended into New South Wales and that any approach towards rural reconstruction should be on a national basis.

Property viability was identified as the key to achieving ecologically sustainable use and development. Until this issue is addressed, the natural resources of the area will continue to degrade.

Solutions

The policies and strategies established by the Queensland and Commonwealth Governments to address issues such as drought, rural and social adjustment, ecologically sustainable development, integrated planning and land degradation can be enhanced and coordinated to provide solutions to the problems of the south west. There is a need to focus on the natural and social resources of the region to promote economic development and conservation.

The strong commitment to community consultation and participation already demonstrated in the formulation of this cross-border program will be further strengthened to ensure effective and equitable implementation, both within each State and across the region.

Approach

The Queensland Government is initiating a whole-of-government approach to developing solutions to the region's problems. The Department of Primary Industries, as lead agency, is coordinating with the Departments of Lands, Environment and Heritage, Housing, Local Government and Planning, Family Services and Aboriginal and Islander Affairs, Business, Industry and Regional Development, Office of Rural Communities and the Queensland Industry Development Corporation.

At the request of the Commonwealth, the proposal has now been linked into a regional study involving south west Queensland and the Western Division of New South Wales (Fig. 1). Queensland has, however, individually moved ahead of New South Wales and developed assistance packages for the south west.

Strategies

The integrated regional adjustment program comprises three strategies. These are briefly described here and further detail on some assistance measures is provided in the boxed section (p.9).

Property Reconstruction

The aim of this strategy is to promote reconstructed pastoral enterprises with a greater capacity for long-term economic self sufficiency and resource use.

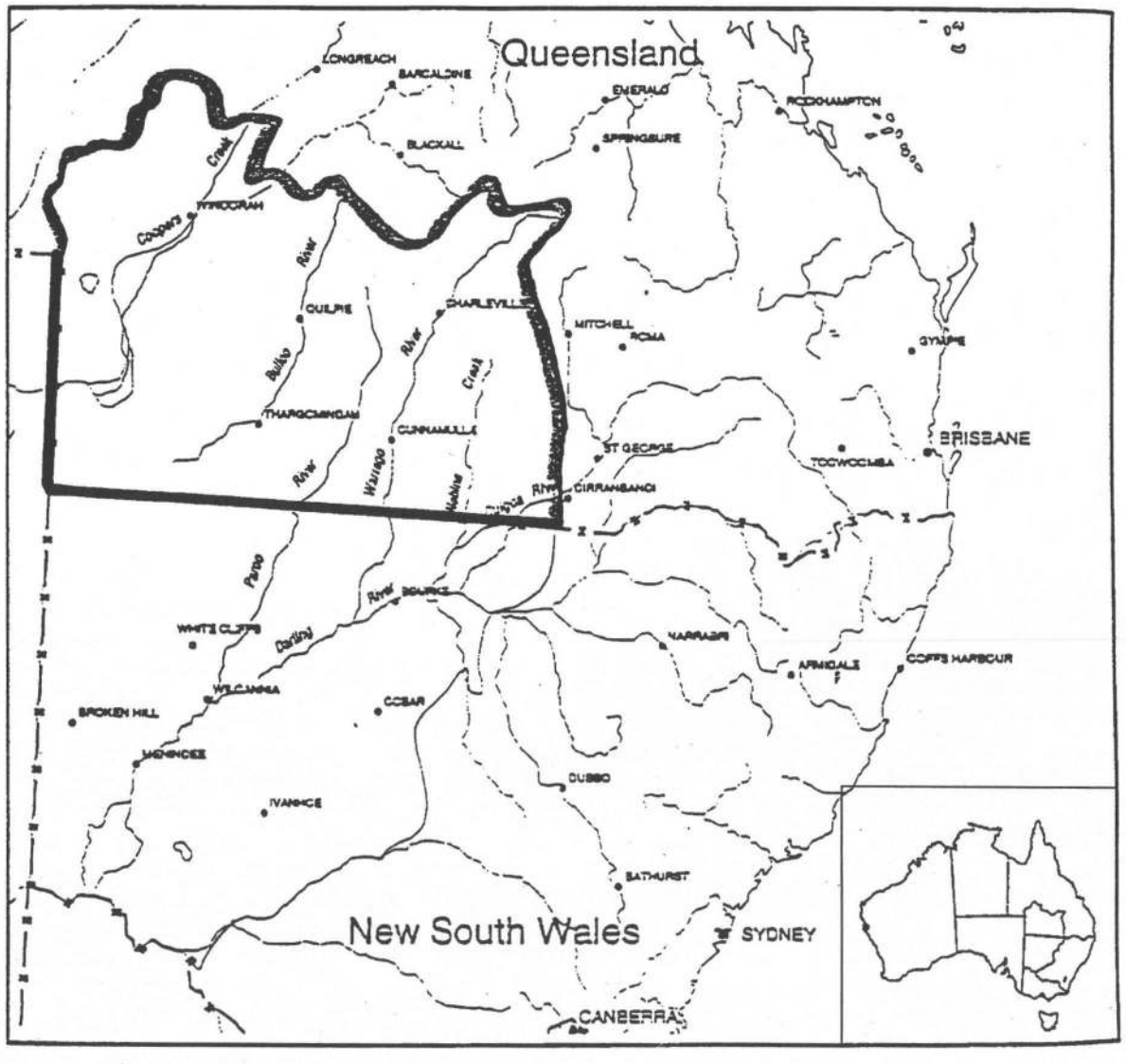


Figure 1. South west Queensland and the Western Division of New South Wales. The area over which the South West Strategy applies is enclosed by the solid line.

The strategy will facilitate accelerated, but managed, property build-up through enhanced awareness and an extended Rural Adjustment Scheme (RAS). A flexible and financially sympathetic approach to reconstruction should:

- Assist those with no immediate or long-term prospect of achieving viability to re-establish elsewhere.
- Provide appropriate build-up and productivity enhancement assistance to those with short term financial constraints but long-term viability.
- Encourage more effective and responsible business management.

Specific existing and proposed activities to achieve these objectives include amendments to re-establishment assistance, property build-up assistance, business management assistance, commercial lending activities, promotion activities and land administration.

Natural Resource Management

The aim of this strategy is to:

- Promote sustainable resource use, including an enhanced network of reserves and voluntary on-property conservation initiatives to secure biodiversity through:
  - the application of known practices for sustainable resource management and efficient production practices to properties;
  - the integration of nature and heritage conservation into property management plans;
  - further enhancement of the existing conservation reserve network and conservation corridors;
  - the development and application of risk management practices so that grazing pressure relates to the availability of pasture thus minimising pasture degradation; and
  - improved water, stock, pest species and pasture management following bore capping and the piping of water.
- Improve long-term productivity and product quality.
- Reduce overall grazing pressure to sustainable levels.

Integrated Regional Development

This strategy aims to:

- empower regional groups and agencies to further develop and manage the initiative;
- develop a robust and more reliable economic base within the region;
- more clearly define a rationale for the ongoing provision of government services to the region;
- assist those pastoralists who have taken the decision to re-establish to find gainful employment;
- ensure networks of support and information services are available to assist individuals and communities with adjustment-related problems; and
- balance the rate of adjustment to avoid an unnecessary loss of skills.

Specific activities to achieve these objectives include improved social support, expanded regional opportunities for development and promotion, and further development of the kangaroo industry.

Implementation

The Premier's Northern and Rural Task Force, accompanied by members of the United Graziers Association and Departmental representatives, toured the south west during July 1993. The task force introduced the concepts of the Strategy to the region and sought feedback on the proposals. Implementation procedures have now been established. A Regional Support Team has been established in Charleville to monitor and evaluate the performance of Government, coordinate the provision of government services and develop communication and promotional strategies for the region.

South West Advisory Groups (SWAGs) have been established in centres throughout south west Queensland to ensure that community input into the Strategy occurs and that information is disseminated throughout the area. Membership comprises representatives of industry, financial institutions, business houses, pastoral houses and Government.

A South West Strategy Group has been established in Charleville to assist with the implementation of the Strategy. This group has members from all appropriate organisations and groups, both rural and urban, within the region. These include social bodies, Chambers of Commerce, government departments, industry groups and financial institutions. The group will be largely responsible for the implementation of the Strategy at the local level.

The strategy has been developed in consultation with Departments that have functional responsibility for individual elements. Extensive consultation has occurred with landholders, local government, financial institutions, rural industry and community groups - both in the south west and at head office level. The desired structure will facilitate continued consultation into the implementation phase.

The Rural Adjustment Scheme Advisory Council has supported the development of a regional approach and the changes to the Rural Adjustment Scheme operations in Queensland.

Funding

The Commonwealth Government has made available $2.8 million under the National Landcare Program over three years to fund a continuation of the Great Artesian Basin Rehabilitation Scheme and for new initiatives involving bore drain conversion to piping schemes and the revision of carrying capacities in the mulga lands. With a matching State contribution, total funding for this initiative is $5.6 million. In addition, the State is funding other activities to ensure implementation of the Strategy at the local level.

Following intense negotiation with the Commonwealth Government, additional funding of up to $8.7 million has been provided to south west Queensland under the RAS. This funding will be utilised in four areas:

- assistance with re-establishment,
- productivity enhancement via an interest rate subsidy for either property build-up or on-property development work,
- assistance with land trading in the event of extremely difficult market situations, and
- grants to graziers to improve their skills and knowledge in sustainable resource management strategies, or for those

who wish to exit the rural industry, grants for advice and re-training.

Applications for productivity enhancement will incorporate property build-up and/or development planning exercises, participation in a Property Enterprise Agreement involving a signed agreement between the Queensland Government, the commercial lender and the recipient, and amended lease conditions as agreed to by the lessee. The intent of these transactions is to ensure the long-term sustainability and viability of the enterprise and to secure a sound investment for all parties concerned.

The above-mentioned forms of assistance (excluding land trading at present) all became available from 1/2/95.

To assist in achieving these goals, the South West Queensland Resource Centre has been established in Charleville. It provides a "one-stop shop" environment for rural clients accessing professional advice concerning financial issues, property amalgamation, the Queensland Rural Adjustment Authority (QRAA) and social issues. The building accommodates all financial counsellors, a rural resource counsellor for social assistance and a QRAA officer (i.e. RAS facilitator).

Summary

The South West Strategy is the result of a concerted effort by the communities of Queensland's south west in seeking support for what has been recognised as a comprehensive adjustment and recovery program for the region. It is based on community input and support and will only exist whilst this situation remains.

It is significant that south west Queensland is the only area in Australia to be funded by RAS on a regional basis. The project is regarded as a pilot, and if successful, will be expanded to other areas of Australia.

The role of government in the process has been to provide support in obtaining both State and Federal Government assistance. It is not (and never should be) dominated or driven by government. As such, carriage of the Strategy should remain the charter of the community, with government providing appropriate support.

SOUTH WEST STRATEGY
Specific Projects and Assistance Measures

Natural Resource Management

Safe Carrying Capacity Project

Producers and government agencies have recognised that the carrying capacities established for many properties are inappropriate. A project team was established to determine sustainable, long-term carrying capacities. Models now exist for estimating pasture production on different soil types and for varying rainfall. These models use risk analysis based on land system mapping and rainfall probability to calculate safe carrying capacities.

Bore Piping Project

Enhanced water management is essential for sustainable utilisation of land systems. Apart from the obvious gains associated with preservation of the Great Artesian Basin, this project offers greater opportunity in management options, including domestic and feral stock control.

An initial government subsidy of 40% Federal and 40% State (with the remaining 20% being landowner contributions) for piping to replace bore drains has been established. An average cost of $3500 to $4000 per km has been estimated for the project. This includes piping, installation and water storage. The 20% grazier contribution can include the grazier installing the system to appropriate specifications.

The demand for this project currently exceeds the existing budget and it is not known how long the subsidy will be available.

Property Management Planning

PMP is an integral part of both the bore piping project and the Property Reconstruction area of the overall Strategy. In addition, PMP should address the economic and ecological problems of the region (e.g. total grazing pressure, erosion, woody weeds, nature conservation).

Property Reconstruction

The Land Degradation Voluntary Property Build Up Scheme was established in 1992 to address the financial hardship and land degradation issues associated with inadequate property size. Further studies identified the need for additional assistance packages to help graziers and $8.7 m of Federal and State funds have been committed for an initial three-year period. Assistance measures include:

- Interest subsidies for enhancing farm productivity under the South West Queensland Rural Adjustment Strategy.
- Re-establishment support under the South West Queensland Rural Adjustment Scheme.
- Acquisition of skills and professional advice under the South West Queensland Rural Adjustment Scheme.

Property Enterprise Agreement

This agreement is used where interest rate assistance is provided and is a record of the understanding and agreement between all parties that the business transaction is based on realistic and sustainable production estimates. The majority of the agreement will be based on the property plan developed during the course of the assessment of the assistance being requested.

Lease Conditions

One of the lease conditions will note that a Property Enterprise Agreement exists. A further condition refers to sustainable land management principles and practices - including a nominated long-term carrying capacity where there is obvious disregard of these principles and practices.

Carrying Capacity Assessment

Where interest rate subsidies are being sought, the Dept. of Lands will re-assess the carrying capacities of the original lands and the lands being purchased. This assessment will be based on the carrying capacity program referred to under Natural Resource Management. The assessment will ensure that assistance provided is based on realistic and long-term sustainable production expectations.

W.E.S.T. 2000

Geoff Wise, Western Lands Commissioner and Regional Director, Dept. Land & Water Conservation, PO Box 1840, Dubbo NSW 2830

(Ed. Geoff, as former Interim Coordinator of W.E.S.T. 2000, was able to provide me with a brief summary of that program just prior to this issue of RMN *going to press. This article summarises the NSW proposal for revitalising its Western Division as a parallel to the* South West Queensland Strategy. *The proposal is presently with Government and if approved, I will ask Geoff (or his successor) for a more detailed account of the program and its planned implementation to be included in a future* RMN.)

W.E.S.T. 2000 is a proposed integrated adjustment and recovery program for the Western Division of New South Wales.

W.E.S.T. (Working for Equity and Sustainability Together) 2000 has a vision of achieving, by the turn of the century, a more robust Western Division capable of sustaining vital communities, viable traditional enterprises and a wider range of land and water uses which accommodate or enhance its natural heritage.

The Western Division of NSW, which covers 42% of the State, produces $1,000 million gross income per annum - with 25% of this coming from pastoralism. The remaining sources of income are primarily from mining, tourism and other agricultural products. It is a region of diversity and complexity, including historic and natural resources of national and international significance. The sparsely distributed population require specific needs to allow them to continue as stewards of this unique environment.

The Western Division pastoral industry and the supporting land resources face major economic, social and ecological challenges. It is now acknowledged at government, agency, industry and community levels that these challenges, when taken collectively, have few parallels in recent history. Issues include:

- serious declines in pastoral enterprise profitability and equity;
- impact of prolonged drought and low wool prices;
- high populations of native and feral animals, lack of control over total grazing pressure and massive encroachment of unpalatable shrubs;
- continuing and serious decline in the economic and social fabric of many small towns;
- direct consequences of isolation, particularly relating to education; and
- increasing expectations by government and society of sustainable management of the rangelands, and the inability of pastoralists to meet these expectations in some areas.

The proposed program comprises four interacting and complementary strategies to address the key issues of profitability, variability, sustainability and isolation. It is not anticipated that all components will be implemented simultaneously. The strategies are directed at:

- improving economic self reliance of pastoral enterprises,
- supporting re-establishment of landholders who want to leave the pastoral industry,
- integrating Natural Resource Management, and
- facilitating regional development and reform of government services.

The program has been developed over four years through strategic planning and consultation to ensure community ownership and relevance. Negotiations are currently occurring at the State and Commonwealth political and agency level with the expectation of the program's approval for implementation in the foreseeable future.

A WORD FROM OUR CONFERENCE SECRETARY

Sarah Nicolson, Middleback Station, via Whyalla SA 5600

Although I have lived at Middleback Station for only the last seven years, my husband Andrew's family have been here for approximately 75 years. For most of that time the Nicolsons have had a long and serious involvement with the Australian rangelands and, since its formation, the Rangeland Society.

Andrew and I travelled to Katherine in 1994 for the 8th Biennial Rangelands Conference, which we thoroughly enjoyed - not only for the conference but also the trip up through the Northern Territory and Katherine itself. Whilst there, I listened to the various trials and tribulations that the conference organisers suffered behind the scenes to ensure that the rest of us had a great time! When it came time to start thinking about Port Augusta in 1996, I felt that I could offer something to the organisers of that conference.

With a secretarial background and being an inveterate organiser, I landed the position of Conference Secretary, although I didn't really know what it entailed. So far, we have an enthusiastic committee of approximately 26 people, who have all been working diligently for the past 12 months or so to attempt to keep our conference "on track" - not to mention the various logistical hurdles of holding a conference of this size in Port Augusta!

We are certain that what we have planned will be exciting and will result in many thought-provoking outcomes. We look forward to seeing as many of you as possible in Port Augusta in September 1996.

THE KIMBERLEY PASTORAL INDUSTRY
An Overview

Greg Brennan, Agriculture Western Australia, PO Box 278, Derby WA 6728

(Ed. In the last Newsletter, I foreshadowed that Greg Brennan would write an article on the Kimberley beef industry. Greg is OIC of Agriculture Western Australia in Derby and also is Executive Officer of the Kimberley Beef Industry Development Team (KBIDT). This group is a partnership between pastoralists of the region and the Agriculture Department. Some of the issues that the KBIDT has investigated include the live export trade to SE Asia (both by visiting the region and hosting buyers on an exchange visit), the feasibility of a modern regional abattoir and land tenure. Last year, the group produced the booklet The Market for Live Cattle and Beef in Indonesia.)

The Land and its People

The Kimberley region in Western Australia covers 420,000 km^2 representing 18% of the State. Half of this land area is pastoral lease and the remainder is occupied by National Parks and Aboriginal and Defence reserves.

Some of the most renowned sites of natural beauty in Australia are located in the Kimberley. These include the Bungle Bungle Ranges, the Mitchell Plateau and numerous spectacular river gorges, all of which are attracting an increasing number of tourists annually.

In times gone by, the isolation of the Kimberley subjected it to the "tyranny of distance". Today, its proximity to the economic growth centres of SE Asia and the availability of modern transport facilities have transformed this isolation from a problem to an advantage. Five major industries dominate the regional economy (Table 1).

Table 1. Major industries contributing to the regional economy of the Kimberley

Industry	Ann.Value millions $	Comment
mining	660	production dominated by the Argyle Diamond Mine
tourism	130	rapidly expanding, with 20% annual growth in recent times
fishing	120	dominated by the cultured pearl industry based in Broome
pastoral	35	based on beef cattle since the last sheep left in the early 1970s
agric. & horticulture	35	60 crops are grown on the Ord River Irrigation Scheme over 13,000 ha. Stage Two development will see another 65,000 ha developed. A sugar cane industry has commenced and cotton is being trialled. Horticultural expansion is also occurring around Broome and Derby.

There are 25 000 people living in the Kimberley, 45% of whom are Aboriginal people. The region's population has increased by 30% since 1981 and is currently recording a 3.5% annual growth rate.

The Kimberley rangelands are also home to approximately 460,000 adult cattle. It is around the pastoral industry that much of the Kimberley history, romance and tragedy has centred since European settlement.

Pastoral Industry and Agriculture Western Australia - a Partnership

There are 99 pastoral leases in the Kimberley, with an average size of 226,000 ha. Sixty businesses operate these leases. The industry is serviced by Agriculture Western Australia (AWA) offices in Kununurra, Derby and Broome. The regional office is at the Frank Wise Institute, a research station at Kununurra. Research on irrigated agriculture, horticulture, leucaena and cattle production is conducted at the Institute.

In recent years an effective partnership has been developing between Agriculture Western Australia and the pastoral industry by way of the Kimberley Beef Industry Development Team. This is made up of industry members who work with AWA to strategically plan and implement the development of the industry. A business plan for the cattle industry was produced in 1993 and implementation is now in full swing. This plan incorporated the opportunities to improve sustainable profits through the developing SE Asian markets for live cattle and improved herd and range management practices.

Features of Kimberley Pastoral Lease Resources

Rainfall: 300 - 1200 mm falling between December and April.

Pastoral value: greater than one half of Kimberley leasehold land has low pastoral value. The cattle industry is concentrated on a relatively small area of high quality rangeland.

Forage quality: the short growing season and high temperatures during this period produce forage which initially has reasonable quality but which rapidly deteriorates, with declines in dry matter digestibility, energy and protein content.

In the current high-cost economic climate, successful pastoralism demands high herd productivity. Such productivity is based on production systems which effectively manage the nutritional challenges of the short growing season and extended periods of low forage quality.

Multiple land use: land formerly used exclusively for pastoralism is now supporting industries as diverse as tourism and horticulture. Conservation issues are being regarded with increasing importance in the community.

A Pastoral Industry in Change

In recent years, the industry has changed from an open-range grazing system of low productivity (40 % weaning rates) to one which now has most cattle paddocked, with *Bos indicus* cattle rapidly replacing the traditional Shorthorn breed and with rapidly improving herd productivity (75% weaning rates are achievable). A stronger business focus has been adopted by the pastoral industry.

This rapid change is driven by a combination of events including:

- The national Brucellosis and Tuberculosis Eradication Campaign, which has not only done a magnificent job in disease control but also accelerated paddocking of the herd and the elimination of feral cattle.
- The attractive prices being paid for live cattle exported to South East Asia.
- The cost-price squeeze, forcing change as free-range production systems become economically non-viable.
- Research, Producer Demonstration Sites and station managers showing that high herd productivity is possible in the Kimberley with appropriate management and infrastructure.

The Kimberley Rangelands Under Pastoralism

Prior to 1985, open-range management and large populations of feral animals resulted in severe rangeland degradation in some areas. During poor seasons, stock and feral animals congregated in large numbers on permanent waters, causing heavy overgrazing especially on the more productive country types.

Since 1985, rapid improvement in range condition on most leases has resulted from:

- a reduction in the regional herd from 800,000 in the early 1980s to the present 460,000 adult cattle,
- culling of the feral donkey population to a managed population,
- decline in the large wallaby population compared with that of the 1970s,
- a run of three average to above-average wet seasons,
- reduced grazing pressure due to better stock control with more paddocks,
- rangelands being stocked according to estimated carrying capability,
- strategic management practices such as wet season spelling of some pastures, and
- active Landcare groups in each of the four pastoral districts.

These changes have been partly facilitated by Producer Demonstration Sites, funded by the Meat Research Corporation, which have demonstrated that conservative stocking rates are a profitable option in the Kimberley because of higher herd productivity. In addition, Agriculture Western Australia officers have worked effectively with pastoralists to improve land management through such actions as:

- improving paddock design by using maps of land resources in a GIS environment,
- stocking paddocks according to assigned carrying capacity,
- where required, strategic spelling of pastures over the wet season,
- applying cost-effective technologies to the design and construction of fences and water points (e.g. electric fencing),
- introduction of *Cenchrus* species and Seca and Verano stylos on small special-purpose areas, and
- photo monitoring to record changing seasonal and rangeland conditions.

Rangeland Research and Monitoring

Agriculture Western Australia is installing monitoring sites across the Kimberley as part of the West Australian Rangeland Monitoring System. A particular requirement has been the need to develop indicators of range condition and trend based on the plants and soil surface characteristics of our land types. Monitoring also extends to assessing the impacts of fire across a range of important pasture communities. The Department uses satellite data to monitor seasonal fluxes in forage quality and abundance. Research has focused on methods to manipulate grazing pressure across heterogeneous pasture types and to find plant species and techniques to improve or rehabilitate rangelands.

Herd Management Practices

The closure of the Broome meatworks fortuitously coincided with the rapid development of the live cattle trade from the Kimberley ports of Wyndham and Broome to SE Asia. Attractive prices in this market have fuelled a concerted effort by managers to incorporate improved herd management practices. These include:

- the infusion of herds with *Bos indicus* blood as demanded by the SE Asian trade,
- weaning down to 100 - 150 kg liveweight twice a year,
- de-horning, vaccinations for botulism and control of wild dogs,
- mineral supplementation, and
- specifically targeting the live-export market - i.e. young stock weighing 280 - 330 kg and pregnancy-tested empty cows less than 7 years old.

Cattle Industry Research and Development

Recent research has focused on developing profitable production systems for irrigated leucaena and on early weaning

methods to maximise weaning rates and minimise cow mortalities.

Close cooperation between leucaena growers and AWA research officers in Kununurra has resulted in beef production methods which are amongst the most productive in Australia. Consumer research has shown that prime beef of equal quality to grain-fattened beef can be consistently produced on irrigated leucaena at Kununurra.

Research at the paddock scale has shown that a single weaning to 60 kg results in high herd productivity and is profitable. Such weaning also produces synchronised calving similar to a control-mated herd. Independent commercial-based research has commenced, to apply this practice across the whole herd.

Producer Demonstration Sites to investigate improved supplementation methods on a range of country types in the Kimberley are planned.

Summary

The Kimberley is on the crest of a development wave. This wave is the result of surges in mining, tourism, fishing and the irrigated agriculture and pastoral cattle industries. A major interest of industry stakeholders and government agencies alike is the challenge of ensuring that this wave of development produces no present or future threats to the treasured natural resources of the Kimberley region. This challenge, and the bringing together of the many interest groups, is not to be underestimated.

The new structure of Agriculture Western Australia features the Sustainable Rural Development program. The resources and objectives of this program, and the commitment of industry, government agencies and the diverse Kimberley community, augurs well for the challenge of achieving environmental sustainability for the region.

FOR SALE
Polo Shirts with ARS Logo

Ken Leighton, Department of Land Administration, PO Box 2222, Midland WA 6056

A number of polo shirts remain after the Utah IRC congress. Some specifically promote the next IRC in Townsville with the logo "Townsville Shines in 99" on the back whilst others only have the ARS logo on the front. These shirts were very popular with the Australian contingent in Utah.

The shirts are available from Sarah Nicolson, Middleback Station, Whyalla SA 5600 for $22.50. This cost includes postage within Australia.

ABORIGINAL INVOLVEMENT IN DESERT NATURE CONSERVATION
A Personal Viewpoint

David Pearson, Department of Conservation and Land Management, PO Box 51, Wanneroo WA 6061

This article summarises a presentation to the 1995 AGM of the Society held in Perth. The title is fairly specific and may be of limited relevance to many readers. However, some of the practical considerations of working with Aboriginal people may be of value to those contemplating collaborative projects with Aboriginals, or who are interested in conservation on Aboriginal lands.

My background in nature conservation projects on desert lands relates to studies of Aboriginal traditional burning practices, survey and management of rock-wallabies (Pearson 1992, Pearson and Ngaanyatjarra Council *in prep.*) and a survey to clarify the distribution and status of pythons (Pearson 1993). 1 acknowledge here the assistance, guidance and goodwill extended to me by the Ngaanyatjarra Council and many Aboriginal people in the central desert region of Western Australia. In particular, I thank those Aboriginal women at a language course in Kalgoorlie who put up with my feeble (and clearly amusing) attempts at pronunciation, particularly when I repeatedly used the term for "pubic hair" when I meant "frog".

Aboriginal knowledge of the Australian biota has been documented by Europeans since first settlement. In the last few decades, there has been considerable interest in ethnobiology, particularly Aboriginal knowledge about plants that may have potential for medicines, food, or for the rehabilitation of disturbed areas. However, there is still much for us to learn about the land and its wildlife by working with Aboriginal people. Counter to this, Aboriginal communities are attempting to grapple with new environmental problems such as weeds, tourism, fire management and the impact of feral animals, and are looking for assistance from scientists and practical land managers.

Aboriginal Knowledge

The term "traditional ecological knowledge" (or TEK) has been used to describe the accumulated knowledge of non-western societies about the environment and man's interaction with it, although the term's acceptance is not universal (Hunn 1993). Comparatively few papers featuring TEK have been published in the scientific literature. This is due to non-western cultures being viewed as "'based on magical beliefs and/or because they lack the benefit of the western scientific method of empirical observation and experiment" (Hunn 1993).

The collection of TEK for use in nature conservation is considerably improved by training and experience in the language spoken by informants or co-workers. Also, knowledge of the language aids in the accurate identification

of flora and fauna, helps in acceptance by Aboriginal communities, and permits better understanding of specific terms used which may not have direct English language equivalents (Baker *et al.* 1993). Several tertiary colleges and missionary organisations now run language courses but to gain fluency, nothing beats spending time in an Aboriginal community and refusing to speak English!

Developing a Project with Aboriginal People or on Aboriginal Land

Where do you start if proposing a new project on Aboriginal land?

In the past, many projects carried out in desert Aboriginal communities were concocted in distant offices and thus lacked local input and "ownership". This usually limited their effectiveness. Aboriginal Councils and communities need to be involved from the initial steps of project formulation. The reality of obtaining funding for projects often limits the time available for the preparation of submissions, but it is important to factor in substantial discussion with Aboriginal communities. Face-to-face discussions in their lands are an important part of that process.

Many Aboriginal reserves have restricted access and require a permit from the relevant Aboriginal Land Council or State Aboriginal Affairs department. Even though Government officers on official business are generally exempt from such permits, it is still good protocol and manners to go through the official permit process.

A good starting point in developing contacts is to speak to the Coordinator or Community Adviser of the relevant Council or community. These people are employed to manage the infrastructure and funds and to deal with bureaucratic affairs as they arise. The connection of Aboriginal communities to the telephone network in the last few years has made such contact much easier. The Coordinator or Adviser can explain the procedure required to develop a joint project: usually a suitably worded letter addressed to the Council or Community Chairman.

A detailed project proposal then needs to be forwarded to the community indicating where you hope to go, who will be doing the work, the financial or other benefits for Aboriginal people, and how and to whom the results will be reported. This letter will probably be read by the Coordinator or Adviser as well as the Chairman, and may then be presented to a Council meeting - so you need to succinctly state your proposal.

Send your letter to the Council or community well in advance of your proposed commencement date - several months if possible. Indeed, a letter requesting Council approval should be sent prior to commencing detailed planning of any project or preparing funding requests. It may take many weeks to get a reply, and sometimes none will be forthcoming. This is usually due to one or more factors:

- Lengthy periods between when a letter is received and the next Council meeting. In many communities, meetings may only take place every two to three months.
- The custodians for the country you wish to visit being absent from the community. Desert people are extensive travellers and think nothing of hopping on a truck and heading off for several weeks.
- Other more pressing issues which are dominating the energies of the Council - e.g. housing, health, water or power supply.

Follow-up telephone calls or faxes can usually clarify the status of your application. Lack of a written response may simply reflect the Adviser's workload or the precedence of issues in the community.

Projects need to recognise and incorporate cultural and social considerations. Baker *et al.* (I993) examined the important issue of ownership and use of knowledge. Unlike western science where information is essentially free for communication, Aboriginal people have responsibilities to ensure that information is managed in a culturally appropriate way (Baker *et al.* 1992, 1993). This fact is also important to consider when writing up data collected with Aboriginal people. Intellectual property rights with statutory legal basis are currently under discussion (Moore 1995). Published and unpublished reports should he reviewed by Councils and communities and joint authorship offered wherever appropriate.

Aboriginal Views on Conservation

While the concepts of extinction, conservation of biodiversity and reserve management are now in everyday usage in western society, they are still foreign to desert Aboriginal people. The traditional reasons for the diversity and abundance of life relates to the continuing creative forces of the Dreamtime (tjukurrpa). During surveys to find rock-wallabies, I often asked people why the wallabies and similar-sized mammals had disappeared. Expecting the blame to be placed on rabbits and foxes, I was surprised to learn of other causes. I had prejudged the response based on my own ethno-centric experience.

People described how declines had occurred during drought, but that recolonisation could result through dispersal from remnant populations. Furthermore, many attributed declines to the cessation of traditional ceremonial practices ("increase ceremonies") that ensured their abundance. Paradoxically, in the case of a python species, it was stated that they needed to be eaten to release the spirit to create further pythons! Other people believed that museums and zoos had removed large numbers of certain animals such as rock-wallabies. The evidence of this was plainly visible at the zoo in Adelaide which many had visited.

Therefore, any calls on Aboriginal people to contribute to nature conservation initiatives on their lands on the grounds of biodiversity conservation is unlikely to be as successful as for Australian urban populations. Nonetheless, there are potential benefits of nature conservation projects for Aboriginal people.

These include employment in varied and interesting work, recognition of skills and knowledge, and an opportunity to travel to country rarely visited-

There are increasing opportunities for nature conservation and land management agencies to work collaboratively with Aboriginal groups. We need more scientists and managers willing to explore these opportunities and to develop the personal contacts necessary to initiate projects. The potential benefits are great for nature conservation on Aboriginal land, and for Aboriginal people. Finally, when I do encounter frogs (thankfully infrequently in the desert), the phrase "kurrtji-kurrtji tjalpatjarra" (literally "tadpole with legs") saves me from embarrassment!

References

Baker, L., Woenne-Green, S. and the Mutijulu Community (1992). The role of Aboriginal ecological knowledge in ecosystem management. *In* Aboriginal Involvement in Parks and Protected Areas (edited by J. Birckhead, T. de Lacy and L. Smith.). Australian Institute of Aboriginal and Torres Strait Islander Studies, Canberra. pp. 65-73.

Baker, L., Woenne-Green, S. and the Mutijulu Community (1993). Anangu knowledge of vertebrates and the environment. *In* Uluru Fauna: the distribution and abundance of vertebrate fauna of Uluru (Ayers Rock-Mount Olga) National Park, NT. (edited by J.R.W. Reid, J.A. Kerle and S.R. Morton). Australian National Parks and Wildlife Service, Canberra.

Hunn, E. (1993). What is traditional ecological knowledge? *In* Traditional Ecological Knowledge: wisdom for sustainable development (edited by N.M. Williams and G. Baines). Centre for Resource and Environmental Studies, Australian National University, Canberra.

Moore, T. (1995). Protecting intellectual property. *Ecos* **85**: 32-33.

Pearson, D.J. (1992). Past and present distribution and abundance of the black-footed rock-wallaby in the Warburton region of Western Australia. *Wildlife Research* **19**: 605-22.

Pearson, D.J. (1993). Distribution, status and conservation of pythons in Western Australia. *In* Herpetology in Australia: a diverse discipline (edited by D. Lunney and D. Ayers). Royal Zoological Society of NSW. pp. 383-35.

Pearson, D.J. and the Ngaanyatjarra Council (*in prep.*). Aboriginal involvement in the survey and management of rock-wallabies.

WHAT DO AUSTRALIANS THINK ABOUT OUR RANGELANDS?

Ron Hacker, ARS President, c/- NSW Agriculture, PO Box 865, Dubbo NSW 2830

The Council of the Society, in conjunction with the WA Branch, has commissioned a survey of attitudes to the rangelands. This survey was conducted by the Roy Morgan Research Centre Pty Ltd over the period 27-28 May, 1995. In face-to-face interviews a total of 1109 respondents from across Australia were asked three questions:

1. Have you ever spent more than one day in Australia's rangelands? (Rangelands were defined verbally and by the map used by the National Strategy for Rangeland Management Working Group.)
2. The card lists contributions rangelands make to Australian life. Which of those contributions do you think are most important? Which others? Any others?
3. The card lists some urgent issues for the management of Australia's rangelands. Which of those issues do you think are the most urgent? Which others? Any others?

The report of this survey is now available. It comprises 31 pages of tables in which responses to each question are cross-tabulated against responses to the other questions and a range of demographic factors.

This report represents the first comprehensive national assessment of attitudes to rangelands in the Australian community. It will be of value to all those with an interest in the use and management of rangelands including all sectors of the rangeland community, government agencies, tourist operators, miners and other entrepreneurs, students and researchers.

Copies of the **Rangeland Awareness Survey** can be obtained from the Treasurer, Australian Rangeland Society, PO Box 240, Parkes NSW 2870 (Tel: 068-62 5233, Fax: 068-62 5237) at a price of $25 for ARS members and $150 for non-members.

?

Images of our Rangelands

APPLICATION OF *RANGEPACK HERD-ECON* TO SOUTHERN AFRICA RANGELANDS

Grant Hatch, Department of Grassland Science, University of Natal, Private Bag X01, Scottsville 3209, South Africa

Introduction

Range scientists have devoted considerable effort to attempting to understand how rangelands function, and subsequently conveying these ideas to producers with the hope that this will foster sustainable land management. This approach has often failed simply because it does not consider the financial consequences of various management practices. Computer-based decision-support tools provide a useful interface between research and management since they can integrate the biology and economics of rangeland systems. RANGEPACK Herd-Econ is an example of a microcomputer-based software tool designed to assist managers with strategic and tactical decision making under uncertain conditions (Stafford Smith and Foran 1990).

Model Structure

Herd-Econ consists of a series of biological and financial windows into the property. The user creates various classes of stock (e.g. cows, calves, steers, heifers, bulls) and provides basic biological information such as growth rate, reproductive rate and mortality information for each class. These data can be given for four year-types (good, okay, poor and bad), allowing the user to modify production parameters in relation to seasonal conditions. Regular transfers between classes (e.g. calves to heifers and steers) are entered, as well as regular purchases and sales of stock - e.g. "sell 50% of all steers aged 2 to 3 years of mass 350 kg in December". Corresponding financial information, including detailed fixed and variable costs, may be added at various levels of detail to customise the setup for an individual property. For example, animal husbandry costs may simply be provided as a total, or broken down into detailed components. Costs, by default, are fixed (i.e invariable in relation to stock number) but the user may specify costs which should be variable to allow for flexibility at various scales of operation. An interactive command window allows the user to create command files which create further flexibility. For example, the user may create sequences of year-types based on historic or probabilistic rainfall and examine the consequences of various management options. The outcomes may be viewed in a simple graphics window or exported to other software for detailed analysis.

Applications in Commercial Agriculture

Herd-Econ has proven particularly useful for assessing the consequences of different stocking strategies in variable environments in Australia for both cattle (Foran and Stafford Smith 1991) and sheep enterprises (Stafford Smith and Foran 1992). Herd-Econ would be extremely useful for southern African situations where similar climatic variability presents major challenges for livestock producers. While some of the cost descriptions may appear unfamiliar to South African users, the outcomes and relative effects of various management strategies would provide a useful planning tool for producers.

In Australia the use of Herd-Econ by pastoralists remains limited largely due to the time and effort required to master the program, and by the small proportion of farmers actively using computers in management. Herd-Econ is consequently used primarily by extension personnel attached to government agencies and by consultants. Similar limitations are likely to occur in South Africa. However, the declining real cost of computers and increasing cost:price squeezes are likely to see increased application of computers in agriculture and increased demand for decision-support software in the future.

Applications in Communal Rangelands

Recent political change in South Africa has seen considerable emphasis placed on agriculture, and particularly rangelands, in the communal areas of the country. In Australia, recent legislation has resulted in increasing land ownership by Aboriginal people. Stafford Smith *et al.* (1994) used Herd-Econ to examine various land use options for Aboriginal communities based on commercial use objectives. In South Africa, the Land Restitution Act and Pilot Land Reform Program have resulted in black communities receiving increased access to land and natural resources. Development agencies have become active in providing agricultural advice to communities on newly acquired land. This trend is likely to continue as the Land Reform Program is effected.

What possible roles could Herd-Econ play in the communal rangelands of southern Africa? I attempted to answer this question while on sabbatical leave at the CSIRO Centre for Arid Zone Research in Alice Springs during September and October 1995.

The effect of various biological parameters on herd dynamics may be assessed within Herd-Econ and the output exported as data files to a spreadsheet package. Addition of appropriate economic parameters would allow the user to examine the consequences of various strategies on both biological and economic components of the system. Assessing the consequences of four drought responses for a communal cattle herd in the semi-arid savanna of KwaZulu-Natal (Hatch and Stafford Smith 1995) revealed that moving stock to non-drought affected areas, buying in additional stock after drought or supplementing stock during drought would achieve considerably greater milk yields and net benefit relative to simply doing nothing in the face of drought. Option costs would increase in relation to the type of drought intervention implemented. Of the three options, moving stock yielded the greatest net benefit and most favoured cost:benefit ratio. Importantly, cost constraints may ensure that communal graziers have little alternative but to do nothing in the face of droughts.

Thus Herd-Econ could prove to be a useful planning tool for development agencies and perhaps help to avoid costly development failures which have been a past feature in African pastoral systems.

Conclusions and Future Developments

Rangeland scientists have concentrated on the ecological aspects of rangeland management but have failed to adequately address integration at the economic level. This level of integration is crucial to the range manager and fundamental to the success of research and extension effort. RANGEPACK Herd-Econ provides a useful medium for integrating these factors.

Future developments of the Herd-Econ approach include integration into detailed biophysical (GRASP - McKeon *et al.* 1990) and financial models (RISKFARM - Milham *et al.* 1993). The RISKHerd model (Milham *et al.* 1995) effectively links relationships between grass growth, animal production, financial return and after-tax whole-farm budgets for various strategies, allowing the assessment of the effect of government policy on sustainability.

Integration of these concepts into poorly understood communal rangeland systems could have major implications for government policies on communal rangelands in South Africa.

References

Foran, B.D. and Stafford Smith, D.M. (1991). Risk, biology and drought management for cattle stations in central Australia. *J. Environ. Manage.* **33**: 17-33.

Hatch, G.P. and Stafford Smith, D.M. (1995). The bioeconomic implications of four drought response options for a communal cattle herd in the semi-arid savanna of KwaZulu-Natal. Unpublished paper, Department of Grassland Science, University of Natal, Pietermaritzburg.

McKeon, G.M., Day, K.A., Howden, S.M., Mott, J.J., Orr, D.M., Scattini, W.J. and Weston, E.J. (1990). North Australian savannas: management for pastoral production. *J. Biogeog.* **17**: 355-372.

Milham, N., Hardaker, J.B. and Powell, R. (1993). RISKFARM: A PC-based stochastic whole-farm budgeting system. Centre for Agricultural and Resource Economics, University of New England, Armidale.

Milham, N., Stafford Smith, D.M., Douglas, B., Tapp, N., Breen, J., Buxton, R. and McKeon, G.M. (1995). Farming and the environment: an exercise in eco-economic modelling at the farm-level in the NSW rangelands. Invited paper, International Congress on Modelling and Simulation, University of Newcastle, Callaghan.

Stafford Smith, D.M. and Foran, B.D. (1990). RANGEPACK: the philosophy underlying the development of a microcomputer-based decision support system for pastoral land management. *J. Biogeog.* **17**: 1-6.

Stafford Smith, D.M. and Foran, B.D. (1992). An approach to assessing the economic risk of different drought management tactics on a South Australian pastoral sheep station. *Agric. Sys.* 39: 83-105.

Stafford Smith, D.M., McNee, A., Rose, B., Snowdon, G. and Carter, C.R. (1994). Goals and strategies for Aboriginal cattle enterprises. *Rangel. J.* **16**: 77-93.

ARIDLAND FAIR PORT AUGUSTA

Merri Tothill,. Primary Industries SA, PO Box 357, Port Augusta SA 5700

The Aridland Growers Association, based in Port Augusta but covering the northern areas of South Australia, held an "Aridland Fair" on Sunday 1st October 1995. The aim of the one day event was to promote all arid area products and services.

A broad spectrum of exhibitors attended, including the Arid Lands Botanic Garden, the local TAFE (promoting the Arid Land Horticulture course) and, of course, the Department of Primary Industries. The aim of our display was to inform the locals and visitors to the area about our role in the rangelands of SA.

The main focus of the day was to promote the emerging aric horticulture industry, which includes quandongs, sandalwood, carob, desert limes and floriculture products such as pearl bluebush and Sturt Desert Pea. Locally made arts and crafts featuring local, native products such as myall fence post vases and pure wool, embroidered ties and a range of "bush tucker" type foods (e.g. chocolate covered sandalwood nuts and quandong jams and sauces) also featured on the day.

This "family" type event was well attended, with visitors from as far afield as Queensland. There was a great deal of interest in the Primary Industries tent and we considered our participation well worthwhile. There may be plans to hold a similar day next year to coincide with the Rangelands Conference.

RANGELAND MONITORING IN THE EASTERN CAPE, SOUTH AFRICA
Report on a 1994 ARS Travel Grant

Noelene Duckett, Agriculture Western Australia, Baron-Hay Court, South Perth WA 6151

In July this year I was fortunate to travel to the Eastern Cape region of South Africa to attend a range monitoring workshop. This workshop, organised by Andrew Beckerling from the University of Fort Hare, had the principal objectives of assessing the status of range monitoring in the Eastern Cape region and identifying the network of key people currently involved in monitoring programs. The major outcome of the workshop was the creation of an umbrella body for range monitoring in the Eastern Cape region, subsequently named *Jongidlelo* (or Veld Watch).

Eastern Cape Rangeland Monitoring Workshop

The workshop was held at Morgan's Bay, just north of East London on South Africa's east coast. Delegates from all over the Eastern Cape and wider regions attended, with a mix of both government agency and university personnel. In addition to myself two other Australians, Alec Holm (Agriculture Western Australia) and Jim Fortune (University of Adelaide), also attended. The interests of the delegates included general range ecology and management, land use planning, natural resource management, wildlife management, remote sensing and plant ecophysiology.

A number of sessions in the workshop concentrated on the history of monitoring in the Eastern Cape region and the current involvement of various research organisations such as the University of Fort Hare and the Department of Agriculture. Professor Neil Tainton gave an overview of the proposed National Rangeland Program for South Africa while Alec Holm provided insight into various aspects of the Western Australian rangeland monitoring program. Additional talks illustrated the role of monitoring in a wider context including the assessment of vegetation condition and animal numbers in the management of game reserves such as Kruger National Park and the Thomas Baines Nature Reserve.

Other sessions at the conference examined more technical issues related to vegetation condition assessment. I gave a presentation explaining the techniques we have recently developed for detecting and interpreting vegetation change using the WARMS (WA Range Monitoring System) data, whilst Alec Holm reported on the Landsat satellite techniques developed by the CSIRO and the WA Department of Agriculture to monitor changes in vegetation condition. Keith Beaumont from the University of Fort Hare illustrated how veld condition data have been used to manage stock numbers on the Fort Hare Research Farm.

Discussion sessions were also held as part of the workshop to set rangeland monitoring objectives. After much debate, it was decided that there are really only two objectives:

- to provide information to land managers to assist with improved land management practices, and
- to provide information to Government to assist with policy decisions.

Several action statements to achieve these objectives were subsequently proposed, including the formation of an umbrella body to oversee rangeland monitoring policy and practice in the Eastern Cape. International cooperation was acknowledged as a crucial part of this guiding process with Alec Holm consequently being nominated as an additional member of this umbrella body.

Comparisons and Opportunities

The present is a very interesting time in South Africa, particularly in the Eastern Cape. Recent political restructuring has resulted in the relocation of government borders and the formation of a single region, the Eastern Cape, to replace the old Eastern Cape region, the Ciskei and Transkei homelands and parts of the Karoo and Winter Rainfall regions. This restructuring, and the equivocal arrival of a national monitoring program, have led to considerable confusion over what parts of the Eastern Cape range ecosystems will be monitored in the next few years. It is also unknown exactly where the monitoring will be done and by whom.

As the workshop was aimed at reducing much of this confusion, we were given an excellent background into the sorts of monitoring that are in progress or are planned. It was interesting (from an outsider's point of view) to compare and contrast these Eastern Cape monitoring programs to those carried out in Australia. One of the most obvious differences is that monitoring is handled by many organisations in the Eastern Cape, compared to only one or two in Western Australia. What was refreshing to note, however, was that these organisations are now very much attempting to focus on the objectives and outcomes of monitoring ('the big picture') without becoming too bogged down with the technical details.

Of the many conclusions drawn at the workshop, the following particularly caught my attention:

- That you are unlikely to satisfy all clients with a single monitoring program.
- That you need to target programs to answer specific questions.
- It is likely that different procedures will be necessary for different vegetation types.
- It is unlikely that you will ever be able to achieve a perfect monitoring system. What is important is that the programs are started and that technique development is continuous.

I was also interested to discover that, despite differences in the scale and administration of monitoring programs in South Africa and Australia, many of the obstacles are similar. These include the lack of political direction on what specific questions

should be answered by monitoring programs, dissatisfaction with data collection techniques, a lack of analysis of monitoring data (the 'black hole' syndrome) and also the inadequacy of methods for communicating monitoring results to end-users. Hopefully, the realisation that these problems are not unique to each country will provide the impetus for future interaction between rangeland researchers in Australia, South Africa and other parts of the world.

Visits to Rangeland Research Trials in the Eastern Cape

After the workshop, a field trip into the pastoral country near Morgan's Bay and East London was organised. This included travel through the communal and commercial pastoral areas of the sourveld and sweetveld, complete with a running commentary from on-board experts in ecology, geology and hydrology.

Our first stop was at an Eastern Cape Department of Agriculture trial at Lily Park. This experiment, carried out by Leander Jarvel and other Agriculture Department personnel, is investigating the effects of bush-clearing on the herbaceous and woody components of mesic bush-grass communities. This study aims to assess the efficiency of control of different woody species using both mechanical clearing and chemical treatments, and also examines the role of fire and browsing by goats as follow-up treatments. Although the data are yet to be analysed formally, large differences in the plots could be seen. For example, mechanical clearing appeared to be much more effective than chemical use in retarding woody growth.

We also visited the Eastern Cape Department of Agriculture's base at the Döhne Agricultural Development Institute, near Stutterheim. Here, Felix Hobson showed us one of the field trials being undertaken by the Pasture Research Section to investigate the effects of different grazing and burning regimes on the composition of sourveld pastures. This trial has been continuing for several years with results showing clear differences in the relative abundance of pasture species between plots that had been burned annually or biennially, grazed early (within a few weeks of burning) or late (several weeks after burning), and grazed continuously or in rotation. The trial also encompasses measures of run-off and soil loss from some of the field plots. Results suggest that more run-off and soil loss can be expected from annually burnt plots which are grazed early after burning. It was interesting to note that, despite this, the average annual soil loss of the worst treatment remained only 10% of that accepted as safe in cultivated areas.

Additional Comments

As a result of my visit to South Africa, I have certainly gained an appreciation of other monitoring systems, and particularly monitoring at different scales (average property size is around 800-3000 ha compared with around 200,000 ha in WA). I was also reassured that we are not the only ones yet to come up with the perfect range monitoring system. In return, I hope that I was able to help provide the South African researchers with an improved knowledge of range monitoring in Australia, and to give them some ideas about the analysis and interpretation of monitoring data. The workshop provided a great opportunity to meet other rangeland ecologists and to establish links which I hope will be extended in the future.

I would like to thank the ARS for providing funds which enabled me to travel to Johannesburg. The assistance of The University of Fort Hare in providing funds to cover the workshop registration and accommodation costs is also gratefully acknowledged.

BRUCE ROCK EREMOPHILA
Report of the ARS Travelling Scholarship

Guy Richmond, B.S.D. Consultants, PO Box 155, Subiaco, Perth WA 6006.
(previously - School of Environmental Biology, Curtin University of Technology, WA)

I was fortunate to be awarded the ARS travelling scholarship in 1993 to support research into the population dynamics of one of the rarest flora in WA, that of Bruce Rock Eremophila *(Eremophila caerulea* subsp. *merrallii).* Eremophilas, commonly known as Poverty Bush in the west (Emu Bush in all other States and Territories), are an important component of the Australian rangelands, often being the dominant understorey species. However, I should note from experience, as illustrated by the ARS conference in Cobar in 1992, that Poverty Bush is considered a major weed in NSW and Queensland, since it grows in competition with native grasses which are considered important feed species. Nevertheless, so important are these species in WA (numbering over 170), that they were recognised in 1994-5 as the Kings Park and Botanic Gardens "Wildflower of the Year". Whilst many species are characterised by their frost, fire, drought and saline tolerance, and general hardy nature, 14 are in fact rare and endangered in this State. Of these, Bruce Rock Eremophila is one of the few rare species that actually occur in the rangelands.

First collected near Bruce Rock (WA) in October 1927, it is restricted to communities located in open shrub mallee on light coloured stony clay loam soil. It has distinctive flowers which are violet, blue or purple with dark spots, the corrolla being tubular. Flowering is between August and January.

Only two populations are currently known in WA, around Bruce Rock (numbering approximately 20 plants) and within the Southern Cross region (2000+ plants). The latter population occurs on Jaurdi Station, which is now a Department of Conservation and Land Management (CALM) Timber Reserve. This community was only discovered by staff from the WA Herbarium in 1990. Little is known of this species in the wild, with the exception of its taxonomy. An opportunity arose to work with CALM staff to establish a long-term monitoring

program for the area and thereby collate ecological characteristics of the species. The intended outcome of this work was to assist CALM in developing a strategic management plan for the conservation of the Bruce Rock Eremophila.

Attempts to locate this population during 1993 were unsuccessful because of heavy rains. However, a monitoring program was established within the 2000+ plant community on Jaurdi Station during the summer of 1994. The plant community consists of *Eucalyptus* upper-storey, an *Acacia* mid-storey and *Eremophila interstans* understorey on pale sandy clay loam. This population occurs in a relatively undisturbed location that has not been grazed by domestic stock for some years. Mineral exploration occurs in the region and drilling and grid line activity has the potential to threaten this community.

As part of the monitoring program, 43 plants have been tagged within a study plot of approximately 500 sq m. Plant growth characteristics (height and width), condition status, flowering and fruiting periods, and herbivory activity were recorded during the summer of 1994. Continued monitoring will enable CALM to document plant germination and establishment events over the long term. It is envisaged that such monitoring will also assist in recognising Bruce Rock Eremophila at the juvenile stage, thereby assisting taxonomy and further survey work. As the ecological characteristics of this rangeland species are further documented and better understood, its future opportunities for survival will be enhanced. This should, in turn, lead to appropriate management practices being implemented.

I would like to thank the ARS for supporting this research program on one of WA's rare flora within the arid zone. The assistance of CALM in initiating the monitoring program is also acknowledged.

FORTHCOMING CONFERENCE
XVIII International Grassland Congress

The XVIII International Grassland Congress will be held in Winnipeg and Saskatoon, Canada, from 8-19 June 1997. A number of pre, mid and post congress tours through Canada and the USA are also available. The Congress organisers are now inviting paper and poster titles until 1st January 1996. There are 30 separate congress themes including one specific to the arid and semi-arid regions.

Further details about the Congress, including a comprehensive brochure, can be obtained from:

Congress Secretariat
XVIII International Grassland Congress '97
PO Box 4520, Station C
Calgary, Alberta, Canada T2T 5N3
Fax: (403) 244-2340
Email: amc@supernet.ab.ca

RURAL PROFESSIONALS TAKE ON EXTERNAL STUDIES IN MANAGEMENT AND EXTENSION

John Petheram, GDAME Course Coordinator, Melbourne University, Longerenong College, RMB 3000, Horsham VIC 3401

The **Graduate Diploma in Agricultural Management and Extension** was designed by the University of Melbourne's Longerenong Campus specially for professionals in agriculture and natural resource management. The aim is to enable rural professionals to improve their qualifications and abilities in management and/or communication, while employed in remote areas. The course normally takes two years in external study mode.

Course structure is based on that of the highly successful Graduate Diploma in Agribusiness run jointly between Monash University and Longerenong College since 1991. There are 1-3 day residential schools for some subjects, but these are not compulsory for remote students. Residential schools are supplemented by tele- or video-conferences and mentor schemes.

The course caters for rural professionals in two main streams:
1. People wishing to improve their **management and business abilities**, and
2. People seeking training in **communication and principles and practice of extension**.

The eight subjects for each of two nominal streams are shown in Table 1. Students may apply to combine subjects from the two streams. Core subjects are shown by (#). The others listed may be substituted with any subject available in that semester.

Table 1. Subjects in the Graduate Diploma in Agricultural Management and Extension.

	Agricultural Management	Communication and Extension
Year 1 Semester 1	Systems Approaches in Ag and NRM (#) Rural Communication and Extension (#)	Systems Approaches in Ag and NRM (#) Rural Communication and Extension (#)
Semester 2	Farm Financial Management (#) Agribusiness	Rural Development (#) Agribusiness
Year 2 Semester 3	Agricultural Policy and International Trade Project 1 (#)	Information technology Project 1 (#)
Semester 4	Agricultural Marketing (#) Human Resource Management in Agriculture	Rural Women Agricultural Technology

Although the course is offered from Longerenong College near Horsham, some subjects are taught by specialists from Glenormiston, McMillan and Burnley campuses of the University. The optional residential schools are held at Longerenong or Glenormiston, depending on the location of the specialist staff coordinating the subjects. For further information contact me at the above address or:

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Fax (053) 622213
e-mail: johnpeth@vcah.edu.au

POSTSCRIPT FROM UTAH

Ken Leighton, Department of Land Administration, Box 2222, Midland WA 6056

(Ed. Ken was Promotions Coordinator for the ARS at the recent International Rangelands Conference in Salt Lake City. He provided the following report for the benefit of those members not at Salt Lake City.)

It would be fair to say that there could not have been any delegate from any country that did not realise that the Australians were in Salt Lake City - in force! In fact at least 55 Australians, not including partners, were in sunny Salt Lake for the Vth International Rangeland Conference. Apart from the US itself, we were by far the biggest contingent. The contribution of many of the visiting Australians was often recognised throughout the proceedings and the standard of our posters and papers was world class! Well done!

For my part it was a privilege to represent such a body of people and it certainly made my job of promoting the Australian Rangeland Society that much easier. The enthusiastic manner in which ARS members got behind the promotion by helping at the display, by spreading the word and by wearing the new polo shirts was certainly a credit to the Society. We received much positive feedback from many "foreign" delegates who were impressed by the organisation.

Might I say that the initiative of an ARS polo shirt probably contributed more towards our international recognition than the actual display. We were the only country "corporately" organised and on any particular day, it was not difficult to spot an ARS member in the crowd. I thank the members for supporting this venture and commend them for the spirit in which they participated.

In terms of achieving our particular goals of increasing international membership and attracting more international authors for the journal - well only time will tell. Certainly there was much interest shown around the display and many contacts made, but we suspect the fruits of our endeavours will not be realised for maybe a couple of years yet.

So what of the future?

Salt Lake City provided the forum for the ARS to get serious about marketing itself internationally but it should not be seen as a once-off event. Some fifty members have just well and truly put Australia and the ARS on the map. Let's not allow their very enthusiastic efforts to be wasted. The VIth IRC, which is scheduled for Townsville in 1999, will provide another ideal opportunity to continue to promote the ARS internationally. In the meantime though, the ARS will require the help of some very dedicated individuals to "maintain the rage".

In conclusion I will take this opportunity to sincerely thank all those members who contributed to the success of the promotion. Many were burdened with display material and shirts to transport to SLC, others gave unselfishly of their time to attend the display. I also acknowledge the considerable support of Julie Hullick from Townsville Enterprise Limited, and Roger Gilmore from the Queensland Tourist and Travel Corp., New York office, who personally came over to help and provide us with a free lunch. And finally, Squatters Ale House in SLC who provided excellent sustenance and a convivial atmosphere for many culturally challenged Aussies.

Sections of the Australian contingent at Salt Lake City

CATCHMENT MANAGEMENT LAKE EYRE BASIN STEERING COMMITTEE

Mark Ritchie, North Australia Pastoral Company, GPO Box 319, Brisbane QLD 4001

A Catchment Steering Group has been formed for the principal rivers in the Lake Eyre Basin. These rivers are the Cooper, Diamantina and Georgina. Representatives from Queensland and South Australia will run the Group and will maintain firm links with Northern Territory interests in all activities.

This Steering Group held its formative meeting in Birdsville on Wednesday 6th September 1995. The Working Group includes representatives of State and Local Government, landcare groups, the mining and petroleum industries, Aboriginal organisations, the pastoral industry and conservation groups. Of the 17 members, 7 are from South Australia and 10 are from Queensland. Also, one of Australia's leading freshwater ecologists is being invited to assist the group with scientific advice. The Northern Territory Government had an observer at the first meeting.

The Steering Group elected the following office holders:

Chairperson	Mr Laurie Cremin, Remote Area Planning & Development Board, QLD
Deputy Chairperson	Mrs Sharon Bell, Dulkaninna Station, SA
Secretary	Mr Mark Ritchie, The North Australia Pastoral Company, QLD
Treasurer	Regional Manager, Dept. Primary Industries, Longreach QLD

The Steering Group is placing a major emphasis on contact with people in the Basin and will use a range of mechanisms to seek local views on principal catchment issues. The Group expects to meet six times before concluding its duties in mid 1997. Meetings will be held at different towns in the Basin and will include a public forum session and field visits to key features or development sites within the Basin. The next meeting will be held in Marree in South Australia on 22nd February 1996.

The Steering Group has begun to gather information on seven key issues. A wide range of agencies and organisations administer or manage these issues and contact will be made with them to gain their support for this initiative, and to compile information relevant to the Lake Eyre Basin. The key subjects are:

- present management and use of the natural river systems,
- management of the Great Artesian Basin,
- management of pest animals and weeds,
- biodiversity conservation,
- land resource descriptions,
- existing land uses, and
- development and future land uses.

Detailed information on these issues, along with community input, will be presented in a widely circulated information paper.

The Steering Group is working towards attracting sufficient financial support to employ a project officer to assist with community consultation, and with the compilation and distribution of the information paper. The Steering Group also expects to produce a final discussion paper on key catchment issues and community views, along with some recommendations for catchment management in the future. These recommendations and options for future catchment management will be discussed at a major public forum in mid 1997. There has been encouraging support for the Steering Group from both the Queensland and South Australian Governments and the various industry and community organisations.

The Steering Group's spokesperson is Mr Laurie Cremin - telephone: (076) 583301, fax: (076) 583433.

RCD WORKSHOP - SA

Vicki Linton, Primary Industries SA, PO Box 357, Port Augusta SA 5700

(Ed. Vicki very kindly rattled this report off her word processor immediately following the workshop and as she was leaving to assist in the RCD monitoring effort on Yorke Peninsula in the first days after RCD "escaping" Wardang Island. Although recent events have greatly altered the plans for public consultation prior to any controlled release of RCD, I thank Vicki for her diligence and promptness in bringing to the attention of ARS members an example of how that consultation process might have occurred.)

On the 16th October 1995 I attended the first Consultative State Group meeting on Rabbit Calicivirus Disease (RCD) as a representative of the Australian Rangeland Society (SA Branch). The meeting was held in the midst of the "escape" of RCD from quarantine on Wardang Island, and on the day that it became public knowledge that RCD had been found on the mainland. Exciting times indeed.

RCD is a virus specific to rabbits and has been recorded in China and Europe since 1984. It has potential for the biological control of rabbits in Australia because it is host-specific, highly infectious and kills rabbits quickly and quietly. A successful introduction of the virus to Australia could result in reduction of the rabbit population to a manageable level and greatly improve the success of existing conventional control programs.

Prior to its possible release, RCD has undergone extensive laboratory trials and is presently being tested in field trials (i.e. Wardang Island). It also has to pass a rigorous test of public consultation. The Consultative State Group meeting was the first part of the public consultation process in SA.

The meeting brought together the major players in the "rabbit" issue and included speakers from the following groups:

- scientists involved with RCD and rabbit control,
- the SA Farmers Federation,
- the Anti-Rabbit Research Foundation of Australia,
- the rabbit as a pet,
- commercial harvesters,
- animal welfare,
- Aboriginal interests,
- hunters, and
- conservation interests.

It was pleasing that despite the news of RCD having been found on the mainland, the program structure was maintained and a useful outcome achieved at the end of the day.

Some of the major points made by speakers included:

- At least 10 acts of parliament (at both the Commonwealth and State level) must be satisfied before the virus can be released; the mode of spread by vectors has not been fully determined; and there will be a critical need to monitor the disease's effectiveness once released.
- Farmer groups want to see rabbits controlled for economic and environmental reasons but animals must be killed humanely; a cost:benefit approach to analysing rabbit control ignores environmental costs; and there must be public and private responsibility for rabbit control.
- Biological forms of control of rabbits need positive (i.e. not passive) support from the community.
- Vaccination of pet rabbits against RCD is available - but what are the costs and how often do rabbits have to be re-vaccinated?
- Australia supplies the "best eating" wild rabbit in the world with exports worth $2.5 m annually; and rabbit exports will cease to three major markets if RCD is released in Australia.
- Animal welfare concerns include the fate of kittens where adults have been killed by the disease, and information such as virus sequences for the strain of RCD used in Australian trials have not been reported (necessary to prove host specificity).
- Aboriginal communities in the southern part of SA are in favour of the disease because these communities face major land management issues while Aboriginal communities in the north rely on rabbits as a major component of their diet.
- Through their concern for the environment and their desire to see native species re-established, hunting groups agree that the rabbit should be suppressed. However, they are concerned that foxes and cats may prey-switch to these native animals.
- Rabbits prevent regeneration of plant species and compete with native animal species thereby affecting Australia's biodiversity.

Following the speakers' presentations, participants divided into five workshop groups to discuss the following questions:

- What are the expected benefits of the proposed release of RCD?
- What are the concerns associated with the proposed release of RCD?

Once the results of the workshops are published, a summary will be reported in this Newsletter.

MULGA TO MEAT
Report on a Meat Profit Day
Alice Springs

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

Approximately 400 people attended a Meat Profit Day symposium held in Alice Springs on the 6th October 1995. The symposium was organised by the Central Australian Beef Research Committee with the Meat Research Corporation (MRC) being one of the major sponsors. In fact, this was the sixth in a series of "technology transfer" exercises that the MRC has conducted around Australia.

The theme of the meeting was "Mulga to Meat", with sessions concentrating on marketing, new technologies and current research. The marketing theme was structured around marketing beef as a product, marketing livestock and marketing the pastoral industry. In the opening session, a panel of quality speakers delivered some hard hitting messages about producing and marketing beef into the future. Long gone are the days when producers can just grow beef and expect the consumer to buy it. The consumer wants consistent quality, and particularly tenderness. It was suggested that recent advertising campaigns directed at the health value of lean beef are not necessarily serving the long-term best interests of the beef industry: tenderness and taste testing trials in Australia and the US have shown that consumer ranking of palatability increases as the fat content (i.e. degree of marbling) increases. To satisfy consumer requirements, the proportion of cattle finished in feedlots will continue to grow. In the rangelands, pastoralists will have an increasing requirement to produce quality store cattle that perform consistently in feedlots. Backgrounding, where cattle are fed a "starter" ration that allows them to rapidly adapt to feedlot conditions, is also becoming a requirement of pastoralists.

John Carter, former chairman of the NSW Meat Industry Authority, presented the audience with five key points:

- The challenge. Provide what the customer wants or beef's market share will continue to be eroded by the highly organised and efficient chicken and pigmeat industries.
- A new initiative each year. Change is exciting while old practices may be obsolete.
- Intelligent crossbreeding is essential to improve production efficiency (i.e. hybrid vigour) and meat quality. (Crossbreeding is a particular challenge to the extensive beef industry - e.g. bull control so that required cows are joined to selected bulls; maintaining, or sourcing, pure lines to continue to reap the benefits of crossbreeding.)
- Follow your cattle through to the customer and act on feedback.
- Quality assurance (QA) is good practice. QA is equally applicable on the station as it is, for example, in the abattoir. However, it requires that all management practices are documented and accredited, and that staff are fully trained and proficient in these practices.

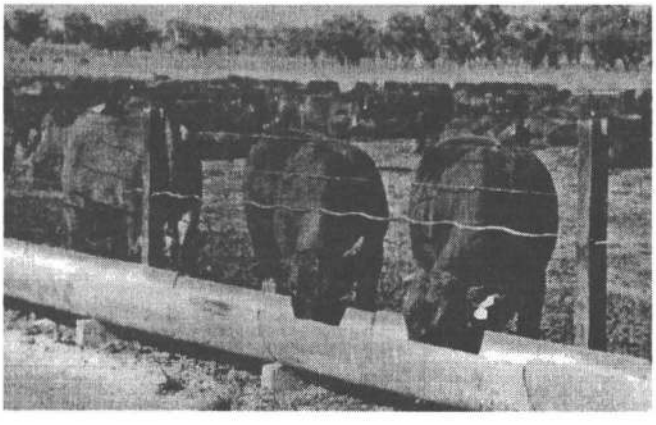
Doug Shears (Chairman of ICM Australia) highlighted the opportunity for Australian agriculture and science to feed a

rapidly expanding world population. In a challenging presentation, he described the development of a "super beast" through genetic engineering: an animal that performs well on low quality forage (mulga and spinifex maybe!), has mohair-like fibre (thereby greatly increasing its hide value) and, when butchered, has meat with an extended shelf life under minimal refrigeration. Unfortunately, production of this animal will be licensed to the very few, and not necessarily producers within Australia, thereby representing a great opportunity lost. Doug Shears challenged the audience, as Australians, to ensure the future competitiveness of our national beef industry by establishing a suitable company (e.g. a revamped AMLC) to be at the forefront of such new technologies.

After the opening national perspective on marketing, the emphasis shifted to a more regional treatment of marketing, research and technology. Under "marketing ourselves", speakers covered landcare in central Australia (e.g. land reclamation with ponding banks, rabbit control) and the changes recorded through photographs over a 30 year period. Topics under the banner of "marketing our product" included Cattlecare, an industry endorsed QA accreditation program, the MRC Marketlink program (to encourage modern business management principles through appropriate training), improving the quality and value of hides, and electronic identification of animals. "Marketing our livestock" dealt with aspects of livestock welfare, transport (e.g. low dust trailers and volume loading), crossbreeding under extensive pastoral conditions, on-farm handling of livestock and management principles to better market live exports into south east Asia.

Product quality, marketing and principles of business management are now rightly recognised as essential components of good rangeland management. As an ecologist in an area of the rangeland community somewhat sheltered from the day-to-day realities of commerce and business management, I was particularly impressed with the focus of the Meat Profit Day and the calibre of the speakers. It is a rare treat when a body of relevant information is presented by quality speakers in a provincial centre such as Alice Springs.

I congratulate the organisers and speakers for an informative and well organised day.



SOME THOUGHTS FROM THE PRESIDENT

Ron Hacker, ARS President, c/- NSW Agriculture, PO Box 865, Dubbo NSW 2830

For those who attended the Vth International Rangeland Congress in Salt Lake City in July, the Australian contingent of about 45, mostly dressed in their green ARS T-shirts advertising both the Society and the venue of the VIth IRC, was one of the more conspicuous features of the meeting. Australians were highly visible, both as contributors to the scientific content of the Congress and as representatives of the ARS. The publicity booth organised by Ken Leighton and Allan Wilson, an initiative of the West Australian council, became a Congress landmark and was very successful in bringing your Society and its publications to the attention of the international community. Many delegates expressed interest in receiving information on the next IRC, of which more later, although far fewer were as keen to dig into their pockets and join the Society on the spot. Nevertheless there are likely to be some lasting benefits from the promotion, particularly as a result of Allan Wilson's contact with potential overseas contributors and with the management of the *Journal of Range Management*. To Ken and Allan in particular, and to all who manned the booth at various times throughout the Congress, my thanks, on behalf of Council, for a job well done.

Plans are now beginning to take shape for the VIth International Rangeland Congress to be held in Townsville in 1999. Council is currently in the process of appointing the Organising Committee and will announce its membership in the next Newsletter. While the Organising Committee, consisting of the Chair, Business Manager, Sub-Committee convenors and a Council representative, will be responsible for overall organisation of the Congress there will be plenty of work to go around. Many of you will no doubt be approached to join particular sub-committees or in some other way assist in Congress organisation. We are a relatively small fraternity and the task of organising an international Congress will necessarily place some strain on our human resources. However I have no doubt that we will rise to the occasion and that the VIth IRC will confirm Australia's place as a leading innovator in the science and art of rangeland management.

In the context of this planning it is worthwhile considering what role Societies such as ours, and indeed the IRC, can play in the ongoing dialogue about use and management of rangelands, both in Australia and abroad. The Vth IRC attracted about 650 delegates from around the world. In contrast, the annual meeting of the American Ecological Society, held at nearby Snowbird the following week, attracted somewhere between 3000 and 5000 according to various estimates. Furthermore the IRC was not very well patronised by some groups which should have been logical participants. The US land management agencies for example were not well represented and the Canadian contingent was relatively small. Certainly the Ecological Society meeting covered a very wide range of subject areas, and no doubt drew its audience and contributors from a larger population of researchers, students and other interested groups than the IRC could command.

Nevertheless the marked difference in the size of these gatherings serves to highlight the fact that a wide range of scientific societies today covers the various disciplines which impinge on rangeland management (e.g. ecology, animal production, weed science, wildlife management), and that for many subject specialists their conferences may well represent better value for money than rangeland conferences, either national or international.

As a Society we can take pride in the fact that our biennial conference is probably still the largest national conference dealing with the ecology and management of terrestrial ecosystems - but not by much. We would do well to exploit the unique opportunities which our Society provides and to differentiate ourselves as much as possible from competing forums. One such opportunity is our capacity to provide a forum for discussion of those issues of land use which are regional, or even national, in scale and socio-economic in nature. These are important issues which underlie and limit the application of technology developed by more conventional research. As Brian Walker pointed out in his paper to the Salt Lake meeting, most effort in rangeland research is directed at the latter, despite the overriding importance of the former. It is we, rather than any other Society, which should be able to address these fundamental matters, particularly given our diverse membership of land owners, land administrators, researchers, conservationists etc. I believe that increasingly we will need to do so if we are to maintain our place in competition with the more specialised Societies, and realise the full potential of our own.

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REORGANISATION OF THE PUBLICATIONS COMMITTEE

Ron Hacker, ARS President, c/- NSW Agriculture, PO Box 865, Dubbo NSW 2830

After seven years as Chair of the Publications Committee, Margaret Friedel will step down before the end of the year. Leigh Hunt, currently a member of the Committee, has accepted Council's offer of appointment as the new Chair and will take over from Margaret at a mutually convenient time.

The Publications Committee determines policy for *The Rangeland Journal* and the *Range Management Newsletter* and oversees their production. Margaret's term as Chair has been a particularly important one for both. Under her leadership the Society's flagship has undergone a change of policy, a change of name and a change of format. The result is a journal which is more attractive to researchers, who have traditionally accounted for the vast majority of contributions, as a medium for publication of high quality material. At the same time the quality and range of articles available to the Newsletter has also increased since it is now able to publish the more applied or less rigorous material which under older policies would have appeared in the Journal. A firm basis has thus been laid for the development of both of the Society's publications as important repositories of the scientific and practical knowledge relevant to the management of Australia's rangelands. In addition to her significant contribution to policy, Margaret has maintained close contact with the production aspects of both publications, reported regularly to Council on behalf of the Committee and established mutually beneficial links with related overseas journals. Her efforts over an extended period have contributed significantly to the furtherance of the Society's aims and I take this opportunity to express the thanks of Council and members for this contribution. At the same time congratulations are in order for Leigh who has assumed an important role in the Society's function.

Other changes are also in train for the Publications Committee. As President of the Society, I too intend to step down as a member of this Committee and consequently two vacancies currently exist. Anyone wishing to nominate for one of these positions should contact either the incoming Chair (Dept. of Primary Industries, PO Box 357, Port Augusta, SA 5700) or the Secretary of the Society by December 13 so that nominations may be considered by Council at its next meeting.

(*Ed. Hear! Hear! I also thank Margaret for the assistance she has given me in producing past issues of the Newsletter. Margaret has been both a frequent contributor and an invaluable help with her proof reading and constructive comments on each issue. Thank you Margaret!*)

AUSTRALIAN RANGELAND SOCIETY
MEMBERSHIP APPLICATION FORM

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

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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.

I enclose $..... for full/part* membership for an individual/institution* for the calendar year 1996.

* delete as appropriate

Signature..... Date.....

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Institution or Company -			
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