The Australian Rangeland Society

RANGE MANAGEMENT NEWSLETTER
An official publication of The Australian Rangeland Society
ISSN 0812-4930

Citation
The material in Rangeland Management Newsletter has not been subject to peer review and may not be acceptable to some editors.

If cited it should be in the form:
Bastin, G. and Allan, G. (2012). After the smoke has cleared: 2011 fire in Central Australia. In: Range Management Newsletter (Ed. N Duckett). 12/2:3-6. (Australian Rangeland Society: Australia).

ISSN 0812-4930

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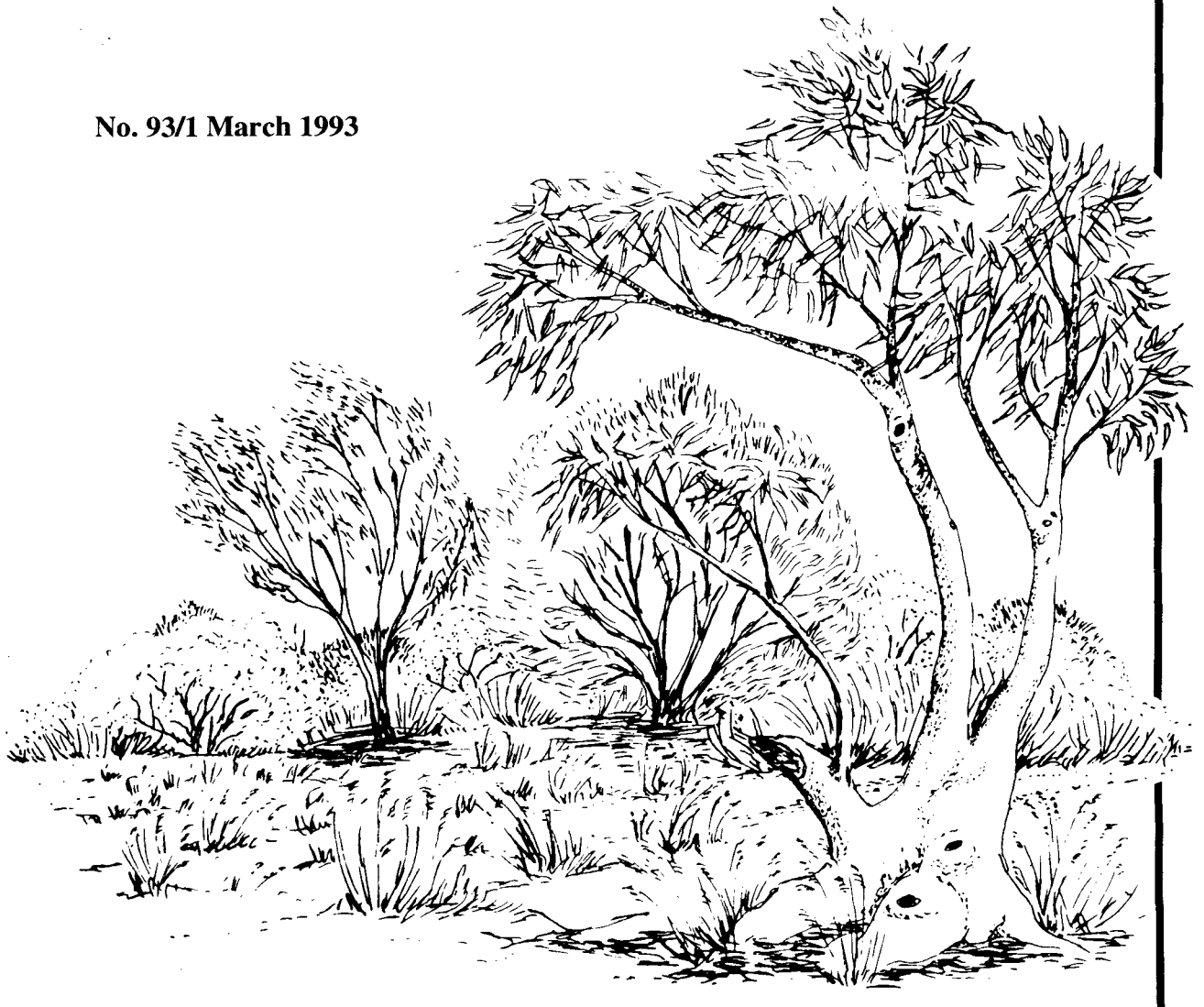
No. 93/1 March 1993



Registered by: Australia Post - Print Post No. 545270/00001

No. 93/1 March 1993

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FROM THE EDITOR

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

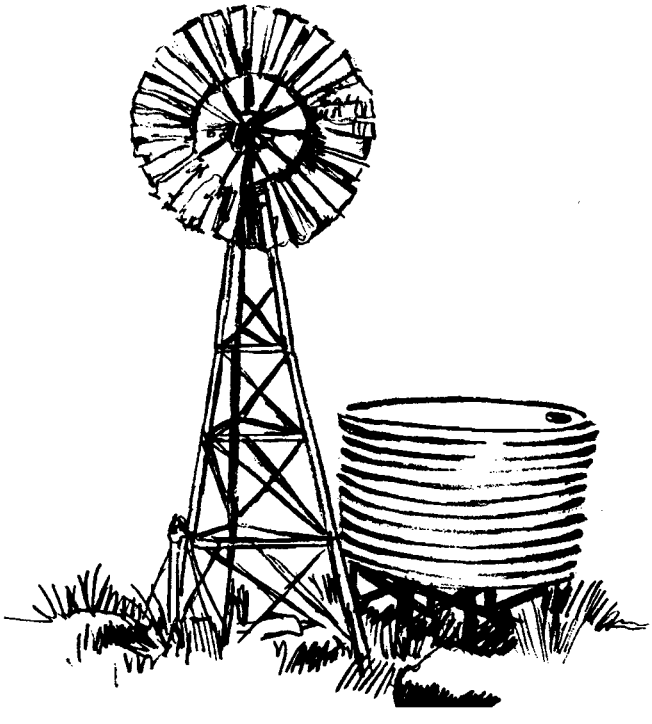
Welcome to another year with RMN. Just a short introduction from me because this issue is well supplied with a diversity of contributions. Of particular interest: David Freudenberger continues his "crystal ball gazing", Julian Reid focuses on the impact of grazing animals other than rabbits, Matthew Dowling draws our attention to woody weeds in South Australia via a series of photos, and Margaret Friedel describes her research into landscape rehabilitation in central Australia.

David Freudenberger paints a more optimistic picture for the future of our rangelands through the Landcare ethic in the second of his three articles. I am sure that David's articles must elicit some response from the pastoral community, land administrators and other researchers, and I welcome any Letters to the Editor in response to his contributions.

Julian Reid draws on his observations in the Coongie Lakes area of north-eastern South Australia to caution us that rabbits are not to blame for all the degradation in our southern rangelands. When the land is under stress in a drought, continued grazing by domestic animals can also cause substantial changes to the soil and vegetation, and place additional pressure on native animals.

Also included in this issue is a contribution from Grant Norbury on the control of kangaroo numbers, news from Western Australian members, reports by recipients of ARS travel grants, information from Council and a voting form for the forthcoming AGM.

So, please read the RMN and respond with your comments to issues raised, or send me news of what you are doing in the rangelands. My deadline for the next issue is the end of May 1993.



WOODED RANGELANDS IN THE DECADE OF 2040

A Letter to the Editor

Essentially Freehold - A Mixed Bag

David Freudenberger, CSIRO Division of Wildlife and Ecology, PO Box 84, Lyneham ACT 2602

How might the rangelands be managed in 50 years? There are many possibilities of course. This is the second scenario of three offered by David. The first, essentially dealing with the 'status quo' situation, appeared in RMN 92/3.

Things have changed much for the better. We have indefinite tenure based on a proven record of Landcare. We bought out the neighbour back in the '90s, set up permanent monitoring transects and went to work. The family album includes pages of transect photos. They are a fascinating collection - the grass shrinks to hardy butts during the dry years, but with a sense of pride, they flush again during the wets. Turpentine and turkey bush crept into some of the photos, but they got hammered after a good fire that did a world of good. We had to follow up with dilute herbicide in some of the paddocks when we could afford it. It has taken nearly 30 years to really get on top in the worst paddocks; there haven't been many opportunities to burn. Some paddocks have even had to be re-seeded. The Ag. Dept. release of native grass cultivars has made a world of difference in places.

Our philosophy has been conserve, conserve and keep it simple. It has not been easy. We've conserved our finances to target improvements starting in the most productive paddock. It took a long while to get started, we were in debt to the hilt when we bought out the neighbour. We almost didn't make it, but we got lucky with the rains. What a relief when we finally got out from under that burden. Even during those early years we stuck to our conservative policy and stocked lightly with all animals. We've worked hard to keep the sheep in top order along with all the other species on the place. Trapping goats, shooting roos and ripping warrens has been as important as crutching sheep. Rabbits are gone, the myxo/sterility virus got the susceptible ones and ripping got the rest. So the only stock left on the place are in good condition - starving roos, bloated goats and dead wool are a thing of the past.

We keep it simple by thinking lazy. Why race around mustering when a couple of one-way spear gates, a holding yard and three days does the job for us? Droughts have their advantages now, making any goats left much easier to trap. We rarely have the shooters in for the roos. We've restored the animal balance by restricting access to water. This was done by fencing all our waters and installing Finlayson Troughs and Siro Selective Gates around the tanks. The tough western greys seem to get along fine without drinking as they quit breeding when it dries out. The reds shift about looking for green pick and there's generally plenty of it now

with all the grasses around. I'm still amazed at the response we get, even with as little as 30 mm of rain.

The waters I talked about before, and adjacent holding paddocks are about the only fencing we've done. The sheep are too lazy to wander far from water. Really wet years are our only real hassle as we have to wait for a dry spell before we can get a clean self-muster. Our only grazing management focuses around the waters. Sheep being what they are, they tend to flog the country in close to water so we give the area a spell now and then by closing the gates. The spell doesn't have to be long, just time for the mulga Mitchell and wallaby grasses to fill out and seed every few years. We're even starting to fine-tune our paddocks by grazing hard in the summer with sheep and a few cattle. This hits the wire grass before it gets away, and then by easing off in the autumn and winter, it helps the soft grasses get established. It doesn't always work - sometimes the autumn rains fail and then we're back to square one. It's an on-going experiment we've been running for years with the research people.

One of the best things the Lands Commission did was give us an opportunity to get some training. I always thought it strange that everybody and their dog had to be trained and licensed to drive a car, jab a needle, connect a few wires or fly the kids to college. But us, the productive backbone of the country, spending hundreds of thousands a year, used to be able to take up a run if we could con the bank manager (it wasn't hard - most didn't know a bullock from a balance!). Now all run-holders have at least a two year diploma in rangeland management and every couple of years, a week-long update course is put on. Like any other profession, our course is run by our Rangelands Society with grants from the Lands Commission to cover the costs. It's a great week to get away, catch up on reading, hear the latest info and exchange notes. Most of us on the land are involved in some sort of long term research project and we're all still learning.

As I mentioned, we run a few hundred cattle - sometimes more, other times virtually none. During the good seasons, we run more as they're relatively cheap and fairly easy to walk in and out. Fossil fuels have dried up as we were all warned - so haulage is kept to a minimum. Drovers have returned on horses and no one, person or beast, is sorry for it. Sheep are worth only their wool, old stock are shot and only enough ewes are joined to replace them. Our rams are the best bred on the range - rams from high rainfall areas, raised on supplements, are a handsome joke. Ewes are culled ruthlessly, and it shows. Our self-mustering system has made such a difference. The only time any stock leave their watering point is for shearing, all else is done at the water and they even die in their paddock.

Droughts are lean times but not disasters. If we don't have six months of feed on hand, we don't put out the rams. Dead lambs, with ewes sapped dry, is such a waste. Droughts don't kill - there's generally plenty of hayed off grass, but it's always poor in quality. This fines up the wool of course and that's the beauty of sheep. We've found that it's nearly impossible to overgraze during drought as the fodder is just too poor in quality. It's the mediocre years when we have a bit of rain here and there that we have to be careful. Sporadic rains keep providing green pick which keeps stock condition up but exhausts the grasses' reserves if we're not careful.

Looking back? - yes, we have some regrets. Paying off the debt cost a lot in spirit and range neglect. One or other of us had to work in town during the week for some years, while the weekends were shot as the spouse recovered from the long drive back. Thinking back - sure, it was tough on the family. Having the kids away at school during their teens was a hassle. A lot of adjustments had to be made when they came home and then left again. We missed so much as a family when they were growing up so fast.

Looking forward? - yes, again we have some concerns. How will this place change hands? None of the kids or their spouses seem to be really interested - it's too isolated for them. Fuel is so expensive that we don't travel as much as we used to. I can sell - but to whose benefit? Certainly not the land's. The next owner will be shackled with debt that's tough to pay on scattered rains. Low stocking rates are fine for us who are debt free, but the temptation is always to run more to clear the debt.

Who is to dictate the care of this land? Yes, we are better informed as graziers and we now have an established tradition of integrated management through districts - but landcare is not enforceable. There have been plenty of court cases over the last 50 years that have been thrown out because it is impossible to prove degradation. Our monitoring album has plenty of photos of apparently flogged-out country, but depending on soils and past history, some of it can bounce back in a spectacular way. How can one be prosecuted for changes in the vegetation state that may have started 100 years ago? You can't enforce burning - by the time you try, the opportunity is lost. You can't force people to work hard or make difficult decisions. The temptation is always there to hold back, keep stock, it might rain next week; shooting sheep is never easy...

RABBITS VS DOMESTIC LIVESTOCK REVISITED

Julian Reid, 18 Burke St, Alice Springs NT 0870

Why the Debate?

A series of lively articles appeared in recent issues of *Xanthopus* which, as well as being the scientific name for the yellow-footed rock-wallaby, is the Newsletter of the Nature Conservation Society of South Australia. The debate, spanning four consecutive issues, concerned land degradation and loss of biodiversity in the South Australian arid zone and the relative contributions of rabbits vs domestic stock (primarily sheep and cattle). Morton & Pickup (1992) addressed these issues and identified the rabbit as the "most pernicious environmental problem" in the southern two thirds of the Australian arid zone as a whole. I beg to differ, only in that

their view is a generalization which, if taken out of context, fails to pay due consideration to the extreme 'patchiness' (in time and space) of the arid environment and of management systems. Here, I wish to draw members' attention to these interesting articles and comments.

I kicked off proceedings (in *Xanthopus*) with a provocative look at the management of cattle on Innamincka Regional Reserve, one of the new breed of conservation reserves springing up over vast areas of outback South Australia. Regional reserves cater for multiple land uses and are to be managed in such a way that conservation values are not to be compromised by the other commercial activities (my interpretation of the purpose and definition of regional reserves under the National Parks and Wildlife Act of South Australia - see Reid & Puckridge, 1992). Innamincka is rich in Aboriginal, European and natural heritage, and famous for Burke and Wills, Sydney Kidman, and more recently, the Coongie Lakes, a vast chain of freshwater lakes fed by Coopers Creek. The Cooper and the lakes hold the key to explaining the remarkable richness of the Innamincka region given its location in the most arid core of Australia. Nutrients, detritus and sediment are swept along by run-off from a substantial portion of central and south-western Queensland and deposited in the vast areas of floodouts and floodplain downstream of Innamincka. It is a rich environment indeed, and following each flooding and drying phase there is a sharp burst of growth by plants. This, in turn, produces an increase in those animals which graze the vegetation before populations again decrease as the vegetation decays.

Rabbits under their own steam homed in on this environment 100 years ago. They can attain colossal population densities when conditions are right; similarly Sir Sydney was not slow in realizing the gains to be had by shifting cattle onto the floodplain pastures where they could be fattened for the southern markets. The legacy today is a degraded landscape and an altered, poorer environment (the loss of native mammals, birds and plants has been documented), but of course the region still contains many features having high conservation significance. For instance, the wetlands are of international importance (RAMSAR Convention) and World Heritage Listing has been proposed.

I have been engaged in ecological research on Innamincka Regional Reserve, focusing on the Coongie district, for the past six years. Over this period, I have thought long and hard about the relative impacts of cattle and rabbits and made qualitative observations.

The first observation, however, concerning the larval stage of a hawk moth (Sphingidae) introduces the concepts of scale and biology, all-important (I think) in relation to the issues raised here. Torrential late summer rains in 1987 caused massive production of native grasses, 'cowvines' (*Ipomoea* spp.) and 'tar vines' (*Boerhavia* spp.) along with many other plants at Coongie. Although rabbit numbers were fairly high, a mass hatching of a sphingid caterpillar resulted in the very rapid consumption of much of the growth of various plants including these 'vines'. My conclusion was that these caterpillars were consuming far more vegetation than the local rabbit population. They were able to, because of the species' ability to rapidly breed and their presumed high growth rates. Not surprisingly, the population of caterpillars crashed once they had exhausted their food supplies. The whole event took place over two months or so - a very short time scale.

1987 was a high rainfall year in the north-eastern deserts of South Australia, and large storms were experienced through 1988 and into the first half of 1989. From then until early 1992, dry conditions prevailed - less than 60 mm fell at Moomba in 1991. The rabbit population increased over the first few years of this sequence, no doubt fluctuating in response to breeding cycles, summer heat-waves and the availability of green vegetation. At the onset of dry conditions, the rabbit population was regionally very high; their numbers crashed as conditions deteriorated, until the population density was effectively zero over large portions of Innamincka Regional Reserve. Undoubtedly rabbits consumed a lot of the plant matter while their population was high, and presumably, they caused an inordinate amount of damage as the region went into drought - suppressing the establishment of seedlings that germinated in response to local storms, and ringbarking (above and below ground), often to the point of killing, favoured shrubs such as umbrella wattle (*Acacia ligulata*). However, as the drought progressed and worsened, their continuing impact effectively became negligible.

Not so with cattle. As the drought progressed, more and more cattle (several thousand) were shifted onto the lakes' frontage and floodplain pastures (and yes, this is a conservation reserve, administered by the then South Australian National Parks and Wildlife Service, now part of the newly created Department of Environment and Land Management). Cattle are large, heavy, hard-hoofed animals capable of ranging five or more kilometres away from water. Provided they have access to water, they can survive for a much longer period on nutritionally poor forage and dry herbage than can rabbits.

Therefore, for a year or so cattle were having a far greater impact on the vegetation (and soils) than rabbits. This occurred under drought conditions, when the land and native vegetation and animals could least withstand additional stress. The popular explanation of the day is that extinctions of native animals within the arid zone are thought to have occurred mainly during droughts and dry spells.

Note the importance of considering the **time scales** and the **biology** of the species in question. Obviously an insect is very different to a mammal, but there are also significant differences between a rabbit and a cow; notably size, generation time, water dependency and nutritional needs. When provided with water (and because of their characteristics), cattle can subsist long into a drought, even at moderate stocking densities. Naturally also, a pastoralist will be tempted to hang onto the stock for as long as possible going into a drought, hoping for the rains that will replenish pasture supplies and stock condition and improve market prices.

My main points are:

1. Rabbits, with existing technology and resources, cannot be controlled in the arid zone. However, it is economically

viable to manage domestic stock numbers in the arid zone. Therefore, when a system is under stress, manage those impacts which you can manage i.e. stock levels.

2. The longer a drought progresses, the greater will be the proportionate impact of stock (and other large ruminants) on the land, vegetation and native animals.

3. Given that drought is a critically stressful period for the natural environment, especially sensitive management needs to be exercised under drought conditions.

4. Conservation goals and short-term grazing objectives will be in direct conflict during drought (noting that longer-term landcare, and therefore, grazing objectives will be best served by stocking conservatively at these critical times to nurture the vegetation and soils).

5. Self-interest may cloud objectivity; this observation is in no way intended to be disparaging of the integrity of commercial land users, but simply a reflection on human nature. By definition, rangeland scientists and ecologists should always be attempting to minimize their bias and striving for objectivity. However, in my opinion, some of these scientists and rangelands' extension officers fall prey to 'client capture', and so lose perspective. Rabbits are not inherently evil, nor livestock inherently good, and from the perspective of land degradation and loss of biodiversity, they should be regarded and assessed from a neutral stance.

6. There will be times when, and places where, livestock have a greater impact than rabbits, and vice versa. There may also be different times at the same place when the relative impacts are reversed.

7. Total grazing pressure should always be evaluated. On Innamincka, cattle and rabbits are the only significant mammalian herbivores, but I am well aware that kangaroos and a range of feral animals pose serious problems elsewhere. As with stock, I believe they could be effectively controlled with proper regional planning and integration and an affordable input of additional resources.

In no way should the above be interpreted to suggest that I have a soft spot for rabbits. They are a pest and have undoubtedly caused massive amounts of environmental and economic damage. I heartily support efforts to find economically viable means of controlling them in the rangelands. However, I believe they have been made the scapegoat with respect to species' extinctions, land degradation and loss of production to an undue degree in some quarters. The provision of water attendant with pastoralism, the elimination of dingoes from the southern rangelands, the introduction of exotic carnivores (foxes and cats) and excessive stocking levels, in a variety of ways and interactively, have contributed significantly to these problems. Furthermore, I believe there is a theoretical case for livestock having hammered the final nails into the coffin of now-extinct mammals, as outlined above. Indeed, Dorothy Tunbridge (1991) attributed the demise of the Flinders Ranges mammalian fauna to Europeans' livestock in the first 50 years of settlement there, prior to that region's invasion by rabbits and foxes!

I recommend the series of articles in *Xanthopus* to those interested in the issues raised here. My article (Reid, 1992) elicited ready responses from two professionals with lengthy experience in the South Australian rangelands, defending pastoralists' and the National Parks and Wildlife Service's endeavours respectively (Badman 1992; Newland 1992). A conservation scientist's perspective was then given (Baker 1992), and the debate concluded with a lengthy essay from rangelands ecologist Fleur Tiver. This last contribution is well referenced and alludes tantalizingly to her own large data set on suppressed establishment of long-lived, woody species characteristic of the southern rangelands. The current theory has it that rabbits, to a far greater degree than sheep, have prevented recruitment from occurring (e.g. as promulgated most recently by Reid & Fleming 1992), but Tiver (1992) thinks she has the data to turn this theory on its head!

I am happy to forward these five articles on to interested parties, but I would ask you to include $1.35 worth of stamps with your request to cover the costs of copying and postage. Alternatively, write to the Nature Conservation Society, S.A. directly to purchase the four back issues of *Xanthopus*. Their address is:

NCSSA Inc.
120 Wakefield St
ADELAIDE S.A. 5000
Ph. (08) 223 6301 Fax 232 4290

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UNDERSTANDING CHANGE IN CENTRAL AUSTRALIA'S CALCAREOUS GRASSLANDS

Margaret Friedel, CSIRO Division of Wildlife & Ecology, PO Box 2111, Alice Springs NT 0871.

(Ed. This first appeared as two articles in the *Alice Springs Rural Review.)*

Since the mid-1980s, we have been investigating bluebush (*Maireana astrotricha*) / oat grass (*Enneapogon* spp.) pastures in the southern Alice Springs District. Our interest is in documenting the way the country changes when it is grazed and whether or not it recovers after good rains.

In the long term, we want to be able to predict the way soil and vegetation will change in response to different levels of grazing and different seasonal conditions. With that capacity, pastoralists will have some useful guides for pasture management.

Gradual or Stepwise Change?

So far, we have tracked pasture species changes at the end of summer and the end of winter over six years, at different distances from water. The distances are equivalent to different levels of grazing, from light through to heavy.

We have found that the mix of species present is relatively insensitive to grazing pressure. That is, composition remains much the same at different distances approaching water until it changes abruptly to a different species mix at some point closer to a watering point. This means change is stepwise, rather than gradual.

Does it Matter?

We thought that the stepwise change in vegetation could mean that key pasture species had disappeared or that the quality of the soil had changed. If that is the case, is the situation reversible? Can recovery occur?

In a further study (July 1991), we compared three areas:

1. 300-600 m from a dam
2. 4.5 km from the same dam and
3. a similar area which had been fenced off from the dam and only minimally grazed for the last 10 years.

Stock numbers on the dam had been reduced in the mid to late 1980s and good rains had fallen.

We wanted to see if any, or all, of the areas showed signs of recovery - e.g. did the proportion of good forage species increase? Did soil nutrients improve?

A local pastoralist had told us that, during a drought in the 1960s, sand blew about the general vicinity, leaving bands and hummocks of sand where the surface had previously been smooth. The sandy bands are some 30-100 m wide and now support mature bluebush. Between the sandy bands are harder surfaces, 100 m or more wide.

Changes to the Pasture

At the site closest to water, where the heaviest grazing would occur, we found that the sandy bands were breaking down and that the bluebush was dying back. The generally sparse pasture grew on the sandy bands and was largely unpalatable (e.g. hairy goodenia - *Goodenia lunata*).

At 4.5 km from the dam, mature bluebush were growing on the sandy bands while younger bluebush were colonising the harder surfaces. Pasture growth was still largely confined to the sandy bands but its palatability had improved (e.g. minor amounts of oat grass - *E. avenaceus* and buckbush - *Salsola kali*).

At the third area, which had been rested for 10 years, bluebush was continuing to recover on the harder surfaces, but the pasture wasn't. The most significant recovery was on the sandy parts where umbrella grass (*Digitaria coenicola*) and oat grass were prolific.

First Conclusions

1. Recovery of bluebush is well underway but the all-important pasture has only recovered to any extent on the sandy surfaces. Since the harder surfaces occupy the larger proportion of the land, the level of recovery that has occurred is unsatisfactory for most producers. Moreover, no-one can afford to close up much country for 10 years to achieve limited recovery.

2. Umbrella grass and oat grass are key indicator species. Their loss through grazing probably means a significant decline in the grazing potential of the land.

Why didn't the pasture recover fully? My colleague from the Canberra branch of our Division, David Tongway, examined the soils and landscape, to explain some of the processes at work.

Broadscale Changes to Soils

By looking at mounding of sand within the bands and the range of soil textures present, David concluded (independently of the pastoralist's advice) that the sandy soils had indeed been strongly wind-sorted. The sand was likely to have come from local deflation. Through this process, the sandier layers on the surface are gradually stripped away by wind (and sometimes water) and the finer, more hard-crusting soil beneath is exposed.

When the wind blows the soil about, the lightest materials are sifted out and can travel many hundreds of kilometres on the wind. Although the amount of material lost might be small, the effect is disproportionately large, because a lot of it is fine clay particles and

organic matter (plant remains, fungi, etc.) containing important nutrients.

Loss of organic matter leads to reduced plant growth. This in turn decreases the amount of organic matter returning to the soil, and the whole system progressively runs down.

Organic Carbon

Organic carbon content is a good indicator of the amount of organic matter present in the soil. We collected replicated soil samples at four depths: (1) 0-1 cm, (2) 1-3 cm, (3) 3-5 cm and (4) 5-10 cm, from each type of soil, and from all three areas, for laboratory analysis of organic carbon.

The area with most grazing had lower levels of organic carbon than the other areas (see Figure). Most organic carbon was in the top few centimetres of all the soils (except one) - that's why minor sheet erosion can have a big effect on pasture growth. The exception was the sandy soil close to the dam; it is still eroding and doesn't accumulate organic carbon.

Other Soil Properties

What other soil properties help to account for the pasture responses that we have described? The levels of organic carbon (and other nutrients like phosphorus) help to explain the differences between the three study areas, but not between sandy and hard surfaces.

Why is it that plant growth is generally better on the sandy surfaces than on the hard surfaces, when nutrient levels aren't always better?

Water Infiltration

To see if soil moisture held some answers, ecologist Ashley Sparrow took replicated measurements of water infiltration rates on each type of soil, and on all three areas, using a "disc permeameter". He also measured saturated water content with a "time domain reflectometer" (TDR is easier).

Not unexpectedly, sandy soils had faster infiltration rates than harder surfaces. However, there were surprises when the hard surfaces were compared in the three areas.

We had supposed that the hard-surfaced soil on the area closest to the dam would be slow to take up water. Its surface was unstable and quickly formed a slurry when wet, which might block the pores that aided infiltration. The other areas had a cover of "cryptograms" (microscopic algae, fungi, bacteria and sometimes lichens) which help to stabilise the surface. But we were proved wrong: the less stable soil became wetter much faster.

Then why wasn't the plant growth better? One possibility was that, without cryptograms, the less stable soil lost water more quickly. Cryptograms may help to slow the evaporation of soil moisture, once water gets in. Subsequent measurements after light rains showed that this was not so; unfortunately really substantial rains have eluded us since. Another possibility was that the supply of seeds is insufficient on bare areas. The hard surfaces may simply be too smooth to trap seeds and particles of organic matter and soil as they blow across. We plan to test this in future.

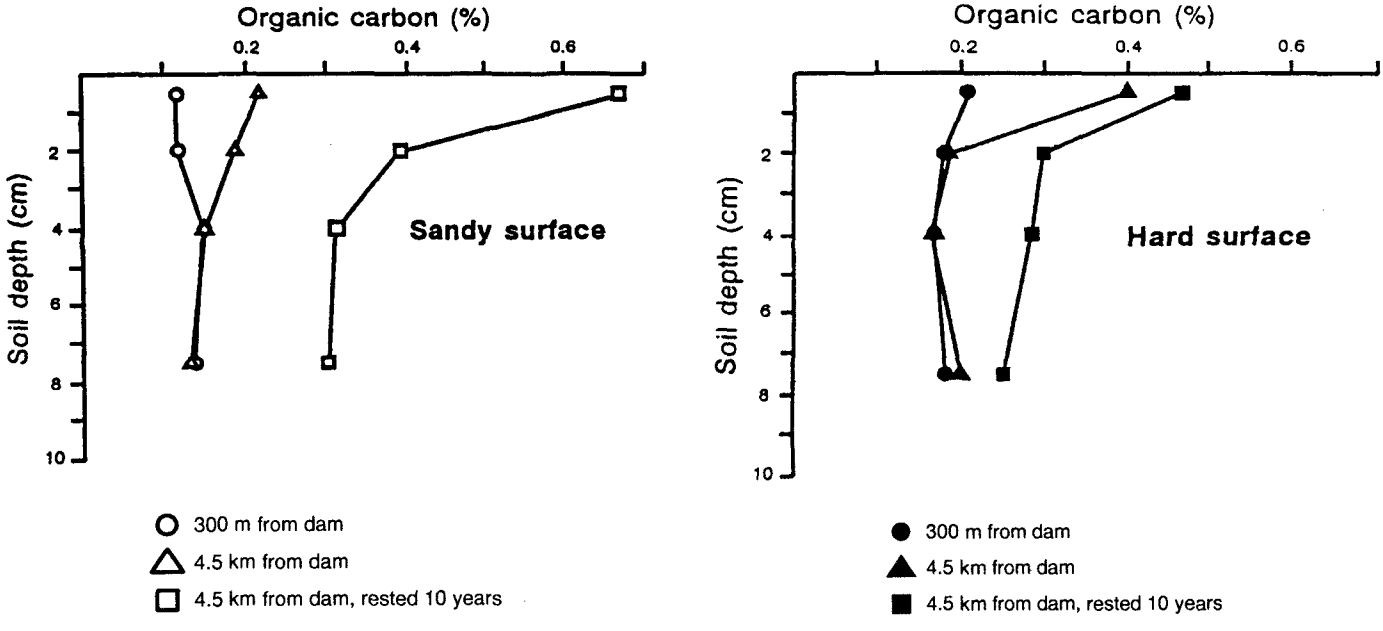

Figure: Organic carbon (%) for hard and sandy surfaces.

Why this is Important

There will be two useful outcomes of this work:

1. Identified indicators of the productive potential of the land. Earlier on, we mentioned umbrella and oat grasses as key indicator species of productive country. There are soil features like cryptograms and crust stability which we think will also be useful indicators. When our work is complete, we will be able to be more specific.

2. Indicators of rehabilitation needs. What kind of intervention is necessary will depend on what is missing from the land. It might be nutrients, water, seeds or soil fauna (which break down organic matter). Treatment may fail if it is not correctly targeted. Our work will help to define what will or won't work.

Postscript

Some time after we began, we were shown a similar area which has been very lightly grazed for over forty years, and probably much longer. Instead of having sandy bands alternating with hard surfaces, the soil has a much more even sandy surface. The bluebush is evenly distributed too.

This area is currently in the midst of drought and the pasture is almost entirely dead there. Nevertheless, there are many grass tussocks anchored in the ground which, though dead, are still identifiable as umbrella and oat grasses, and in densities not seen in the grazed areas.

It looks as though the banding might be a product of grazing and drought, rather than drought on its own. If this is so, then the presence of umbrella and oat grass is a very useful indicator indeed.

Thanks

This work was carried out on Erldunda Station with the full support of the owners, Aileen and Bernie Kilgariff. They have shared our interest in the research all along and were willing to see this article in print. The interest and advice of other local pastoralists has also been a great help. We thank them all.

SOIL CONDITION MANUAL

David Tongway, CSIRO Division of Wildlife and Ecology, PO Box 84, Lyneham ACT 2602

Many ground-based methods for monitoring the condition of rangelands try to include the status of the soil as one of the properties assessed. Soil condition, or productive potential, is an important variable to be able to assess, because it inherently addresses longer term issues of condition rather than response to recent rain.

In times of prolonged drought when plant cover is low and species identification is difficult, information about soil condition can provide useful guides to likely pasture response when rain does come.

Traditionally, it has been difficult to provide a field method with the capacity to be used in a wide variety of landscapes. This is because different soil and landscape combinations respond in different ways to degradation forces, and specifying narrowly defined features can't take account of this. On the other hand, features which are too broadly defined also fail to get at the essence of soil condition, and create confusion and elastic values in the minds of those who do the monitoring.

I am presently working on a manual which provides a step-wise method of selecting the most appropriate features to use in assessing soil status. This work is being done for the WA Department of Agriculture and is to be incorporated into their WARMS (WA Range Monitoring System) methodology. The method is based on ecological principles derived from recent research.

For a given rangeland monitoring site, the three steps are:-

1. recognising where in the overall catchment the site is located,

2. identifying terrain/soil/plant associations or "pattern" in the vicinity of the site, and

3. assessing soil status within each pattern zone by field observations which address soil stability, fertility and hydrology.

Each monitoring site needs to have Steps 1 and 2 done only once, so as to arrive at the appropriate method of soil assessment (3), which is the task of continuing monitoring.

Step 1 takes off from the regional summaries of Land System Survey, and uses the techniques described in the "Australian Soil and Land Survey Field Handbook" (McDonald *et al.*) to locate the site in its geomorphic and hydrologic setting. Water runoff depends on slope and fetch at landscape scale, so it is important to know whether a site is high (i.e. droughty) or low (floods or receives water from upslope) in the landscape, and whether water runs quickly or slowly.

Rangeland landscapes are characterised by their patchiness, or lack of uniformity, at the 5 to 100 m scale. This is caused

by subtle and complex processes depleting soil, litter and water from some parts of the landscape and depositing them on another, thereby producing a patchwork of naturally richer and poorer sites. The patches can be recognised from their vegetation type or associations (e.g. mulga groves) and topographic features (e.g. flats, slopes, depressions). This next descriptive phase is completed in Step 2 of the system, and in the manual a number of types are characterised with captioned photographs and sketches. Steps 1 and 2 tend to group monitoring sites into sets with similar functional properties. Thus, it is quite feasible that sites from distant land systems may use the same monitoring method because the observer has deduced that they work in the same way. Alternatively, sites quite close together could be discriminated by the scale and manner of resource distribution.

The third step involves observing soil surface features within each of the pattern elements separately for signs of fertility (effective nutrient cycling), stability (whether the soil may erode or not) and surface hydrology (whether water runs off readily or is ponded or conserved in some way). A number of separate observations are made, and generally, they are assigned to a class, using criteria and photographs in the manual.

The method does require some commitment from the observer, but with careful interpretation, it can provide an improved understanding of range condition assessment. Methods of rehabilitating degraded rangelands can also be deduced from this data, but that's another story.

ESA MEETING

Jill Landsberg, CSIRO Division of Wildlife and Ecology, PO Box 84, Lyneham ACT 2602

The next conference of the Ecological Society of Australia will be held in Canberra from 26th September to 1st October 1993. The venue is the Research School of Biological Sciences, Australian National University, Canberra. A one day excursion to various research and policy centres, based around the theme "How does science become policy?", is also planned.

Symposia will include:
- application of GIS to the study and management of terrestrial ecosystems
- community ecology: a litany of special cases
- disturbance and the maintenance of biological diversity
- from the forest floor to the forest canopy: interactions of flora and fauna in nutrient cycles in Eucalypt forests
- grazing ecology
- landscape ecology and conservation
- science policy and research: can science and the bureaucracy meet?
- seed dispersal
- techniques for biodiversity preservation.

Further details and registration forms are available from Craig James or myself at the above address, or:
Phone: (06) 242 1600 Fax: (06) 241 4020

INCREASING THE COMMERCIAL VALUE OF KANGAROOS HAS BENEFITS FOR LANDCARE: FACT OR FALLACY?

Grant Norbury, WA Department of Agriculture, PO Box 522, Carnarvon WA 6701

Given the heightened public awareness of landcare and animal welfare issues, it is important that the Australian Rangeland Society has a clear position statement on the management of large kangaroos. It appeared from the discussions on kangaroo management at the last ARS Conference in Cobar that increasing the commercial value of kangaroos was an important means of solving the kangaroo problem in the rangelands. I would like to contribute to this debate by questioning whether increasing the value of kangaroo products by itself has major benefits for landcare.

The objectives of kangaroo control from the pastoral industry's point of view usually take two forms: to reduce competition with stock for food, and to prevent and repair land degradation by reducing grazing pressure on the rangelands. Better range management is now a high priority for Landcare groups throughout pastoral Australia. Concerns and frustrations are constantly raised regarding the inability to reduce effectively total grazing pressure in the presence of kangaroo populations that are generally regarded as over-abundant. Indeed, our research in Western Australia has experimentally supported these concerns and indicates that commercial harvesting in its present form offers little respite.

It will take a concerted effort to change the general community's perceptions of kangaroos as an economic resource and to establish reliable markets. Given a successful marketing campaign, there may be significant improvements in financial returns to the kangaroo industry, and perhaps to pastoralists themselves if they consider kangaroos sufficiently lucrative to harvest them as a supplementary source of income. The shift in emphasis from kangaroos as pests to kangaroos as a valuable resource will inevitably lead to a focus on sustainable utilisation of kangaroos. This has positive economic outcomes, but is sustainable utilisation of free-ranging herbivores always in the best interests of landcare? For example, the population levels required to sustain commercially viable populations of kangaroos may be well above those levels required to recover degraded land. Moreover, it would appear that the quotas set by each State are too low to recover degraded land and that they have no impact on the direction of effort in degraded areas.

Given that kangaroos become more valued economically, shooters may avoid smaller animals in order to sustain commercially viable populations in the future. This form of "free-range farming" is not uncommon in efforts to control feral goat populations. Indeed, the history of feral goat control in Australia epitomises the inability of commercialisation of free-ranging herbivores by itself to provide long-term population control.

Regardless of whether kangaroos are considered a pest or a valuable resource, they should be included in estimates of carrying capacity of the land. If this is done, then some reduction in presently allowable stock numbers will be required in many areas to prevent overgrazing and land degradation.

The vast majority of government resources available for kangaroo management are spent on monitoring and administering the maintenance of large kangaroo populations. There is relatively little attention paid to the efficacy of these management programs in safeguarding land rehabilitation. The kangaroo management programs throughout Australia are preoccupied with preservation of large kangaroos. This happens at the expense of conserving the ecosystem they rely on. I believe that the current control system fails in this area, not because of the low commercial value of kangaroos, but mainly because kangaroo shooters are capable of covering only a small proportion of the rangelands, making hunting an inefficient process.

I suspect there are greater benefits to be made by improving accessibility of shooters to kangaroos rather than increasing their market value. There are already two ways this can be done. Electrified fencing has been shown to concentrate kangaroos (and goats) effectively, thereby facilitating localised control programs (improved stock control is an added benefit). There is some evidence that electrified watering devices that allow stock, but not kangaroos, to drink can concentrate kangaroos around watering points, which may facilitate commercial harvesting. Significant technological improvements in these areas have been made in recent years and pastoralists are already adopting these technologies.

Apart from their impact on population size, electrified devices such as these also confer greater control of kangaroo distribution. This is important especially for red kangaroos, whose remarkable ability to descend on country that responds to local rainfall or removal of stock can severely impede rangeland recovery. Their home ranges overlap extensively and large concentrations of animals can result from simultaneous use of productive land common to the home ranges of numerous animals. An increase in commercial value will not necessarily overcome this problem.

Even if a more lucrative kangaroo industry actually fills the prescribed quotas on the number of kangaroos that are allowed to be shot each year, there still remains the problem of a filled quota to achieve kangaroo populations low enough to allow the recovery of destocked degraded land.

Another problem concerns the difficulty of controlling kangaroo numbers by the current shooting system when numbers are primarily controlled by rainfall. Kangaroo populations slowly increase during good seasons and crash spectacularly during drought. The impact of shooting on these population trends is minuscule compared with the impact of rainfall. This could pose problems for consistency of supply in a more pro-active market in the face of massive declines engendered by drought.

A final, but vitally important, thought is that Greenpeace and the Australian Conservation Foundation oppose the commercial use of kangaroos (not to mention the opposition from Europe and North America). Therefore, regardless of whether it can be demonstrated that increasing the commercial value of kangaroos has clear benefits for the land, there are major philosophical differences to overcome before Greenpeace and the ACF will come anywhere near offering their support. This alone stands as a formidable barrier to increasing the commercial value of kangaroos as an improved means of population control.

I do not oppose increasing the commercial value of kangaroos *per se*, but simply question whether it is a universal panacea for landcare. I raise the issue as food for thought for the Australian Rangeland Society in the hope that, if we are to openly support increasing the market value of kangaroo products, we have at least considered the implications for landcare.

REPORT ON THE AUSTRALIAN RANGELAND SOCIETY TRAVELLING FELLOWSHIP, 1991

Michelle Leishman

School of Biological Sciences, Macquarie University NSW 2109

In 1991, the Australian Rangeland Society awarded me $900 under its Travelling Fellowship scheme. The money was very welcome as it helped to pay the cost of transport between Macquarie University (where I am completing a PhD) and my field sites, based around the CSIRO Field Station at Lake Mere in western New South Wales.

My PhD research has been about the comparative biology of seeds and seedlings of the semi-arid flora of western New South Wales; in particular, their establishment and dispersal biology. Part of this research has involved experimental work to test various hypotheses about the adaptive advantages of larger, compared to smaller, seed size. At Lake Mere, I conducted a field experiment to test the hypothesis that large seed size provides an advantage to seedlings establishing in low soil-moisture conditions. Seedlings establishing in semi-arid and arid regions are highly susceptible to mortality from water stress.

The experiment used 18 species varying in seed size from 0.06 mg to 22.2 mg. Species used included grasses such as the bottlewashers or oat grasses (*Enneapogon* spp.), forbs (e.g. Bogan flea - *Calotis cuneifolia* and lilac Darling pea - *Swainsona phacoides*), shrubs and trees (including acacias and eucalypts). I used a randomised block design with three levels of watering treatment. Water was carted from the Darling River at Louth, about 40 km away and I am very grateful to John McMaster of CSIRO for his help.

The seedlings were watered under each of the treatments for about three weeks and the percentage emergence and survival was recorded daily. Daily temperatures were quite high during the course of the experiment (30° - 43° C) and even the most favourable watering treatment showed low rates of emergence and survival. Species with larger seeds did have higher rates of emergence and survival than small seeded species. However, this advantage decreased as soils became increasingly drier. Thus, it would appear that the improved establishment of large-seeded species is unrelated to soil moisture conditions.

The Lake Mere experiment, plus follow-up glasshouse experiments at Macquarie University, have been written up and submitted for publication as well as being a part of my PhD thesis. The results from this research contribute to our fundamental understanding of the plant characteristics which affect seedling establishment in semi-arid and arid environments. This knowledge may help in the development of management plans for the establishment and maintenance of the vegetation of the semi-arid rangelands.

REPORTS BY RECIPIENTS OF THE AUSTRALIAN RANGELAND SOCIETY TRAVELLING FELLOWSHIP, 1992

Australian Rangeland Conference - Cobar, 1992

(Ed. Bill Hannaford and Guy Richmond received financial assistance through ARS Travelling Fellowships to attend the Cobar Conference last October. As a condition of the award, each provided a report to Council which is reproduced here. The two reports vary considerably in style and content - perhaps Council should provide some guidance to future recipients as to what it regards as useful information in formal recognition of an award.)

Guy Richmond

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"*Australian Rangelands In A Changing Environment*"

The theme of the rangeland conference was apt for the rangelands are not a static entity in which economists keenly estimate the cost-benefit of proposed projects. They are instead a dynamic system in which the economy (domestic and international) and changing markets, feral animals, and the vagaries of climate constantly beat at the pastoralist's door for recognition. It is with this flavour that the last conference highlighted many of New South Wales' rangeland problems, particularly rabbits and the invasion of woody weeds, e.g. emu bush (*Eremophila* spp.).

It was with some apprehension, after reading over the last two years of the problems of emu bush encroachment around Cobar, that I presented a poster which focussed primarily on how to grow them (in Western Australia), both for rangeland and minesite rehabilitation. With well over 170 different species in WA, the opportunities for utilising the more desirable shrubs are extensive. I had several people come up to me and the first question I was asked was "*How do you eradicate them*?", whilst a further comment was "*Why do you want to grow them anyway*?". There are extensive (and often expensive) ways of clearing unwanted *Eremophilas* ranging from chemical applications to mechanical clearing, as illustrated by Ruth Barclay on the field day at Bundoon Belah (e.g. the grubber), to chaining followed by burning. These queries can be answered by bodies such as CSIRO and the Department of Agriculture who have been researching these areas thoroughly. I made no attempt at answering the first question but focused on the main issue at hand: until you can obtain a handle on the ecology, and in particular, germination and establishment characteristics of species, then eradication in selected areas will continue to be difficult. One other point is that not all *Eremophila* species are woody weeds and some shrubs such as *E. longifolia* (Berrigan) and *E. latrobei* (Warty-leafed eremophila) are ideal fodder plants for domestic stock. When I returned to Perth and explained to my colleagues about the field excursion where the effectiveness of the grubber pulling eremophilas out of the ground was demonstrated, I was asked if I was urged to jump in front of the tractor to stop such an act. Whilst that idea amused me, I was surprised at the densities of some of the emu bush around Cobar and their ability to take over and reduce grass cover. Each region of Australia's rangelands has its own set of problems which must be managed effectively.

I was interested in comments from pastoralists throughout the conference, as we have all heard that they are here to keep us (Ed. government people?) honest. The scientific community must not forget that our jobs are to complement, support and guide the pastoral industry in the many decisions made on a daily basis. Some pastoralists asked me why should they join the Rangeland Society since there are few pastoralists who are members. My comment is that they should join and become active members for the reason that the Society is a forum, not only for the scientist or land administrator, but also for the pastoralist. The rangeland community at large can only benefit if scientific, pastoral, administrative and conservation groups get together and discuss contentious issues.

On the final day of conference proceedings, the presentation by the Warrego Graziers Association on "Business or property - the changing skills required of property managers" was a topical and serious issue at hand, especially after John Chudleigh's presentation on "Changing financial environments". The former presentation illustrated the need for flexible financial skills and a support base for local graziers to meet and discuss important issues. Whilst discussing financial concerns in the open session on Society matters, I agreed totally with the idea of conference sponsorship through the banks. This would be a good opportunity for the financial institutions to become more aware and sympathetic to issues associated with rangeland managers.

I felt that the conference was a success, and an ideal opportunity for all interest groups to meet and discuss scientific as well as pastoral matters at hand.

Bill Hannaford

Australian Plague Locust Commission, Dept. Primary Industry and Energy, GPO Box 858, Canberra ACT 2601

I drove into Cobar on Monday evening feeling a bit apprehensive about my first conference. After all, I'd never been to one before and I knew very few people. Things changed considerably when I got to the club. It was soon happy hour, then it got even better when drinks were free. I was beginning to like the Australian Rangelands Society.

My reason for going to the conference was not to give a paper and not even to present a poster. I was there to meet people and to hear the latest research and technology in the Rangelands world. I think I more than achieved those goals. I'm currently doing an Honours project about spelling in the chenopod shrublands, with supervision from Martin Andrew and Mark Stafford Smith, and with some help from Leigh Hunt. That in itself was enough reason to be at Cobar. However, recently I was lucky enough to get a job with the Plague Locust Commission where I am involved in pasture modelling and remote sensing technology. Therefore going to Cobar was extremely beneficial to me.

I guess some of the most memorable things at the conference were talks by John Chudleigh, Steve Morton and John Leys. The field trip talks by Jim Noble and the grazier from Hay about the roo proof trough were also excellent. But I suppose the highlight of the week was the bus trip back from Bundoon Belah. I learnt a few new jokes from the Queenslanders up the back of the bus. You had to be there!

I was really pleased to see people from different departments from all around the country integrating their work, e.g rangeland monitoring. As a newcomer to this profession, I can see this as a major step forward to improving things and to stop the duplication of work. I spoke to Greg McKeon about this in relation to pasture growth models and remote sensing and it is encouraging to know that he also wants to follow this integrated approach.

Lastly, the only disappointment I had with the conference was to know that less than a sixth of the participants were pastoralists. I feel that the Society definitely needs to get more pastoralists involved. Maybe in harder times, more noise could be made about the Travelling Fellowship. We who work for the Government have got it easy in this respect. We still get paid, but the grazier that doesn't do the work while he's at the conference loses three or four days. As was said at the conference, communication is the key.

SPECIAL ISSUES OF *THE RANGELAND JOURNAL*

Margaret Friedel, Chairperson, Publications Committee, c/o CSIRO, PO Box 2111, Alice Springs NT 0871.

Congratulations to Steve Morton for his fine job as editor of the recent special issue of *The Rangeland Journal*, "Wildlife and conservation in the rangelands". Steve's name did not appear on the cover and so his effort might not have been recognised by all our subscribers. He was responsible for inviting contributions from a wide variety of people, so as to present as broad a perspective as possible; other authors offered their work subsequently. Once the manuscripts were in hand, a great deal of time was devoted to developing a consistent style of a high standard. The outcome was a unique collection of papers on a theme that is certain to receive increasing prominence. Both Steve and the authors must be well pleased by their publication.

Scarcely before the presses have stopped, it's time to begin planning for the next special issue. Participants in the Cobar conference will recall being asked for their ideas on future themes. Journal editor Allan Wilson and I have been reducing this long list of suggestions to a manageable few. The selected theme will be announced in the next issue of *RMN*, along with the name of the editor. Voluntary contributions will be welcome but the usual editorial standards will apply, so that publication cannot be guaranteed. To help future editors on their way, Steve Morton has written a report for the Publications Committee on the pitfalls and joys of special issues, which no doubt will reach epic proportions as more issues appear.

More ideas for themes are welcome at any time, and can be sent to me at the address above.

ABSTRACTS *THE RANGELAND JOURNAL*

Vol 14 No 2 1992

Special Issue: Wildlife and conservation in the rangelands
Guest Editor: Dr Steve Morton

The Conservation Status Of Birds In Arid Australia

Julian Reid and Michael Fleming

Previous studies provide an impression that there are few bird conservation problems in the and zone, particularly because none of the 230 species has become extinct. Here, we show that the status of one half of the avifauna has changed since European occupation, and conclude there are many threats to avian biodiversity at the regional scale in the arid zone. There

are 19 species (8%) in the arid zone classified as rare and threatened nationally. Twelve more (5%) are uncommon species which have decreased or are at risk in two or more regions. A further 40 species (17%) have declined in at least one arid region, although many of these remain common and some have increased elsewhere in arid Australia. At least 45 species (20%) have increased in range or abundance, including a suite of ground-feeding birds associated with degraded landscapes.

Striking patterns emerged from analysis of 29 threatened and declining species:

- birds associated with chenopod shrublands and grassy, riparian or floodplain environments have been most affected whereas mulga inhabitants and canopy-dwellers of riparian woodland have been little affected;

- birds generally with a northern distribution have declined in the south of the arid zone and birds with a southern distribution have declined in the north of the arid zone. These patterns contrast with many birds with a southern or continental distribution which have declined more in southern semiarid regions than within the arid zone itself;

- birds which feed at ground and low shrub height have been most adversely affected;

- sedentary bushbirds (passerines - perching birds) are more at risk than nomads and their limited mobility seems to be a risk factor;

- among non-passerines, parrots, cockatoos and pigeons are most at risk, while three passerine families stand out, namely wrens, quail-thrushes, and thornbills and allies;

- contrary to findings for mammals, size does not generally appear to be an important risk factor.

Land degradation and habitat alteration such as shifts in abundance or dominance of plant species caused by the introduction of exotic herbivores appear to be the principal factors causing change in status while the provision of reliable water sources in pastoral districts is also important. Introduced predators are implicated in some cases and altered fire regimes may have played a part in spinifex and mallee habitats. Competitive interactions between increasing and declining species, although not demonstrated, appear to be likely for some species.

We have documented a hitherto unsuspected degree of change in avian biodiversity in the Australian arid zone. In the absence of widespread regeneration of dominant plant species in the southern arid zone, the decline of many arid zone birds will accelerate dramatically. Also, unless better management ensues, the next major drought could cause accelerated declines and extinctions. We advocate a range of measures designed to improve the conservation prospects for arid Australian birds, including lower stocking rates on pastoral properties, rehabilitation of critical habitats and their protection from exotic herbivores, experimental research on the impact of grazing and predation, and monitoring of both threatened species and a range of sedentary passerines typically associated with representative habitats in the arid zone.

The Original Mammal Fauna and Some Information On the Original Bird Fauna of Uluru National Park, Northern Territory

Alexander Baynes and Robert F. Baird

Investigation of mammal bones, accumulated mainly by owls, from four cave deposits, combined with observations and museum records, has revealed an original (i.e. immediately pre-European) fauna for Uluru National Park of 34 species of native ground mammals and 12 species of bats. This fauna comprises one monotreme, 22 marsupials from eight families, 12 bats from four families, 10 murid rodents and the dingo. For six of the species, the park records represent an extension of range over published distribution maps, though originally all the ground mammals were probably widespread in the arid zone. A recent survey found that the present fauna of Uluru National Park includes 15 native ground mammals and a minimum of seven bats, indicating a loss in about the last century of up to 19 species of ground mammals and at least one bat. The local status of three of these is uncertain, 10 appear to be locally extinct, two are extinct throughout the Australian mainland and five are probably totally extinct. As elsewhere in the arid zone, the mammals that survive are the largest and smallest species and the echidna.

The cave deposit sites yielded two orders of magnitude fewer bird remains, some of which could not be identified below family or genus. The material includes at least 16 species representing 13 families. All identified species were recorded in the present fauna of the park by the recent survey. This relatively small sample suggests that in non-pastoral areas of the arid zone, bird faunas, unlike mammals, have so far survived European colonisation of Australia without loss of diversity.

The Decline Of The Brushtail Possum, *Trichosurus vulpecula*, In Arid Australia

J.A. Kerle, J.N. Foulkes, R.G. Kimber and D. Papenfus

That the brushtail possum was once common and widespread in the arid zone is confirmed by a collation of historical information. Although possums were widespread. detailed records from the Northern Territory and South Australia show that they were most abundant in rocky ranges and outcrops and along watercourses. Possums are now rare in the arid zone.

In considering the reasons for the decline of this apparently robust species, we have further developed a currently popular model which explains mammal decline in the arid zone. Our hypothesis is based on the premise that disturbance of refuge habitat patches critical for the survival of the species was occurring at the same time as the country was experiencing average or below-average rainfall. During the period between 1920 and 1970, rainfall was either average or markedly below

average with no exceptional rainfalls recorded. Analysis of this rainfall data suggests that sub-surface waters were probably not fully recharged, placing a natural stress on the possum's refuge habitats. At the same time, possum populations were being affected by many disturbing factors introduced by European settlement. Once the populations were reduced, they fell into a 'predator-pit' through depredation by dingoes and introduced predators and were unable to increase in numbers even with the advent of improved conditions.

In this paper, we identify the need to accurately determine the refuge habitats of a species and then use appropriate analysis procedures to predict when these habitats will be under most stress. Specific protection measures can then be developed in association with land managers in order to reduce disturbance at the most critical times.

Patterns Of Waterbird Use In Wetlands Of The Paroo, A River System Of Inland Australia

M.T. Maher and L.W. Braithwaite

The significance of inland wetlands to Australian waterbirds has been overlooked until recently. One important area identified from regular aerial survey centres on the Paroo River in north-western New South Wales. Between April 1983 and December 1985, a period covering a major flood, waterbird populations were estimated on five wetland systems associated with the Paroo during 14 trips. Fifty-three waterbird species were recorded with the anatids (ducks) accounting for 75 per cent of total estimated populations. Most breeding events were observed in those wetlands dominated by lignum. Breeding accounted for shifts in waterbird populations between wetland systems. A model of waterbird usage of the five wetland systems in relation to a complete flood event is described. The importance for waterbird conservation of wetlands used for breeding and maintenance of populations between flood events, and threats to the integrity of these wetlands are discussed.

Influence Of Habitats, Climate, Grazing And Mining On Terrestrial Vertebrates At Olympic Dam, South Australia

John L. Read

Small mammals, reptiles and amphibians were trapped in pitfalls in a range of habitats around the Olympic Dam Operations mine in central South Australia over a five year period (1987-91) to assess the impacts on these groups of climate, mining and grazing. A frog species was the most abundant vertebrate in the region but was only recorded after heavy rains. Reptiles were both diverse and abundant in summer samples and in general maintained their population sizes during droughts. Mammals, however, exhibited considerable fluctuations in population size which were associated with climatic cycles. Sites within the mining lease consistently yielded higher species diversities and capture rates of reptiles than sites in pastoral land, but this could not be related directly to land use.

Mound Springs: South Australian Conservation Initiatives

C.R. Harris

The mound springs of inland Australia are of outstanding scientific and cultural importance. Natural outlets for the waters of the Great Artesian Basin, they are found mostly on, or near, its margins. The most numerous and active springs are in the far north of South Australia. Parts of western Queensland still have active springs, but almost all in north-western New South Wales are now extinct, presumably because of aquifer draw-down in the wake of bore sinking.

As permanent sources of potable water in a desert environment, they have been a focus for human activity over many years. Aboriginal occupation has been demonstrated to at least 5000 years before the present and almost all the springs are rich in archaeological material and mythological associations. Since European settlement, they have been of strategic importance in exploration and in the location of pastoral stations, the Overland Telegraph and the old Ghan narrow gauge railway line from Marree to Oodnadatta.

Biologically, they represent unusually specialised aquatic habitats, the discontinuity being analogous to islands and the isolation just as great for species with limited dispersal abilities. The result is an assemblage of plants and animals of evolutionary, biogeographic and ecological interest, with many endemic and relic species.

Heavily degraded by aquifer draw-down and over a century of pastoralism, the springs were given little attention until relatively recently. In the past decade, two key areas have been acquired for the national parks system and ten important springs on pastoral country outside of the parks have been fenced. Important research has also been carried out, with a particular focus on the endemic elements of the invertebrate fauna.

These are positive achievements, but the remoteness of the localities where the springs occur presents a continuing difficulty for on-going conservation and management programs.

Comparing Two Views Of The Landscape: Aboriginal Traditional Ecological Knowledge And Modern Scientific Knowledge

L.M. Baker and Mutitjulu Community

There has been increasing international interest in indigenous people's traditional knowledge, particularly in the area of economically useful plants. In Australia, ecologists and land

managers have been increasingly interested in Aboriginal knowledge of the land and resource management practices.

The potential for combining Aboriginal ecological knowledge and scientific knowledge is explored. Results of a fauna survey jointly undertaken at Uluru National Park by Australian National Parks and Wildlife Service, CSIRO and Mutitjulu Community provide the basis for discussion.

This paper compares Aboriginal ecological knowledge with that of scientists by looking at how each group classifies habitats, recognises habitat use by various fauna, and interprets the impact of drought and fire on fauna.

Aboriginal knowledge is unique in that it can provide a long term view of the dynamics of Australian ecosystems. Because the corporate knowledge of generations is passed on and added to by contemporary observers, Aboriginal people can provide detailed knowledge of the life history of fauna in their natural environment and can provide crucial insight into the decline of native species.

The way in which Aboriginal people and scientists view habitat classification and use by fauna was found to be compatible. Information provided by Aboriginal people can give perspective to, and enrich, the research of scientists.

There is tremendous scope for Aboriginal people and scientists to work together to help us understand our Australian environment and to develop appropriate management strategies. The scientific community is urged to accept Aboriginal ecological knowledge on an equal basis to ecological research.

It is important that scientists wishing to work with Aboriginal people recognise the importance of people keeping control of their traditional information. Copyright and control of usage must remain with the Aboriginal informants and it is suggested that this is crucial if Aboriginal people are to be equitably involved in team projects.

Technological Change In Fences And European Pastoral Heritage In Semi-arid New South Wales

John Pickard

Despite increasing attention to conservation of natural resources and Aboriginal heritage, relics of the European pastoral industry in the semi-arid rangelands have been neglected. Fences are ubiquitous relics of the pastoral industry and show a rich variety in styles, techniques and technological change. Examples from Wilcannia in western New South Wales illustrate the variety that can be found. Legislation in New South Wales prohibits disturbance of relics (items > 50 years old) but has not been applied. The key step is assessing the significance of the item or place. Criteria adopted under The Burra Charter are listed and briefly discussed. Costs of conservation should be borne by society, not individual graziers, and grazier cooperation is essential for conserving cultural heritage.

Multiple Use And Nature Conservation In South Australia's Arid Zone

Bernice Cohen

Public interest in the arid zone has led to a huge expansion of South Australia's arid conservation reserve system since the early 1980s. As the arid reserve system expanded, there was accommodation of other land uses under existing legislation. Other uses are tourism and recreation, exploration and mining, Aboriginal land uses and grazing. Expansion of the reserve system into the State's rangelands and into the oil and gas rich Cooper Basin led to the designation of a new reserve category, known as the Regional reserve, which explicitly affords resource exploration a place alongside conservation. The multiple use concept has allowed some key areas to be brought into South Australia's reserve system with relative ease. Innamincka was the first Regional Reserve and, to date, is the most complex of the multiple use reserves; tourism, petroleum exploration and production, and grazing take place in it. The multiple use concept assumes that more than one use can be managed in space and time without significant detriment to conservation values. It implies an acceptance of human-induced changes to natural systems, but does not resolve concerns about the acceptable limits to change. The question of who bears the cost of management and monitoring of multiple use reserves remains unresolved. There is an opportunity for conservation objectives to play a more central role in the management of arid lands which fall outside the reserve system. Careful, conservative management regimes in multiple use reserves will greatly increase the chances of a favourable outcome for nature conservation.

Nature Conservation In Rangelands: Lessons From Research On Reserve Selection In New South Wales

R.L. Pressey

Information on the features to be protected in a system of conservation reserves is an obvious requirement. The quality of the data base will primarily determine the effectiveness of conservation planning in protecting the full range of natural features in a region. However, the way in which data are used to make decisions on the locations of protected areas is also critical. Rigorous procedures for reserve selection can make the difference between achieving reservation goals or not. Research on reserve selection in New South Wales over recent years has concerned both data bases and procedures for guiding decisions. Reserve planning in many regions is based largely on some form of land classification like vegetation types or land systems. There are good reasons for using such land classes to guide the selection of reserves and to judge their representativeness. Nevertheless, they can have considerable limitations as a basis for protecting all the species in a region. These limitations are reviewed with reference to more detailed discussions of particular issues. The paper also reviews a variety of procedures for selecting reserves which have been tested and applied in New South Wales. Some of the recent procedures are conceptually simple but very useful in identifying the requirements of reservation goals and demonstrating the options available to planners for representing particular features. Three principles are proposed which should underpin any attempt at systematic conservation planning: these are complementarity, flexibility and irreplaceability.

WOODY WEEDS: A Consequence of Continued Overgrazing

Matthew Dowling, Regional Landcare Officer, Department of Primary Industries, PO Box 196, Cleve SA 5640

Until late 1992, I was based at Port Augusta as Landcare Officer for the northern region of South Australia. This involved working with pastoralists and the various Soil Conservation Boards through the Flinders Ranges, the Gawler Ranges and north to the Marla/Oodnadatta group to foster landcare.

This short, pictorial article is based on a series of photos taken by Brendan Lay. Brendan was with the former Department of Agriculture and is now with the Pastoral Management Branch, Department of Environment and Planning based in Adelaide.

Woody weeds are generally not seen as a problem in the arid and semi-arid rangelands of South Australia. However, this series of photos demonstrates that given the right seasonal conditions and heavy grazing, woody weeds such as hopbush *(Dodonaea* spp.*)* can become established on certain soil types. The sequence of photos should serve as a particular warning to land managers and their advisers of yet another potential problem facing the South Australian rangelands.

The photopoint is in the Woomera - Roxby Downs district and the original photo was taken to record the growth of regenerating native pine *(Callitris Columellaris).* At that time, and since, the sequence shows that:

- In March 1973 (**Photo 1**), the paddock had a history of overgrazing as indicated by the poor condition of the low bluebush (*Maireana astrotricha*) in the foreground.

- Between September 1976 (**Photo 2**) and October 1980 (**Photo 3**), unpalatable hopbush had established. These shrubs germinated approximately two years prior to the 1980 photo (Photo 3) following good rains. Seed had spread from adjacent thickets of hopbush.

  Woody plants, such as hopbush, find it difficult to establish when there is good grass cover (as in Photo 2). However, continued heavy grazing between 1976 and 1980 may have contributed to lower ground cover and assisted the establishment of hopbush.

- Growth of hopbush continued through the 1980s with the next photo taken in October 1984 (**Photo 4**).

- Seven years after the previous photo (in November 1991 - **Photo 5**), the stand of hopbush continues to suppress pasture growth, possibly because it is using most of the available soil moisture. This, in turn, has exposed the bare soil to increased risk of erosion, which in this case appears to have affected the soil structure.

The key point of this article is that by the time the hopbush seedlings were firmly established (i.e. Photo 3 - 1980), permanent change in the vegetation composition was inevitable. It is possible however that had the paddock been conservatively stocked from 1973 onwards, thereby maintaining a higher level of pasture cover, that the present-day density of hopbush would not be near as great.

Photo 1: March 1973

Photo 2: September 1976

Photo 3: October 1980

Photo 4: October 1984

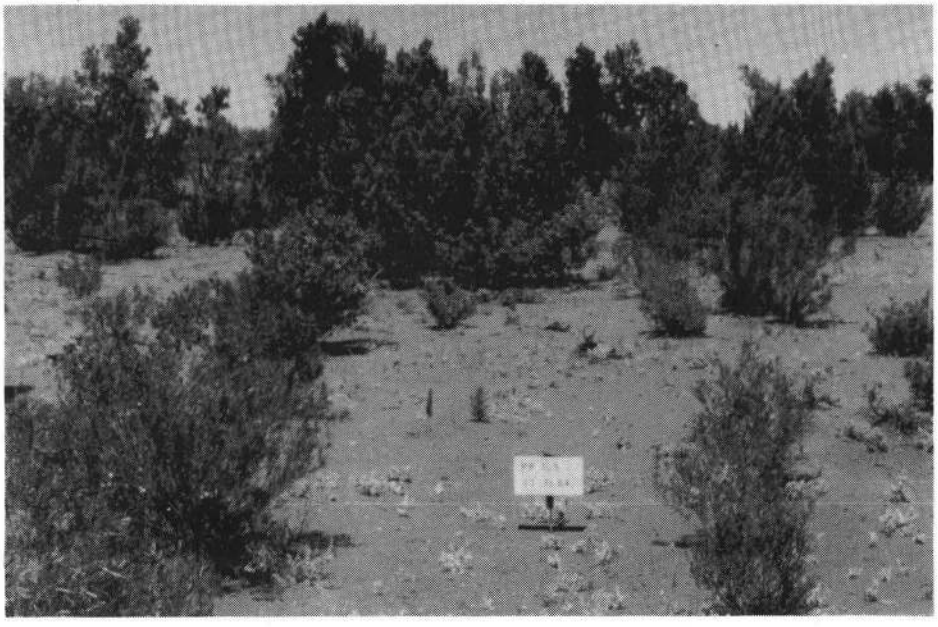


Photo 5: November 1991

ANNUAL GENERAL MEETING

Greg Campbell, Honorary Secretary, PO Box 596, Alice Springs NT 0871

The Annual General Meeting of the Society will be held on Friday 28 May at 1:30 PM. The meeting will be at CSIRO, Centre for Arid Zone Research, Heath Road, Alice Springs.

The business will include:

1. Reports from Council
2. 1992 Financial Report
3. Proposal to replace the Honorary Member category with that of Fellow, with any consequent alteration to the Society's Articles of Association
4. Resolution to allow current Honorary Members to adopt the title of Fellow
5. Proposal to adopt new guidelines and titles for the awards currently known as *Travelling Fellowship* and *Overseas Conference Scholarship*.
6. Notice of alteration of both the Memorandum and Articles of Association to replace reference to the Western Australian Companies Act 1961 with reference to the Corporations Law 1991
7. Election of new Council from the state of Western Australia:
   - President
   - Vice-Presidents (1 from WA and 1 from NSW)
   - Honorary Treasurer
   - Honorary Secretary
   - Subscription Secretary

All members are invited to attend the AGM and the following presentation by guest speaker Mr Alec Holm, Manager of the Environmental Monitoring Group, Department of Agriculture, Western Australia. Drinks and snacks will follow this presentation.

Further details are available by contacting the Secretary at the above address or by telephoning the RMN Editor: (089) 500124.

ON PUTTING OUT FIRES

Wayne Fletcher, Department of Agriculture, Karratha WA

(Ed. You may remember Wayne's last contribution to RMN (90/3). Wayne was part of the entertainment at the Carnarvon Conference dinner in 1990 where he made some revealing comments about CSIRO scientists - amongst others. Here, he reveals a little about himself!)

I was having a good day, "on a track never cross'd 'cept by folk that are lost". I stopped for lunch ..... cold snags from the previous night's tea, piece of carrot cake and a billy of tea. I decided on a second cup of tea and second slice of cake ... and fortunate that I did as I was never to see that cake again.

I cleaned up, put the cake in the fridge, packed up the ute, and put the empty billy in the back. Was I to know there could be a tiny coal stuck to the bottom of the billy? I drove off at a sedate pace (was such a nice day).

After 15 or 20 minutes, a cursory glance in the rear-view mirror revealed the back of the ute was awash with flames! Was a bit of a shock (gross understatement).
I leapt out, and muttering concerned obscenities, surveyed the situation. Well ablaze was the fridge and spare tyre, and my swag was catching nicely. I decided that priority must go to the jerry cans of fuel roped securely in the back. The tucker box (not yet ablaze) would provide me with a knife to cut the rope.

The tucker box was thrown out of the ute and a knife retrieved. There was no need to cut the ropes as they had melted, so the jerry cans were easily tossed out on the ground.

Next, the fire extinguisher. I knew I had one, but where? ... under the seat? ... which side? Valuable seconds were lost negotiating those little wires that exist under vehicle seats to make ergonomic adjustments. Back to the rear of the vehicle with the extinguisher where I realised that this fire, now of quite spectacular proportions, was going to require more than one extinguisher.

Armed with a stick, I removed the flaming swag. I was rather fond of that swag and considered putting it out, but a quick mental calculation told me the Hilux was worth about 100 swags. The swag was burnt to the ground (in hindsight, insurance covers Hiluxes but not swags).

A tin trunk holding a week's clothes was dragged off with a stick, the contents of which were smouldering. Attention again went to the more valuable (though insured) Hilux.

This left one burning fridge and one burning spare tyre, both securely mounted in the vehicle. About now, the spare tyre exploded giving me another start (another gross understatement).

The fire extinguisher was then used to put out most of the fridge and half of the spare tyre before expiring.

I went for the pannikin in the tucker box. The contents of the tucker box were now also on fire and the pannikin was very hot. I removed the burning articles (good old stick) and the pannikin, cooled it off under the water tap fitted to the vehicle, and proceeded to pour pannikins of water onto the tyre and fridge.

Surprisingly, this was successful. The swag was reduced to eyelets and buckles. I opened the smouldering trunk and spontaneous combustion resulted. Contents were tipped onto the road and I managed to save a few workshop togs only.

I checked the contents of the fridge. The beer was cool, though covered in oily tar. Again the pannikin was put to use.

A few messages came out of this tale. In order of occurrence:

- Always have a second piece of cake.
- Check the bottom of the billy for that little elusive ember.
- Mount the fire extinguisher securely in the vehicle - don't throw it under the seat.
- Fire extinguishers don't have a lot in them - maybe about 15 seconds ... so beware.
- In the case of pannikins - bigger is better.
- With embarrassing tales like this, it is best to tell the tale first before someone else does!

MOTION FOR ANNUAL GENERAL MEETING

Honorary Member or Fellow of The Australian Rangeland Society

David Liddle, Vice President, NT Conservation Commission, PO Box 496, Palmerston NT 0831

Background

Federal Council has been approached by two Honorary Members to consider a change in the title of "Honorary Member" to "Fellow of The Australian Rangeland Society (FARS)". Following investigation into the use of these titles by other organisations and discussion within Council, the issue was raised in the July 1992 *Range Management Newsletter* and discussed during the General Meeting at the ARS Conference in Cobar in October 1992. Opinions were also canvassed at Cobar via a questionnaire distributed to all conference participants. Following a majority response in favour of the title of Fellow at Cobar, a motion to change the Articles of Association of The Australian Rangeland Society has been tabled for the Annual General Meeting to be held on 28th May 1993.

Proposed Change

The proposal is to replace the title "Honorary Member" with "Fellow". The modification involves a change in name, but no change to the underlying premise of recognition for "distinguished service to the Society or to rangelands" or the requirement for written nomination of not fewer than six members. In recognition of the diverse backgrounds of Members, eligibility for either title is not dependant upon academic qualifications.

The administration of either title is subject to procedures set by Council. There is no proposal to modify existing procedures regardless of which title is accepted during the AGM. The existing procedures are:

a) to maintain the prestige of the honour, the upper limit of Honorary Members/Fellows is two percent (2%) of Society membership. (Membership as at December 1992 = 412)

b) any nomination for Honorary Membership/Fellow stands before the Council for three (3) years before lapsing.

Currently there are no subscriptions for Honorary Members. The setting of annual subscription rates for the different categories of membership is the responsibility of Council. Thus, provision exists under the current Articles (6 b) for levying subscriptions on Fellows.

Arguments presented in favour of the change include:

- the title Fellow is more readily recognised by the public as an acknowledgment of distinguished service than Honorary Member. There is some apparent advantage in recognition of the title Fellow within the consulting business.

- the classification of Fellow would allow the Society to levy membership subscriptions.

Arguments presented against the change include:

- the Society is small and the Honorary Member title meets our needs to reward service.

If the proposed change is passed by the Members, the Council will need to pass a resolution at the Annual General Meeting, that all Honorary Members of the Australian Rangeland Society are free to adopt the title of Fellow of The Australian Rangeland Society (FARS).

Honorary Member or Fellow of The Australian Rangeland Society

Motion to be put to the Members of The Australian Rangeland Society at the Annual General Meeting on the 28th may 1993.

Motion:

That Article 3 (i) of the Articles of Association of the Australian Rangeland Society be changed from

(i) Any person who has rendered or is rendering distinguished service to the Society or to rangelands, may be appointed an Honorary Member by the Council acting on the written nomination of not fewer than six members, submitted to the Council.

to

(i) Any person who has rendered or is rendering distinguished service to the Society or to rangelands, may be appointed a Fellow of The Australian Rangeland Society (FARS) by the Council acting on the written nomination of not fewer than six members, submitted to the Council.

Postal Vote

For those who are unable to attend the AGM in person, postal votes may be lodged with the Secretary, The Australian Rangeland Society, PO Box 596, Alice Springs, NT, 0871. A voting form is included as a loose-leaf insert with this Newsletter.

RANGELAND RESEARCH PRIORITIES IN WESTERN AUSTRALIA

John Morrissey, WA Department of Agriculture, Baron-Hay Court, South Perth WA 6151

Background

The Australian Wool Research and Development Corporation (AWRDC) is currently reviewing its rangeland research priorities throughout Australia. Western Australian rangelands are sufficiently different from other areas in terms of landform, soils and management history to warrant particular examination. As part of the review process, Department of Agriculture staff, representatives of the pastoral industry in the Southern Pastoral Region (south of the Pilbara) and university academics met with Dr Allan Wilson (who is conducting the review for the AWRDC) in Carnarvon in early February.

The AWRDC review process has run in tandem with the establishment of a rangelands research group within the WA Department of Agriculture. The AWRDC review provided an ideal opportunity to review existing research activity in Western Australia and planned for the future.

The Workshop

The workshop used 'technology of participation' procedures where issues were defined by groups, clustered into similar responses by all workshop participants and then ranked in order of priority. Groups were asked to respond to the key question:

"*By the year 2003, what would we like to know about managing rangelands that we don't know now?*"

The groups were given the guideline that high priority research activities should be those that lead to the development and application of management practices which provide for sustainable pastoral management and for maximum enterprise gross margins.

Information Needs

Information needs identified by the workshop (in priority order) were:

1 How to determine the appropriate indicators and associated criteria to be used in managing for maximum, but sustainable, grazing use.

2 How to determine appropriate stock numbers and duration of grazing for each land type, and season, that will result in sustainable use.

3 How to establish relationships between grazing management, the state of the soil and range condition.

4 How to determine the comparative economics of enterprises other than sheep and cattle raising.

5 How to rehabilitate degraded rangeland.

6 How to manage shrublands to prevent an increase in woody weeds.

7 How to design cost-effective infrastructure networks.

8 How to control grazing pressure by livestock other than sheep and cattle in a cost-effective way.

9 How to determine the community expectations of rangeland managers, and to know how the achievement of sustainable land use will be identified.

10 How to match pasture type and different classes of livestock.

11 How to forecast seasonal conditions.

12 How to make genetic improvement in livestock.

13 How to increase income and reduce costs.

14 How to access comprehensive and relevant information.

What Next?

Manpower and monetary resources obviously do not allow all issues to be tackled. The Department of Agriculture will address the first three issues in formulating its future research priorities for the Southern Pastoral Region. A report on the workshop has been forwarded to the Wool Research and Development Corporation and this should assist them in their review process. The public and structured process which we have undertaken to establish research priorities should also place us in a better position to attract limited external research money.

Some scope exists for addressing those issues listed above which have a lower priority ranking. For example, alternative enterprises such as horticulture are being promoted within the region (priority 4). The Department of Agriculture is working on the marketing of goat and kangaroo products with information being made available as work progresses. Research into rangeland rehabilitation in the Meekatharra office is drawing to a close with information again being released as it becomes available (priority 5). The very successful Land Conservation District Committees and the Department of Agriculture are cooperating to promote station management planning (priorities 7 and 10). The Department of Agriculture and Agriculture Protection Board are conducting research on kangaroos and goats which will assist their control (priority 8).

The participants were very positive about the workshop outcomes and the process employed. These provided an encouraging start to the much more difficult task of implementing the research required to satisfy the information needs in the Southern Pastoral Region.

THE SECOND NT PASTORAL OFFICERS' TRAINING COURSE

Gary Bastin, CSIRO, PO Box 2111, Alice Springs NT 0871
Christine Long, Department of Lands, Housing and Local Government, GPO Box 1680, Darwin NT 0801

In June 1992, the NT Government commenced the Pastoral Land Act. This Act shifted the emphasis in pastoral lease administration from the former prescriptive covenants (e.g. minimum stock figures, establishment of fencing and waters), to a Landcare ethic of fostering improved land management. A cornerstone of the new legislation is rangeland monitoring. This monitoring, based in the first instance largely on photopoints established on each station, is intended to encourage and assist pastoralists to follow the condition of their rangeland, to help with making season-to-season management decisions at a paddock level.

As part of the changed emphasis in pastoral lease administration, the duties of the Pastoral Officers of the Department of Lands, Housing and Local Government are also changing. They will have the primary responsibility for selling rangeland monitoring to the pastoral industry as an integral part of station management and assisting in the establishment of the pastoralists' photopoint monitoring sites. Initially, their efforts will be concentrated in the Victoria River District, where they will work closely with pastoralists to establish a pilot program of monitoring sites and collect the first layer of information, with follow-up visits every 2-3 years. It is hoped that pastoralists will continue to monitor sites on an annual basis, thereby fostering ownership of the site and its information.

The Department of Lands, Housing and Local Government has conducted two training courses for its officers with assistance from the CSIRO Division of Wildlife and Ecology and NT Government Departments. The second course was held in Alice Springs in late February with Don Burnside (WA Dept. of Agriculture) performing an admirable job as course facilitator. The course included a workshop section, in which a group of pastoralists from the Alice Springs region participated. This session led to the identification of the outcomes that pastoralists expect from the monitoring system and thus assisted in the identification of future priorities for the Pastoral Branch.

The Chairman of the NT Pastoral Land Board, Mr Noel Buntine, also participated in the course. The Pastoral Land Board has primary responsibility for carrying out the new legislation and ensuring that the NT's pastoral lands are managed sustainably in the future. As such, the Pastoral Land Board has embraced monitoring and, with assistance from a technical advisory group, known as the Pastoral Land Board Advisory Committee, has been instrumental in designing the photopoint methodology. The technical advisory group has representatives from the three Departments with an interest in pastoral land management: Department of Lands, Housing and Local Government, NT Conservation Commission and Department of Primary Industry and Fisheries.
The latest training course had the specific objectives of:

- enabling Pastoral Officers to clearly understand their new role and responsibilities;
- developing a working understanding of rangeland ecology (particularly in relation to landscape diversity and seasonal variability);
- developing skills in rangeland monitoring, e.g. sensible site location and vegetation estimation techniques;
- introducing basic extension methodology for explaining the benefit of on-property rangeland monitoring to the lessee; and
- identifying skill gaps and future training needs.

The bringing together of people from different backgrounds should foster communication and clearer understanding of the issues involved. Although this was primarily a training course, it did result in considerable clarification from my (Gary Bastin's) perspective, of the requirements of the Pastoral Land Board under the new Pastoral Land Act.

Having been involved in rangeland monitoring for many years, I had initial concerns about the ability of the proposed photopoint-based monitoring system to adequately separate grazing effects from natural variability in the rangelands. However, these concerns were placed in perspective as it became clearer that, from the Pastoral Land Board's point of view, the primary objective at this stage is to 'sell' monitoring to pastoralists so that they come to 'own' the sites and associated information. If this can be achieved, then much will have been gained in focusing management attention on the rangeland resource.

From the pastoral land administrator's perspective (i.e. Department of Lands, Housing and Local Government and the Pastoral Land Board), they acknowledged that rangelands can be complex and that the effects of grazing are often not clear cut. It is clearly acknowledged that the development of monitoring will be an evolutionary process. The first stage (i.e. photos and information derived from simple estimation techniques) is intended to provide a means of identifying when change to a landscape is occurring. This may lead to the collection and analysis of quantitative data by other Government agencies which would assist with the provision of extension advice. The management of data and co-ordination of activities amongst relevant Departments are yet to be streamlined, but will be a function of the Pastoral Land Board Technical Advisory Committee.

The Pastoral Branch of the Department of Lands, Housing and Local Government now has the challenge of implementing the future actions identified as being required in the course. These include:

- the publication of plant species identikits to assist pastoralists in recognising pasture and weed species;
- indicator species lists to identify the indicator value of particular species;
- fact sheets to provide guidelines for completing the Monitoring Site Recording Sheets; and
- some additional specific training for the Pastoral Officers related to the Victoria River region.

An encouraging theme of the week was the sense of commitment and cohesion amongst the Pastoral Officers who have the job of selling monitoring as a management tool to the pastoral industry. These people did not seem daunted by the complexity of the rangelands or the size of the job in hand: to establish monitoring sites on the 232 (as at February 1993)

pastoral leases throughout the NT in the three year life of the present Pastoral Land Board. The Pastoral Officers demonstrated an ability to select sensible monitoring sites and to agree broadly when using vegetation estimation techniques. Most importantly, they have the enthusiasm and communication skills necessary to persuade others of the benefits to be gained from monitoring.

LETTER TO THE EDITOR

Pastoral Lease Rental

Bruce Alchin, University of Queensland, Gatton College, Lawes QLD 4343

John Pickard presented a controversial topic at the Cobar conference, viz lease rental, and Allan Wilson pursued the issue further in RMN 92/3.

Rental payments are a topic of on-going debate in most states. For example, in Queensland, the recent rise in rental payments has caused significant controversy. However, whilst there are variations between states, there are many common features in pastoral lease rentals across Australia.

Allan Wilson's point that pastoral holdings are sold for free market values and the rental is more akin to a licence fee is very important.

Leasing of crown land is often viewed as the Lands Department being the landlord and the lessee as the tenant. This is a false analogy of the historical intent and currently accepted use of leasing crown land for primary production. The Queensland Country Life editorial of 17 January 1991 stated: "The original concept of leasing crown land was to encourage primary producers to venture... and add to the nation's wealth". This contrasts with a recent statement on pastoral leases by the Queensland Government that it was "looking for a return on its investment".

The government's policy of "cost recovery" has been proposed as a further basis for setting rental charges - but should rental charges equate with running costs of the department involved?

The general community's interest in land resource management has resulted in increased demands on the Department of Lands and a consequent increase in cost of administration. If cost recovery was to be continually pursued it could result in the primary producer subsidising the costs of the broader community's interest rather than paying only for rental costs directly related to their own enterprise.

I support Allan Wilson's view - the pastoralist pays full value for the property; the rental is a "licence" payment because of the government's administrative responsibility.

It is interesting to note that the USA uses rental calculated annually and based mainly on costs and returns of production. It would be interesting to review how this would apply to Australia.

AUSTRALIAN RANGELANDS SOCIETY KANGAROO POLICY GROUP

Bood Hickson, 'Melinda', Cloncurry QLD 4824

At the Cobar conference last October, I put a motion to those present calling on the Society to 'examine the use of kangaroos as a complementary resource to domestic livestock to effect total grazing management in the rangelands'. The motion received a good deal of support with no one voting or speaking against it. The Society's Council has since set up a nine-member Kangaroo Policy Group to address the motion within the following guidelines:

- review current recommendations and practices on kangaroo management.
- identify information gaps in ecology, animal welfare, health, trade and any other areas that may limit the development of a sound position statement for the Society.
- highlight inadequacies and discrepancies in existing legislation relating to kangaroo management.
- develop a series of recommendations for the Society to present to research agencies, specific interest groups and government.
- identify any other avenues which should be considered.

Apart from the notice by Greg Campbell in the last Newsletter, I have informed several other media channels in Queensland (including ABC Radio and Country Life) of our activities and have also invited contributions. Should members wish this to be done in other states, please provide me with the appropriate contacts as soon as possible.

To date, contributions have been received from Ross Blick, David Freudenberger, Andrew Gatenby, Bood Hickson, Les Le Lievre, Grant Norbury, Mark Stafford Smith, Jacky Williams and Allan Wilson.

The report at this stage largely reflects the issues raised by the above contributors. This format will be built upon, although additional chapters could be inserted if directly relevant to the terms of reference, or to the report outline as defined below.

1. Executive Summary.
   - Do we need to cull kangaroos?
   - How many roos should be culled?
   - How should the cull be managed?
   - Can we develop a more humane and efficient cull?
   - Can we better utilise the kangaroos that are culled?
2. Definition of kangaroo.
3. The ethical issues.
4. The current political landscape.
5. Existing management limitations.
6. Establishing a broadly acceptable policy.
7. Practical and ecological management options.
8. Conclusions
9. References

At this stage, we hope to have a draft report ready for the June Newsletter. So, if anyone has any comments or anything they wish to contribute, please let us know as soon as possible. My address is:

"Melinda", Cloncurry QLD 4824
Phone: (077) 425983
Email: Bood@peg.pegasus.oz.au.

AUSTRALIAN RANGELAND SOCIETY PROMOTED AT THE 17th INTERNATIONAL GRASSLANDS CONGRESS

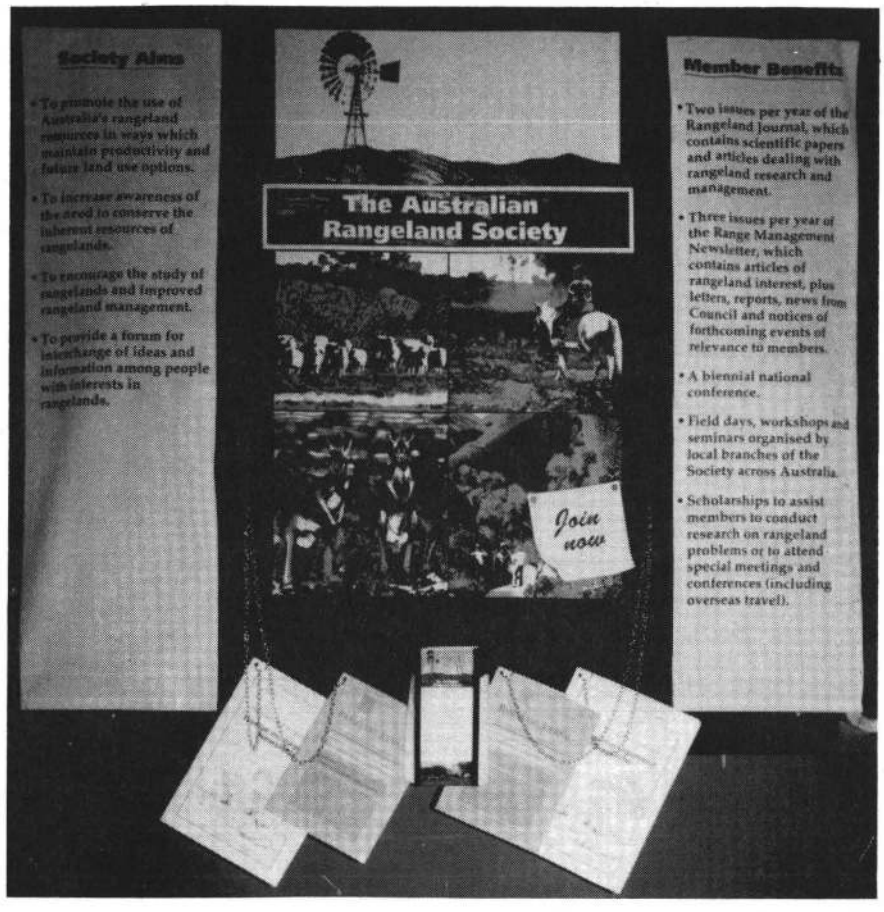
Greg Campbell, Honorary Secretary, PO Box 596, Alice Springs NT 0871

(Ed. Greg's report provides a good account of how the Society promoted itself at the recent IGC. However, he very much undersells himself as a participant in that promotional activity. I am sure that all Society members join with me in thanking Greg for his efforts as an ambassador for the Society at this recent international congress.)

For some time now, there has been concern within the Council that there is very little promotion of the Society and its activities. The responses to a questionnaire at the Cobar Rangelands Conference firmly indicated that members would like to see more effort put into such promotion, including promoting our Society at appropriate international gatherings.The present Council therefore took advantage of the promotional opportunity offered by the recent 17th International Grasslands Congress held in New Zealand and Rockhampton, Queensland. For $1,000 worth of sponsorship, a tiny fraction of the $750,000 total IGC sponsorship, we secured display space at one of the largest agricultural conferences ever held. The 1,300 delegates attending the New Zealand sessions came from over 90 countries, representing interests in intensive pastures and rangelands. About 700 people attended the Rockhampton section of the congress.

The Australian Rangeland Society was promoted through a new display (shown below), carefully and creatively designed by Ashley Sparrow, our hard working Subscription Secretary. The printed three-piece fabric display met the competing goals of durability, portability and style. Photographs were kindly provided by Bill Van Aken and Graham Chapman of CSIRO and the final layout, colour separation and production were done commercially.

The display is eye-catching and conveys a good summary of the Society's aims and activities. When rolled, it fits neatly into a large postal tube, and is easily carried. As such, it was an insignificant contributor to the excess baggage bill incurred by my wife and I.The display was somewhat overshadowed in New Zealand by the size and vigour of the permanently staffed displays of the major sponsors, but a good number of people visited and collected our new promotional brochures. Our display was much more effective in Rockhampton where we were given a prominent position in the area assigned to technical posters. Here, the display received much attention and a large number of brochures were taken. These brochures contained new subscription forms and a number of subscriptions have already been received in response to this promotion.The display is available for further promotion of the Society. Members intending to travel to similar meetings and who are willing to promote the Society are asked to contact the Secretary and make arrangements for collecting the display.



LETTER TO THE EDITOR

Pastoral Financiers And The Society

Bruce Alchin, University of Queensland, Gatton College, Lawes QLD 4343

The recent Conference at Cobar was one of the best attended, with a very wide range of interests and interaction. However, in view of the objectives of the Society and the biennial opportunity for such a forum, there was a significant void, viz. financiers.

There would be little argument that the financiers of pastoral enterprises (and other rangeland users) are the most significant influence on rangeland management decisions.

It is apparent that either the Society is not attracting the financiers (or the financiers are not interested or aware of the Society's role).

This may be an appropriate time for the Society to consider drawing the financiers into its forum on rangeland management. This could be achieved by:

- inviting guest authors to contribute to the Newsletter and Journal as a focus for further debate,
- local branches liaising with local financiers with the aim of developing field days/seminars.
- the organisers of the next Conference ensuring that financiers are well represented.

The long term aim should be to have representative financiers as an integral part of the Society.

LETTER TO THE EDITOR

The Role and Status of the Rangeland Journal

Bruce Alchin, University of Queensland, Gatton College, Lawes QLD 4343

The upgrading of the *Rangeland Journal* to international status was discussed at the recent Rangeland Conference. I would like to raise several issues on this for further discussion.

1. The *Rangeland Journal* in relation to the Society

"Say it in our language" was a phrase heard from the non-scientist participants at the Conference (i.e. in relation to material which was not easily interpreted) and this was a reasonable expectation in view of the Society's aims and membership.

The development of the *Rangeland Journal* into one with scientific recognition at an international level means that much of the input will not be easily digested by many of the Society's members. One aspect of this is that a significant proportion of the paying members will be subsidising a journal for the use of a few. In effect, the journal will not be one for the whole Society, but for those who are doing research which is acceptable in a highly regarded research publication. The only benefit of this to the Society as a whole is the additional recognition it may gain by virtue of the status of the journal - and that could be valuable where the Society is involved in "lobbying".

Consideration of this matter could lead to partitioning of the membership into:

(i) subscription for newsletter, journal, etc.
(ii) subscription for newsletter, etc.

The partitioning of membership is proposed because I view it as unfair for a majority of the subscribers to subsidise the publication contributed to, and used by, only a small proportion.

2. The *Rangeland Journal* and the *Newsletter*

If the journal is to be upgraded, it would seem appropriate to upgrade the status of the Newsletter. The latter should include increasing its attractiveness to rangeland users.

3. The *Rangeland Journal* and the *Tropical Grasslands Journal*

The upgrading of the *Rangeland Journal* may lead to further consideration for its amalgamation with the *Tropical Grasslands Journal.*

The foregoing is put forward for discussion. My own viewpoint at this stage is:

(i) The *Rangeland Journal* should remain as a forum for contribution to (and use of) **all** members of the Society;

(ii) Those in the Society who wish to publish scientific material should utilise the plethora of international scientific journals which are already available.

(Ed. Members currently have the option of subscribing to both the Rangeland Journal and Range Management Newsletter, or just the RMN.)

AUSTRALIAN RANGELAND SOCIETY AWARDS

Greg Campbell (Secretary) and Bruce Strong (Treasurer), PO Box 596, Alice Springs NT 0871

The Australian Rangeland Society currently has two awards to assist members. These are the ARS Travelling Fellowship and the ARS Overseas Conference Scholarship. The Fellowship is intended to assist land managers and students with travel within Australia to investigate topics connected with range management. The Overseas Conference Scholarship, as the name obviously implies, is intended to assist members with travel to international conferences dealing with rangeland issues.

Council has held lengthy deliberations directed at increasing the relevance of these scholarships to Society members. The apparent need for their restructuring is supported by:

- recent low response to calls for applications for the awards,
- suggestions from members that the awards be more attractive and better promoted, and
- the results of the Cobar Conference questionnaire of Society issues where 69% of respondents considered that an award scheme should continue but 66% thought that the awards should be made more attractive (RMN 92/3).

Council has proposed that the existing awards should be restructured into the Australian Rangeland Society Scholarship and the Australian Rangeland Society Travel Grant. This proposal is an agenda item for the next AGM.

Australian Rangeland Society Scholarship

The Scholarship would be an annual award to assist eligible persons to undertake formal study of a subject related to range management. The Scholarship will be available for study either within Australia or overseas. However, for overseas travel, applicants will need to have been a member of the Society for at least one year.

Written applications will be accepted up until 30 November each year. One or more scholarships can be awarded in a calender year but the maximum amount available for distribution shall not exceed $2000. Applications should include details of the program or course of study to be undertaken and where it will be conducted. Recipients may be required to write an article on their experiences, suitable for publication in *RMN*, on conclusion of the study course.

The Scholarship will be open to all members (i.e. no formal qualifications are required) but preference may be given to younger members.. In circumstances where Council considers that an application meets the aims of the Society and is of sufficient merit, the Scholarship may also be awarded to non-members.

Australian Rangeland Society Travel Grant

The Grant is intended to assist eligible persons to attend a meeting, conference or congress related to rangelands. It may also be used to assist with travel or transport costs to investigate a topic connected with range management. The Grant is available for overseas travel and/or travel within Australia.

Application and eligibility criteria are similar to the Scholarship.

Further information relating to the awards can be obtained from Council. Full details will be published in the next Newsletter following consideration of the proposed restructuring at the forthcoming AGM.

BOOK RELEASE

Prescribed Burning for Brushland Management
The South Texas Example

Charles J. Scifres and Wayne T. Hamilton

Texas A&M University Press has recently released this book and their description of its contents is reproduced here.

South Texas represents the northern portion of an unique biotic province - the Tamaulipan thorn woodland. This vegetation, a transitional type linking desert scrub to subtropical vegetation to the south and east, is analogous to vegetation existing in South America, Africa, and Australia. It is safely assumed that results from experience with prescribed burning can be extrapolated to these vegetation types.

Prescribed Burning for Brushland Management first describes the ecological setting in South Texas. The authors then present the benchmark principles related to fire behaviour and mode of action, in order to understand vegetation responses to burning and to predict these responses. Finally, methods of fire application and control are discussed.

Actual results from prescribed burning are explained in terms of vegetation, livestock and wildlife responses. The final section centres on the role of prescribed burning in range management systems and economic assessment. This material is supported by interpretive discussions that incorporate specific examples and case studies.

The book is available from:

Texas A&M University Press
Drawer C, College Station, Texas 77843-4354, USA
for $US40.00 (cloth) or $US19.50 (paper) plus postage.

NEWS FROM THE WEST GASCOYNE BRANCH

(Ed. Sandra Van Vreeswyk and Don Burnside supplied the following information about recent activities of the West Gascoyne Branch of the ARS. The Branch appears to have embarked on a thought-provoking and very useful exercise. I welcome news of their progress in future issues of RMN.)

The West Gascoyne Branch held their most recent meeting on February 5th. The main agenda item was to discuss the Branch's role in debating rangeland issues within the wider community, particularly to identify the issues and develop a strategy. Issues were identified by asking the key question "*what issues would you like to see dealt with in the next two years by the Australian Rangeland Society?*".

Participants listed 14 issues which were also assigned a priority score. The issues were:

- mis-informed conservation groups
- land tenure
- define ecological sustainability for rangelands
- viability of pastoralism
- define management objectives for different land uses
- inadequate educational opportunities
- risk management
- institutional constraints to good land use
- management of native animals
- Aboriginal land claims
- weeds
- nature conservation
- ARS membership - diversity and credibility
- land degradation

After ranking, the five key issues which participants want to deal with are:

1. ARS membership - diversity and credibility
2. Define management objectives for different land uses
3. Define ecological sustainability for rangelands
4. Land degradation
5. Mis-informed conservation groups

A Society strategy for dealing with each issue will be developed at future meetings.

FORTHCOMING CONFERENCE

Nature Conservation: The Role Of Networks

Networks of people are our conservation force
Networks of vegetation are our conservation resource

An international conference on the role of networks among people involved in conservation is being organised by the CSIRO Division of Wildlife and Ecology, the Centre for Conservation Biology at Auckland University, World Wide Fund for Nature (WWF Australia), and the Department of Conservation and Land Management, Western Australia.

It will be held in Geraldton, Western Australia from Sunday 15 to Friday 20 May 1994.

Effective nature conservation requires the commitment and participation of local people. Without their involvement and acceptance, nature conservation on private lands is impossible and even on public lands will be constrained by inadequate resources or support. Conservation biologists and others aware of the need for conservation will only see effective translation of research results into action if community responsibility and management approaches are planned from the outset. Community linkages between land holders and other individuals, groups, conservation agencies and conservation biologists are as essential to effective nature conservation as are linkages across the landscape.

The conference will cover subjects such as:
- why we need community involvement in conservation,
- the role of indigenous peoples in conservation,
- the link between scientists and community groups involved in conservation,
- conservation biology as a discipline and as a force for change,
- current understanding of landscape linkages in conservation,
- the role of landcare groups in conservation,
- integrating conservation with production and development,
- and the role of mining companies in conservation.

These issues, together with other subjects related to the conference theme will be presented in invited and contributed papers as well as structured workshops.

Those interested in attending the conference (or obtaining further details) should contact:

Dr Denis Saunders
CSIRO Division of Wildlife and Ecology
LMB No 4, PO Midland, WA 6056

Phone: (09) 2520111
Fax: (09) 2520134

BOOK RELEASE:
Spirit Of The High Country
The Search for Wise Land Use

The South Island High Country Committee of Federated Farmers, New Zealand

Land of contrasts, land of extremes, the high country of the South Island of New Zealand has for 140 years been the source of much hardship and many legends. From the peaks of the Canterbury Gorge with 4000 mm of rain to the rolling sunbaked hills of central Otago receiving only 300 mm, most stations have these things in common: snow, climatic extremes, and a reliance on mainly wool for their economic base.

Today, rabbits, the spread of *Hieraceum* (a weed) and the downturn in commodity prices are particular problems faced by station owners in this region. To focus on land use and land management issues facing the region, and to publicise community response to these issues, the High Country people have produced a booklet called '*Spirit of the High Country*'. The committee says in its introduction "...we intend to take you through a variety of high country matters, so that at the end you may have a better understanding of some of the problems facing runholders, and also enjoy with us some of the positive aspects. Like most things in life, it is a matter of getting alongside other people to see where they are coming from. We hope that this publication helps to achieve that".

The booklet is available for $A20.00 from:

The South Island High Country Committee of Federated Farmers
PO Box 665, Timaru, New Zealand.

REPORT FROM THE PRESIDENT

Bill Low, PO Box 596, Alice Springs NT 0871

The Council in Alice Springs is fast running down to the end of its two year term in Office. The work has certainly exposed most of us to the broader needs of Australian rangelands and rangelanders. It has also allowed us to bring the special problems and opportunities of multiple use of central Australia into sharper focus nationally. Unpredictable productivity, ballooning tourism, Aboriginal homeland reservation, localized mining, recreational needs and conservation needs for endangered flora and fauna all initially compete but potentially offer opportunities for diversification and cooperation. Our tour of duty has completed some tasks and initiated others that the incoming Executive may choose to continue with.

West Australia will host the Management Committee from 1993 to 1995. Previous rotations in the Management Committee has seen NSW follow W.A. and if this pattern continues, NSW members will have to nominate a Vice-President as part of the next council.

Policy Statements

The development of policy statements by the Society is starting to gather a little speed. At the Cobar conference, Bood Hickson got us moving to form the Kangaroo Group and his interim report is included in this Newsletter. Denzil Mills has been spearheading a move to encourage government controlling bodies to integrate the many present and proposed uses of water in the south Queensland rivers so legitimate users and the environment do not miss out. It is proposed that the Society develop an Australia-wide policy. Any members who would like to contribute to such a policy should contact myself or Denzil Mills. Marg Friedel has suggested it is time we formalized our approach by undertaking to develop a full set of policy statements similar to that of the American Society of Range Management recently published in their Newsletter, *Trailboss*. This task will fall to the incoming Executive to keep the ball rolling.

Membership

Membership of the Society continues to diminish. The decline is associated with the rural recession but it appears that we need to raise our profile to compete with the burgeoning number of other special-interest groups. There was an increase following the Cobar Conference. Already, new members are signing on as a result of the display organized by Subscription Secretary Ashley Sparrow for the International Grasslands Congress. Every member can do his bit by signing on a new member and taking every opportunity to promote the Society.

The Publications Committee through the flagships of the Society, the Journal and the Newsletter, continue to perform well. The new format Journal has been well received. The Special edition of the Journal edited by Steve Morton was well received and plans are already afoot for the next special issue in 1994 or 1995. It is a pleasure to have David Wilcox agree to join the Publications Committee to represent the West Australians.

The organizing committee for the Cobar conference, in addition to hosting a well organized and successful conference, also managed well and ended with a profit of over $20,000. Most of this will go towards swelling the capital used to support the annual scholarships. Part of the profits will be used to assist in establishing an outdoor native plant display at the Cobar Museum aimed at educating the public about 'increaser' and 'decreaser' plants. Signs stating the role of the Society could result in additional members. Another part of the profits will go to assisting the activities of a Branch which is in the process of forming in the Cobar region.

It has been a pleasure to work with Council, proxies and Publications Committee in Alice Springs over the last two years and I thank each of them for their unstinting efforts. Greg Campbell, Bruce Strong, Ashley Sparrow, David Liddle, Alec Holm, Martin Andrew, Gary Bastin and Marg Friedel all contributed significantly to the team effort. The incoming Council will have to work to make things happen and I wish them success.

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