



The Australian Rangeland Society

RANGE MANAGEMENT NEWSLETTER

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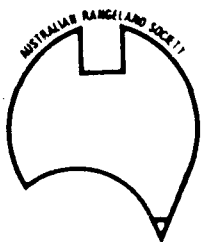
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EDITORIAL

Gary Bastin, CSIRO, Alice Springs, N.T.

Welcome from your new editor. At the outset, I extend sincere thanks to George Gardiner who has been RMN Editor for the past four years. The Society is indebted to George's work in producing an informative and quality Newsletter; one which I have particularly looked forward to receiving. George's efforts are all the more commendable as professionally, he has been out of the area of rangelands for the last couple of years.

In taking over, I asked George for his thoughts as retiring Editor and he offered the following comments. "When I took over the editorship in 1986, the Newsletter was accepted as an important member of the Society's publication list. It was not until a meeting of the Publications Committee in February 1990 that I found out it was not even mentioned in the Society's articles.

In 1986 I decided, with Council's blessing, to change the image of the Newsletter by stepping up to a professionally printed magazine. Despite the extra costs (we used a high grade paper, professional type setting and a major printing firm in Perth) the new image was accepted with enthusiasm.

The upmarket appearance was of little benefit unless the content came up to scratch. At the time, ARS branches were just kicking off and soil conservation districts were beginning in WA. An enthusiastic contributor in Bill Bolton-Smith also made my job easy by regularly contributing thought provoking and insightful articles. 'Anecdotes From a Past Era' will always remain one of the highlights of many of the issues I helped to put together. Bill was able to bring together all members of the Society in a way that no editor could do on his own.

During 1986 we had our first paying customer when Kimberley Seeds ran an advertisement. This is one area that I think we need to pursue in order to defray the additional costs of printing better quality Newsletters.

There were many other highlights during the four years that I was involved and I think the most pleasing to me was the level of grazer contributions that came in for publication. Support from enthusiastic younger members of the Society has always been great; unfortunately there has been a lesser contribution from the more experienced of our members from the scientific community.

A challenge for the new editor will be to draw the more experienced of the scientific community back into the industry and its Newsletter. There is a wealth of information that forms the basis of the art and science of rangeland management locked up in those 'Oldies' and their experiences. The Newsletter could in part fill the need for the passing on of some of their magic."

I can only whole-heartedly concur with George's call for contributions. Many members should have relevant knowledge and experiences to offer. I urge you to put pen to paper (not all for the next issue please!) and keep me supplied with a steady stream of informative and interesting articles.

For those who don't know me, I am an Alice Springs resident of 14 years having worked until early 1990 with the NT Department of Primary Industry and Fisheries. Most of that time was spent on rangeland monitoring work in the Alice Springs district. I am now employed at CSIRO in the area of land condition assessment using remote sensing methods. One of my particular interests as Editor is to make contact with the numerous Land Care groups throughout rangeland Australia for information on issues being addressed, problems tackled and progress made. I will be particularly keen to communicate with coordinators and State rangeland advisory agencies in the first instance to establish a list of contacts and possible sources of information.

Fortunately, I have a healthy supply of articles for my first issue. Council has been busy with the AGM and has supplied various reports associated with that meeting. Also included is a comprehensive submission by the Society to the Queensland Government's "Review of Land Policy and Administration". This submission was put together by Denzil and John Mills, Richard Silcock, Bill Burrows and Ian Beale. I am sure that Society members, and the Council in particular, are appreciative of their efforts. The submission is very detailed and I have elected to spread it over two issues.

Amongst other things in this issue is a report on an agricultural approach (spray topping) to the problem of spear grass infestation in sheep in the south eastern rangelands.

In keeping with the search for relevant information in land management, a group of pastoralists from the Pilbara region visited the Northern Territory earlier this year. We have a report from Andrew Mitchell on this study tour.

The Northern Territory Cattleman's Association has issued an environmental code of ethics for their members. This code is voluntary, but nevertheless, a significant move towards recognizing and accepting environmental responsibility by an industry which occupies a considerable area of Australia's rangelands.

We have more information on Carnarvon and its environs for those attending the Conference. I wish the Conference organizers and delegates well and will likely see you there!

A STUDY TOUR OF ALTERNATIVE LAND MANAGEMENT PRACTICES IN THE ALICE SPRINGS AREA.

Andrew Mitchell, Dept. of Agriculture, Karratha. W.A.

Six Western Australians from the Pilbara region conducted a study tour of properties and organizations concerned with land management in the Alice Springs area in March 1990. The group consisted of four pastoralists who are members of land conservation districts in the Pilbara and two officers from the Western Australian Department of Agriculture.

The Alice Springs area was selected for studying land management as its climate and vegetation has similarities with the Pilbara in that both areas receive a predominance of summer rain and their vegetation consists of tussock grasslands, hummock grasslands and mulga woodlands.

A grant of \$4800 was received from the State Assistance for Soil Conservation fund and this was used to pay for the hire of a light aircraft to transport the group from the Pilbara to Alice Springs and then back to W.A. The study tour was organized through the Australian Land Conservation Group and personal contacts with the NT Dept. of Primary Industry and Fisheries, CSIRO and NT Conservation Commission.

The purpose of this article is to compare and contrast the land and cattle management practices in the Alice Springs and Pilbara areas and suggest where improvements could be made on both sides of the fence.

Climate

The East Pilbara climate, especially east of Newman, is quite similar to the Alice. The West Pilbara is, however, considerably different as suggested by the burning frequency of spinifex country. Spinifex has a burning cycle of about 5 years in the West Pilbara but occasional severe droughts appear to be a significant feature in extending this interval to about 14 years in the Alice area.

Vegetation

The vegetation in general was found to be similar, however there are some species differences. What was surprising to me was the large area of partly degraded spiny bluebush shrubland and perennial grass country north of Alice Springs. I had always been under the impression that the area around Alice Springs did not grow fodder shrubs. The D.P.I.F. monitoring system certainly concentrates on grasslands to the exclusion of edible shrubs.

We were shown monitoring site records going back 12 years in some cases by a number of pastoralists and what struck me was the way these sites had changed with the seasons. Some of these sites were originally established supporting limestone grass (*Enneapogon* spp.) and in subsequent years were supporting only bindiis (*Sclerolaenas*). This, I presume, reflects the ephemeral nature of limestone grass, dry seasons and the type of subsequent rainfall.

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The West Australian range monitoring system only uses long lived perennials and this avoids the problems of short lived species. It also means there are large areas on the margins of the W.A. pastoral country that we avoid putting quantitative sites on, for want of measurable populations of edible shrubs. The W.A.D.A. is currently tackling the monitoring of grasslands but we will continue to concentrate on what we consider to be "good" perennials.

Landscapes

The Pilbara consists of rugged ranges, plains and floodplains with rivers draining out to sea, whereas the Alice area has ranges from which flow rivers that flood out into the desert. These differences have an important bearing on the distribution of soil types and water in their respective landscapes. In the Pilbara, there are generally semi-permanent pools along the major and some minor rivers; these seem to be absent from the Alice area with the majority of stock water coming from bores and dams.

In the Pilbara, the better soil types are found along extensive river floodplains or formed in place on basalt or limestone rocks. In the Alice, the better soil types occur as alluvial fans and plains below the ranges, on rock outcrops and in river floodouts.

Land Management

There are more properties in the Alice area practising active land management than in the Pilbara. By this, I mean managing the land to minimize degradation rather than managing the land for maximum animal production. Most Pilbara cattle properties are poorly fenced (ie. perimeter fencing with only some internal fencing). In contrast, the properties we saw in the Alice area were extensively fenced and some were fully fenced. Some properties in the Pilbara are starting to fence their most important country but the situation here seems to be far behind that in the Alice.

Most Alice properties utilize traps on their watering points, thus effectively controlling their grazing animals. In some of the Pilbara however, traps are not feasible due to plentiful surface water. Even in areas where there is no surface water, there are still few traps. Traps have begun to be used more frequently in the Pilbara, but it will take a long time for the area to develop to the same degree as the Alice region.

There are properties that rotationally graze their stock in the Alice region, whereas this is not practised to my knowledge in the Pilbara.

Range regeneration

Range regeneration using a ripper with opposed discs and seeding with buffel grass appears to be popular in the Alice region. However, these machines throw up only small banks (0.3-0.4 m high) which appear to slump after 10 years. In the long term, these will disappear as, I presume, will the vegetation they support. We saw some very large ponding banks (1.5 m tall) at Atartinga Station which, although expensive, would appear to last 50 years and survive most floods.

Woody weeds

Mulga, ironwood and other trees and shrubs less attractive to cattle have thickened up in areas which were once a savannah woodland of large trees and an understorey of grass. This problem is being tackled by either blade ploughing or currently experimental treatment with Graslan. One property is using fire to remove these excessive populations of woody weeds. This problem is not present over much of the Pilbara and where it is, is not recognized by most pastoralists.

Fire would appear to be the cheapest method of woody weed control but requires more active management to ensure its success. This is due to the fact that stock have to be removed to allow fuel build up, the fire has to be effectively controlled and the area must afterwards be spelled to allow grass regeneration.

Cattle Management

Breeds

There is a big emphasis on Herefords in the Alice region and we saw no "micky" bulls. All the cattle were either well bred Shorthorns or Herefords and many properties were practising A.I. on their own stud herds. The Pilbara situation is that there are few well bred herds, very few studs and no-one practising A.I. This is perhaps due to the fact that the D.P.I.F. have put resources into helping pastoralists use A.I. whilst the W.A.D.A. has not.

Supplementary feeding

This was universal throughout the Alice area whilst it is only practised in times of dire need in the Pilbara.

Weaning

"Conventional" weaning appeared to be a universal policy on the Alice properties we visited. In the Pilbara, weaning is practised but not necessarily by all properties.

Age of sales

Most properties in the Alice area sold 2 year old steers, with one property producing Japanese Ox. Many rigorously cull their heifers and old cows, with one outstanding Alice property having a 34% turnoff. Some Pilbara properties sell 2 year old steers and cull females whilst some properties sell mainly bullocks and cull few females.

Cattle prices

The Alice area appears to be better positioned to the eastern states' markets and prices received there are better than those received in the Pilbara for equivalent stock.

Overview

There appears to be a new station management system developing in the Alice Springs area. This involves good cattle control at moderate to low stocking rates. When coupled with weaning, supplementary feeding and good breeding, high weaning percentages are being achieved along with stable land management and a reasonable income. The Pilbara situation is not as advanced in its development as the Alice pastoral industry.

Government assistance to the pastoral industry in the areas of range regeneration, range management and cattle husbandry in the Alice region is much more substantial than in the Pilbara. The CSIRO presence in Alice Springs has also been a big catalyst in the development of philosophies for stable land management.

It must be noted here, however, that we may have gained an unrepresentative view of the Alice region as it is probable that we visited only the best managed properties.

Appreciation

The group would like to thank all members of the Centralian Land Management Association, especially Mrs Pat Barber (the Secretary) for organizing our itinerary on the stations. We greatly appreciated the wonderful hospitality shown to us on the stations we visited. Our thanks also go to members of the D.P.I.F., CSIRO and Elders for their time and assistance.

AN ENVIRONMENTAL CODE OF ETHICS FOR RANGELAND MANAGERS IN THE NORTHERN TERRITORY

Malcolm Roberts, Deputy Executive Director, Northern Territory Cattleman's Association. PO Box 2288, Alice Springs. NT 0871.

This code was accepted by the members of NTCA at their 6th AGM in Darwin on the 20th April, 1990. The requirement for such a code was originally conceived 3 years ago after an animated rangeland management field day hosted by the NTCA, and growing awareness amongst NTCA members of the public's increasing interest in environmental issues throughout Australia. Harry Butler and Cliff Emerson (former director of the NTCA) put the original draft together. Since then, the document has been discussed widely at Branch level, then considered at Executive level and finally presented to the AGM where it was accepted more or less unanimously.

Compliance

The Association seeks voluntary rather than compulsory compliance with this code of environmental conduct. It is appropriate, in dealing with voluntary codes, not to try and impose penalties or sanctions on those who do not adhere to the principles but rather to use education, extension and peer pressure to promote them.

The Government has a range of measures, specifically enacted to address the management of resources and protection of the environment. It is fundamental to all, that these laws be observed.

If these laws become outdated, or prove inadequate over time, we should highlight the areas of deficiencies and advocate for change.

Preamble

A significant portion of the Northern Territory land resource consists of rangelands, generally referred to as the pastoral estate.

Beef cattle producers - rangeland managers - are the principal caretakers of the Territory's pastoral estate. The management of this land in conformity with principles of responsible development and sound conservation practices is their responsibility.

1990 is the Year of Landcare; it is also the beginning of the Decade of Landcare during which Australia's land degradation problems will be addressed. The whole community will be required to participate in some manner to this formidable task.

Before embarking on a quest to address land degradation in the Territory it is imperative that beef cattle producers, in particular, put for public scrutiny their fundamental position on the environmental management of our rangelands.

This Code of Ethics represents the NT Cattleman's Association position; it will serve as the foundation upon which more substantive future actions will be based.

Code of Ethics

Philosophical Principles

To recognise development and conservation as different but not incompatible expressions of human use of the environment.

To recognise alternative uses of rangeland.

To consider the values of other legitimate land users and respect those values.

To promote the need for security of tenure as a means of establishing and maintaining a long term perspective of management.

To encourage government not to adversely influence land users responsibility for sound management by unnecessary intrusion and excessive regulation.

Educational Principles

To promote appropriate land care policy guide-lines and to encourage understanding and acceptance by all rural land users.

To encourage all rangeland managers to develop a sound knowledge and understanding of the rangeland ecosystem via education programs.

To promote the incorporation of the environmental code of ethics for rangeland managers in the curricula of all relevant rural industry training programs.

To promote and support regional and national planning concepts.

To encourage expression of public opinion on land care, always recognising that particular views, no matter how expressed, are part of the spectrum of public opinion, but should not replace balanced and reasoned expressions of environmental opinion.

Operational Principles

To protect and conserve flora and fauna, habitat, natural and cultural areas of local, national or international significance, congruent with rangeland production.

To actively maintain and manage rangeland infrastructure such as bores, fences, water points, yards, etc.

To plan and conduct land management practices which avoid destructive activity or environmental damage.

To undertake corrective and remedial action where necessary in cases of land degradation.

To contribute to the definition of proper land management practices through participation in regional landcare / conservation organizations.

The importance of flexibility in grazing management practices to achieve and maintain sustainable production is emphasised, particularly in the area of varying stocking rates.

Definitions

Conservation: The management of human use of the earth's resources so that it may yield the greatest sustainable benefit

to present generations while maintaining its potential to meet the needs and aspirations of future generations.

Development: The modification of the earth's resources and the application of human, financial, living and non-living resources to satisfy human needs and improve the quality of human life.

Ecosystem: A system where balance exists between living organisms and their environment, in which a dynamic equilibrium applies to provide life and long term maintenance of species.

Land Degradation: The damage to the physical, chemical or biological status of the land and/or the loss or restriction of the land's productive capability due to any causal factor or combination of factors.

Rangelands: Areas of land which by reason of physical limitations are unsuited to cultivation and which are a source of forage for free-ranging native and domestic animals, as well as a source of wood products, water, wildlife and wilderness experience.

Rangeland Management: The science and art of optimising the returns from rangelands in those combinations most desired by and suitable to society through the manipulation of range ecosystems.

A VISIT TO THE US RANGELANDS

Margaret Friedel, CSIRO, Alice Springs NT.

During February and March this year, I visited the western US to meet with colleagues and learn first hand about the issues that were exciting the world of rangelands research and extension.

The trip began at Reno, Nevada, at the AGM of the Society for Range Management. The meeting was on a large scale compared to its Australian counterpart, with nearly 2000 participants, and several concurrent sessions morning and afternoon over three days for all the papers and posters. Amongst the sessions were two Graduate Competitions in which presented papers were judged, and a Ranchers' Forum. A program of student activities ran in parallel to the main program, and included a plant identification exam, high school and undergraduate contests for presented papers, a general range exam and student posters. It was clear that the long tradition of range science in universities had led to the development of student involvement in rangeland activities from an early age.

Education

Later, at the University of Wyoming in Laramie, I learned of other more broadly-based youth activities, dealing with agriculture and science, nutrition and health, family economics etc., available through a national program. This was the 4-H program for 9 to 19-year-olds, backed by research and extension faculty and staff of land-grant universities, colleges, the US Department of Agriculture and local counties.

The issue of land-grant universities in itself is interesting. They began as colleges for teaching, extension and research in agriculture and related themes, and were funded by grants of land in 1862. The notion of combining teaching, extension and research under one roof was far-sighted indeed and still has great value. Those colleges (later to become universities) lucky enough to have oil under their land (Texas A & M for example) do not have the funding problems experienced by the majority, and are viewed somewhat enviously by the less fortunate.

Environment

The difficulties of obtaining funding were considerable. I was surprised by the remarks of prominent range ecologist Neil West to the effect that Australia would have to undertake the landscape-scale ecological research because funding was no longer available in the US. He could see that pressure from environmentalists was directing rangeland research funding into conservation biology, to an increasing extent. Other scientists also expressed disquiet about the long-term effect of the environmental lobby. On numerous occasions, the slogans "No more moo in '92" and "cattle-free in '93" were quoted as examples of how environmentalists were thinking, and the very real impact they were having in the hearts-and-minds war that was perceived to be in progress. Indeed, there were times when range science appeared to be very much embattled, and on the back foot.

Over 80% of the 11 western states is rangeland, most of it publically-owned and on very short-term lease where it is grazed. The push for alternative land uses is strong. Depending on the type of country, there are grouse, mule deer, white-tailed deer and elk for the hunters, and fish for the fishing enthusiasts. While these are public property, there is real potential for game hunting to be a more productive use of land than grazing on some rangelands. There are also some 34,000 feral horses and donkeys and a wild horse and burro law which protects them, and fabulously expensive placement centres run for them by the Bureau of Land Management in Nevada and Idaho. Despite spending millions of dollars per year, the Bureau is not keeping up with the natural rate of reproduction, and is being pressed by groups that believe it is unnatural to attempt to even control reproduction with contraceptives, let alone allow culling.

Management

The lack of acceptance of and research into fire as a management tool was notable, with the exception of some of Henry Wright's work from Texas Tech at Lubbock. I enjoyed the contradiction

which I perceived, perhaps wrongly, at the Santa Rita Experiment Station in Arizona, when out with a student excursion. Hunters were riding shotgun in open trucks weaving around narrow, mountain roads during the last weekend of the javelina (native pig) season, and shots echoed around the slopes in fair imitation of some war-torn area seen on TV. While I was scared stiff of being shot, the excursion leader was reviling two hunters who had lit a tiny fire in a damp cold spot, for the raging wildfire that might develop.

Control of unwanted shrubs is a major issue in many areas, but it would be misleading to suggest that fire is the single answer. Problems vary from place to place. Sometimes, the requirements of a variety of game animals mean different degrees of shrubbiness are important. Sometimes, invading fire-enhancing grasses have increased fire frequency to the extent that fire can eliminate desirable slow-growing shrubs. There has been a strong emphasis on the use of tebuthiuron (Graslan) for shrub control in the past but, in some areas at least, the economics of blanket herbicide use have caused a rethink. In Texas, where chaining and burning are necessary to control juniper, I was told that this form of control was uneconomic too, but ranchers were willing to spend oil-money to keep their land looking good.

Not surprisingly, in a journey spanning the cold deserts of Nevada, Utah, Wyoming and Colorado, and the warmer regions of Arizona, New Mexico and Texas, I encountered a wide diversity of rangelands, opinions, problems and science. There were many issues common to Australia and the US and, naturally, some that were not. In some cases we cannot take US practices on board because our small population base, our infertile soils or our climatic variability make it impossible. Where we can make a move I believe is in the area of rangelands education. Range science should be part of university curricula. Rangelands make up 70% of Australia's area, and only 34% of the US, yet range science is almost invisible in our education system. And while we are at it, why not link teaching, research and extension more closely, as the land-grant universities do?

APPLICATION ABSTRACTS - AUSTRALIAN RANGELAND JOURNAL

Volume 12, No 1 1990

The Publications Committee has reviewed the roles of the Australian Rangeland Journal and Range Management Newsletter. One of the decisions was to print Application Abstracts of Journal papers in RMN.

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PAPERS

Examination of Risk and Stocking Rate Decisions in the Mulga Lands Using Simulation

A. J. Meppem and P. W. Johnston.

Much work has been done in western Queensland to monitor and measure the effects of different stocking rates on pasture production and stability as well as on animal performance. The approach taken in this paper uses a simulation model to generate information on sheep flock gross margins and pasture stability at different pasture utilization rates. The model uses an historical rainfall series as input for determining the level of pasture production. The numbers of sheep are set at the end of summer to consume a certain proportion of the available pasture in each year. Results were obtained for a total of six different levels of pasture utilization.

The results indicated higher pasture utilization rates led to higher mean gross margin, but higher variation in gross margin (higher risk) and a decrease in pasture productivity. Lower pasture utilization rates provided a more stable gross margin and had the ability to maintain these levels in the long term (lower risk) due to increased pasture stability.

Intake of Lick Block Supplements by Cattle Grazing Native Monsoonal Tallgrass Pastures in the Northern Territory

A. R. Eggington, T. H. McCosker and C. A. Graham.

Supplement intakes by 870 Brahman/Shorthorn cross cattle in eight herds were measured monthly for three years at Mt. Bunday Station. Mean intakes of three commercially available supplements over three wet seasons were 43, 124 and 149 g/animal/day for the Salt, Ultraphos and Ultrapro-50 lick blocks respectively. Weathering loss was recorded and was substantial only for the salt block. Supplement intake of Uramol averaged 182 g/animal/day over three dry seasons.

Supplement intake increased with declining native pasture quality, decreasing proportion of country burnt during the dry season and increased demand due to the physiological status of the cattle (for example, lactating cows consumed more supplement than dry cows). The research findings allow strategic planning and accurate budgeting of a supplement programme in a tallgrass monsoonal environment.

Quality and Storage Characteristics of the Seeds of Important Native Pasture Species in South- West Queensland

R. G. Silcock, Lynn M. Williams and Flora T. Smith.

Increased awareness of the value of Australia's native pastures is stimulating research on the major species. Seed of these plants is very scarce and often unavailable. However, once funded for new work, researchers generally need seed immediately. Very old or freshly harvested seed is often all

that they can get. Hence information is needed on the likely quality of native seed of a given age.

This paper reports on the quality and storage life of hand-harvested seed collected around Charleville, S.W. Queensland, after a good summer. Seed of 27 species was stored "as harvested" in paper bags in a large bin in a Charleville laboratory and tested periodically for the next eight years. Seed was tested on paper in a germinator in its natural state and, where feasible, after some simple treatment to minimize dormancy e.g. scarification or dehulling.

In general, legume seed had a high viability and stored well but needed severe scarification to allow germination. By contrast, germination and storage life of other forb species was unpredictable. Prior testing or knowledge of the idiosyncrasies of forb species is recommended before using them in research projects. Freshly harvested grass seed usually did not germinate unless dehulled. We recommend that grass seed should be 1-3 years old if high viability is needed. Storage life of viable grass seed in "as harvested" condition is generally longer than five years under inland Australian laboratory conditions. In some cases viability after eight years unrefrigerated storage was still at least half the peak value. However, we almost invariably had difficulty getting germination from seed of lovegrasses and dropseed grasses of any age.

ARTICLE

Some Key Concepts for Monitoring Australia's Arid and Semi-Arid Rangelands

M.H. Friedel.

Range monitoring is intended to let the custodians of pastoral lands, both land users and government, know what effect management is having on the land. Depending on the type of changes that monitoring detects, adjustments to management strategies may be necessary. But the task of detecting changes caused by the way that the land is used is complex. Vegetation and soil can vary over large and small areas, so that selecting where and what to monitor will have a powerful influence on the information collected and how it is interpreted. Making the best decisions depends on understanding both the distribution patterns of vegetation and soil and how they change in the short and long term.

SHORT COMMUNICATION

Seedling Emergence of Hummock Grasses in Relation to the Effects of Fire

A. Bogusiak, Barbara Rice and M. Westoby.

There has been relatively little scientific investigation of the spinifexes or hummock grasses, no doubt because their economic value for livestock production is small. However, they are plants with unusual characteristics. They give a distinctive beauty, and probably a distinctive ecology, to a very large proportion of the Australian arid zone.

It is thought that hummock-grass seedlings establish mainly in the aftermath of fire. This paper reports a field test of the hypothesis that seeds germinate in response to the heat of fire or the addition of ash. The test was carried out for the three most important central Australian hummock grass species.

No evidence was found that seeds require anything other than rainfall for germination. This poses several puzzling questions for further investigation. For example, hummock-grass stands may not always have a substantial viable soil seed bank, with the consequence that fires might be followed by little or no seedling regeneration.

WORKSHOP PAPERS

Principles, Problems, and Priorities for Restoring Degraded Rangelands

J.A. Ludwig, K.C. Hodgkinson and R.D. Macadam.

A workshop was held in July 1989 to discuss issues related to the restoration of degraded rangelands. This workshop, sponsored by the CSIRO Division of Wildlife and Ecology, and convened at the Rangelands Research Centre, Deniliquin, not only reviewed past and current research on restoring degraded rangelands, but explored those basic ecological and economic principles applicable to restoration. The workshop also established a set of priorities for future restoration research. The workshop participants (16 people, selected to represent national interests) presented papers on principles and economics of restoration ecology and on case studies of rangeland degradation and restoration projects. This was followed by workshop sessions which explored the many issues of degradation and restoration. The workshop clarified which ecological and economic principles are directly applicable to the prevention of further rangeland degradation and to restoring those rangelands already degraded. A case was built for the role of animals as the facilitators of restoration. The economics of rangeland restoration must invoke principles of long-term, cumulative and sustainable benefits. A number of priorities for restoration research were also identified, such as the need to develop appropriate extension tools to facilitate information transfer.

Principles of Restoration Ecology Relevant to Degraded Rangelands

P.A. Werner.

Ecological principles, theories, paradigms, and current ideas which may be usefully applied to restoration projects are discussed, as well as a general protocol to use in conducting restoration. Mycorrhizae (special fungi on plant roots), natural seed banks in the soil, and colonizing abilities of plants are important considerations in the establishment of vegetation. Understanding the behaviour of species and species interactions is necessary (but not sufficient) in order to formulate "rules" for constructing communities of plants and animals which would be self-sustaining, stable, minimally disruptive to native biota, and yet produce a high yield of an introduced animal.

Knowledge of succession, ecosystem processes, and the importance of spatial relationships of food and habitat for animals are all potentially applicable to restoration of rangelands. Both rangeland managers and rangeland scientists can benefit from their interaction.

An Economic Framework for the Evaluation of Rangeland Restoration Projects

N.D. MacLeod and B.G. Johnston.

In recent years there has been increasing concern about the degradation of Australia's semi-arid and arid grazing lands. Most statements concerning rangeland degradation and restoration issues have been supported by technical evaluations with minimal attention given to economic considerations. Where attempts have been made to include economic elements into analyses, the methodology adopted has often been inadequate. This can produce misleading results as well as make comparisons of restoration techniques difficult.

A benefit-cost analysis framework is recommended for future studies. The framework is demonstrated via a case study approach to examine the private economic value of several technologies for rangeland restoration. A conclusion is reached that, from the viewpoint of individual land managers, many restoration techniques are too expensive relative to the gains in productivity that they provide. Issues relevant to the extension of the analysis to encompass social evaluations of rangeland restoration management are canvassed.

Soil and Landscape Processes in the Restoration of Rangelands

D.J. Tongway.

Restoration procedures in the rangelands, together with related research, may now be generalized to the extent that methods can be tailored to particular landscapes. This paper outlines the theoretical framework and practical means by which appropriate restoration measures can be recommended for degraded rangelands. The nature and degree of degradation is assessed both qualitatively and quantitatively and is also geographically referenced by integrated vegetation and landscape surveys aimed specifically at elucidating landscape function. Recognition of favoured plant habitats and of the processes which maintain them are key elements of the procedure. An example of the landscape analysis and experimental restoration procedures based on it is described.

REPORT OF THE 1990 ANNUAL GENERAL MEETING

*Dennis R. Barber
Honorary Secretary*

The 1990 AGM was held at the Adelaide University Staff Club on Thursday, May 31st at 4:30 PM. Those present included Dr Martin Andrew, Andrew Johnson, Michael McBride, Melissa Gibbs, Dennis Barber and Robin Lamacraft. Apologies were received from Denzil Mills who has nominated the President as her proxy. The Minutes of the 1989 AGM were confirmed as read and the President, Treasurer and Subscription Secretary's Report were received to be submitted for publication in this issue.

A motion to reappoint the Publications Committee was carried and Council was pleased to hear that Gary Bastin (now with CSIRO - Centre for Arid Zone Research) has volunteered to become the Editor of the RMN.

Under General Business, the subject of ARS Branch activities was discussed. At present it was noted that the only Branches in existence were in South Australia and the Gascoyne (who are the conveners of the next Conference). The President observed that the biennial ARS conference seems to be the one major event when everyone comes together. It was agreed that activities at a regional level should be fostered and the Subscription Secretary has offered to provide a local mailing list to any group wishing to start up or revitalise a Branch of the Society.

Furthermore, the Vice President suggested that financial assistance should be provided to any group wishing to establish a Branch. Council encourages interested members to contact the Subscription Secretary by mail or by speaking to the Honorary Secretary at the 6th Australian Rangeland Conference in Carnarvon.

Changes to the Articles of Memorandum as proposed by the Publications Committee were discussed and Council is confident that they will be acted upon by the next AGM. Anyone wishing to obtain a copy of the latest 'Articles of Memorandum of the Society' can do so by writing to the Honorary Secretary.

There being no further business, the meeting was declared closed by the President at 6PM after which the SA Branch AGM took place over dinner. John Bradsen from the Law School, University of Adelaide was to speak on "Voluntary Land Care in Rangelands - The Role of Legislation"; however he was regrettably unable to speak (literally). Dr Martin Andrew, with only several days notice, kindly offered to provide a presentation on "Rangelands in the Top End of Australia".

PRESIDENT'S REPORT

to the Annual General Meeting

31 May 1990

Martin Andrew

The location of the executive moved to Adelaide for a two year period, following the 1989 Annual General Meeting in Queensland. The incoming Council, comprising Dr Martin Andrew (President), Ms Denzil Mills (Immediate Past President), Mr Andrew Johnson and Dr Charlie Carter (Vice Presidents), Mr Dennis Barber (Secretary), Mr Michael McBride (Treasurer), and Ms Melissa Gibbs (Subscription Secretary) were very grateful to the outgoing Executive for leaving the Society's records in such a well-ordered state. This made the transition much easier than it might have been. As President, I was very grateful for Denzil's extensive briefing notes about matters in train that we had to attend to.

Council quickly established a postal address for the Society (PO Box 262, Eastwood), and purchased a filing cabinet for Council's records.

Given our various workloads in our various employments, we quickly adopted the suggestion of the outgoing Executive to employ a person to assist with routine paperwork and correspondence. Ms Jenny Colquhoun has filled this role admirably, and made the Society much more client-responsive than would have otherwise been the case. We thank her for her efforts, and look forward to continuing to work with her in the forthcoming year.

Council has met on six occasions. Denzil Mills has appointed me as her standing proxy, and Council has appreciated her responsive advice on numerous issues. Council was pleased to be able to involve Dr Carter in a telephone conference meeting recently, where we discussed the report of the Publication's Committee with Dr Margaret Friedel, who is also based at Alice Springs.

Administrative action

Council has increased the subscription fee but introduced a discount for early payment; discontinued the availability of credit card payment facility for membership fees; and increased the maximum size of the Society to 1000, as allowed for under our Articles.

Membership

During the year, Council was pleased to approve 51 new memberships; 55 resigned or retired from the Society. The total number of members of the Society is now 632.

Council was saddened to hear of the death of Dr Owen Williams late in 1989. Dr Williams was a long-standing member of the Society, and one of Australia's foremost rangelands ecologists. Dr Williams was also the Society's nominee to FASTS (the Federation of Australian Scientific

and Technological Societies), and Council is in the process of appointing a new nominee.

Council is indebted to Melissa Gibbs for having transferred the membership data base to the commonly-available dBase III Plus system, allowing easy access for future Council members.

Submissions to Enquiries

Council, on behalf of the Society, has made submissions to the Enquiry into Drought Relief Policy, into Taxation Policy, and to the National Review of Agricultural and Related Education. Council has delegated to Dr Richard Silcock to coordinate and present the Society's submission to the Queensland Crown Leasehold Land Policy and Administration Review (*Ed.* submission in this issue of RMN).

Publications

Council is indebted to the Society's editors, Dr Ron Hacker (Journal) and Dr George Gardiner (Range Management Newsletter) for their work during the year. Council has actively used the Newsletter as a means of communication, and the relatively high rate of payment of membership fees (for which the only prompt appeared in the Newsletter) indicates that the Newsletter is read widely by our members, and is therefore a useful means of communication.

A major development during the year was a meeting-in-person of the Publications Committee. This has produced a most thorough review of our publications policies, and Council has largely adopted its proposals. These include recognizing the Newsletter and its Editor explicitly in the Society's articles, changing the purpose and format of the Journal to make it more scientific and international, and to seek its listing in Current Contents. We aim to have the Society's Articles amended at a Special General Meeting to be held in conjunction with the Carnarvon Conference, in September, to incorporate these changes.

Council is indebted to Dr Friedel and her colleagues for the fine work they have done.

National Conference

Council is pleased with the reports from the Organizing Committee which indicates that we will have yet another successful Conference this year. There is already a very impressive list of enrollees.

This is the first year that the Conference has been held in a different State from that in which the Council is located, and it has highlighted both the difficulty of Council maintaining close input into the planning of the Conference - this Conference is very much the work of the local organizing committee - and the need for Council to give consideration to assisting the President of the Society to attend if the President is unable to obtain sufficient funding from his or her own organization.

Scholarships and Fellowships

Council has decided that the overseas scholarships should be applied to assisting travel to the International Rangelands Congress in Montpellier in France in April 1991, and has called for further applications, with a deadline of June 30.

There was only one application for the Travelling Fellowship. Council is somewhat mystified as to why this Fellowship has traditionally attracted low numbers of applicants. Nevertheless, Council was pleased to award a Fellowship to Mr Andrew Drysdale, a pastoralist from Charleville in western Queensland to assist him to attend the Biennial Conference in Camarvon in September.

Other matters

Council has deliberated on a number of other issues this year. We declined a request for funding to reprint CSIRO's National Rangelands Policy, due to insufficient funds, and because we thought it best to assist CSIRO, by lobbying in other means, so that it would in future have sufficient funding to pay for such projects.

Council has considered whether Australia should bid for an International Rangelands Congress in 1999 or 2003, and we have raised this as a matter for discussion at this AGM.

Council has agreed to assist in arranging a session dealing with the renewal of the natural environment or a similar topic for the ANZAAS Congress to be held in Adelaide, 1-3 October 1991, on the theme "Renewal and Reproduction". Again, we agreed to raise this for discussion at the AGM.

Thanks

I would like to thank my fellow Council members for their work and support in this past year, and I look forward to continuing to work with them for the remainder of our two-year term. I would also like to place on record, on behalf of the Society, my appreciation to our respective organisations for typing, meeting room, and other kinds of assistance that contribute so valuably to the work of the Society.

APOLOGY

Due to unforeseen difficulties, the Newsletter labels that were used to mail out the last Newsletter were printed 2 months before they were needed. If you had paid your subscription in the 2 months prior to receiving the last Newsletter, or notified us of a change of address, that information would not have been reflected on the label. We apologize for any confusion this may have caused.

Range Management Newsletter July, 1990 Page 10

SUBSCRIPTION SECRETARY'S REPORT to the Annual General 31 May 1990

Melissa Gibbs

The Society currently has 553 members and 77 library subscribers. While the majority of the ordinary members are individuals, the Society also has 6 honorary life members, 7 ex-officio officers and 30 company members. Membership has remained stable in the past year with a turnover of about 60 members in the year. Council has increased the maximum membership from 500 to 1000.

Thanks to Richard Silcock's well documented database and guidelines, the transition of the membership records from Queensland to South Australia went very smoothly. The introduction of a discount for early payment of subscriptions this year encouraged more than half of our members to pay before 31 March. This is a great improvement over previous years.

A breakdown of members by state is given below (the figures for last year are included for comparison).

State	1989	1990
ACT	16	18
NSW	190	172
NT	36	37
QLD	92	108
SA	105	102
TAS	1	1
VIC	17	18
WA	126	128
Overseas	55	46
Total	638	630

NEWS FROM THE PUBLICATIONS COMMITTEE

Margaret Friedel, CSIRO, Alice Springs NT

After revamping in 1989, the Publications Committee comprises the Journal and Newsletter Editors, the Production Manager and a representative from each state. The current membership is:-

Dr Margaret Friedel, NT - chairperson
Dr Ron Hacker, WA - Journal Editor
Dr George Gardiner, WA - RMN Editor (to June 1990)
Mr Gary Bastin, NT - RMN Editor (from June 1990)
Mr Malcolm Howes, WA - Production Manager
Dr Tony Pressland, Qld
Mr David Eldridge, NSW
Mr Leigh Hunt, SA

The Committee last met in January when the roles of the Journal and Newsletter as well as the responsibilities of the respective Editors were extensively reviewed. The Committee made a number of recommendations to Council including draft policies for its own operation and for both publications. We also drafted definitions of the roles of the Editors and Production Manager. These recommendations are particularly relevant in the case of RMN as neither the Newsletter nor its Editor are recognized in the Articles of Association. These recommendations were considered by Council in May and will be discussed at the Carnarvon conference. Here are our recommendations for the Publication Committee's role and draft policies for the Journal and Newsletter.

The role of the Publications Committee is to be responsible to Council for:

1. Establishing and revising quality standards for style, content and format of publications.
2. Monitoring standards of publications and providing direction to the Editors and Production Manager accordingly.
3. Receiving reports from Editors and the Production Manager.
4. Recommending rates and charges associated with publications.
5. Adjudicating disputes between authors and Editors.
6. Determining and reviewing roles and performance of Editors and the Production Manager.
7. Recommending appointments to positions of Editors, Associate Editors, Production Manager and the Publications Committee.

AUSTRALIAN RANGELAND JOURNAL

We consider that the Journal has not operated according to the charter presented inside its front cover, nor is it likely to do so - ie "to develop communication between all those involved with rangelands, ie graziers, 'agency' land managers, extension workers, educators and scientists; to develop and foster a philosophy of rangeland use attuned to Australian needs....; to speak authoritatively on matters affecting rangeland and its uses; to represent....rangeland users by presenting a consensus of their aspirations and ideals; and to point out deficiencies in our present approaches to rangeland use, extension effort, education and research activity".

History has proved that the contributors and readers are almost entirely scientists. There is nothing to be gained from attempting to make the Journal attractive to everyone. The Journal has published a wide variety of papers which have not always been of a high scientific standard. This has led to a perception that the Journal is second rate and scientists are reluctant to contribute their best work. International recognition of the Journal would be improved through listing in "Current Contents" but this will not be achieved unless the Journal is of a high scientific standard.

Draft policy for Australian Rangeland Journal

The Australian Rangeland Journal publishes material of scientific merit relevant to all aspects of the ecology, use, management and conservation of rangelands, both within

Australia and internationally. The term rangelands is interpreted broadly to include all land which is not devoted primarily to the production of cultivated crops or timber.

Contributed material may be in the form of papers or short communications which report the results of original research, reviews or thesis summaries. Articles of a discursive nature may be accepted at the discretion of the Editor.

RANGE MANAGEMENT NEWSLETTER

Upgrading of the Newsletter in recent years and in future will allow the Society to pursue with confidence an upgraded Journal. The Newsletter currently fulfils many of the original aims of the Journal and will increasingly be able to do so. It is therefore a more appropriate vehicle for the publication of articles and application abstracts, and is more likely to be read by land managers.

Draft policy for the Range Management Newsletter

The Range Management Newsletter is a forum for the communication of information and expression of views on all issues relating to the use and management of Australia's rangelands. It aims to foster interaction and the exchange of ideas between groups as diverse as pastoralists, Aboriginal people, conservationists, scientists, mining companies and tourists.

The Editor invites letters, anecdotal or opinionated articles, reports and other similar material.

The Range Management Newsletter will also publish timely Society business.

The Future

We believe the recommended changes to the Society's publications will allow the Journal to tap a higher standard of papers thereby improving its international standing and circulation. The Newsletter should be consolidated as a forum for the ready exchange of ideas and information amongst all those with an interest in rangelands.

We would welcome any comment on these proposed changes - either to the RMN Editor or me (both at CSIRO, PO Box 2111, Alice Springs. NT 0871).

FUTURE IRC IN AUSTRALIA

*Martin Andrew
President*

Council seeks your views as to whether Australia should bid for the 1999 or 2003 International Rangelands Congress.

Range Management Newsletter July, 1990 Page 11

Mr Ray Perry, Chairman of the International Rangelands Congress Continuing Committee, has written to me proposing that Australia should make a bid now for the 1999 or future Congress, in order to "keep its place in the queue". Very likely, Kenya will be the venue for the 1995 Congress, and the following one (1999) will be announced at the Montpellier Congress in May next year. We have until late this year to finalise an Australian bid.

During the 1988 Congress in New Delhi, Council offered to host the Congress in 1999 or later. Townsville and Darwin were suggested as the venue because of their proximity to tropical rangelands, the 1984 Congress in Adelaide having been closer to southern arid rangelands. The choice of venues was limited by the need for conference facilities for 700-900 participants, and for a substantial body of scientists within university and research institutions.

I propose to write to various individuals and organisations around Australia seeking expressions of interest. Meanwhile, Council will appreciate any advice you have to offer, including locations where there are organisations and people willing to take on this significant task.

HONORARY MEMBERS

Martin Andrew
President

The Council of the Society wishes to remind members that it is possible to nominate people as Honorary Members of the Society, and that it would welcome proposals for such members at any time.

The relevant clause of the Society's Articles is:-

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

NEW MEMBERS

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Mr John Murphy
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Mr David J Powell
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Mr Justin Steadman
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Department Of Agriculture
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CARNARVON WA 6701

REVIEW OF LAND POLICY AND ADMINISTRATION IN QUEENSLAND

*Dr R Silcock, D and J Mills, Dr B Burrows and
Dr I Beale.*

SUBMISSION FROM THE AUSTRALIAN RANGELAND SOCIETY

(This submission addresses its comments to the arid and semi
arid pastoral lands - Queensland's rangelands).

Objectives of Land Administration

1. LAND CARE - to ensure that the land resources are
maintained in a satisfactory and productive state and to ensure
land does not become derelict or a source of pollution or a
financial impost on the government.

2. To oversee orderly and efficient allocation and utilization of
Crown lands.

The present land administration system has failed on most
fronts (see section on Closer Settlement and Sustainable Land
Use) - land care has been lacking, there are areas where land
degradation has occurred, there are too many undersize living
areas, land administrators are not respected and in the not so
distant past, there was extreme animosity between landholders
and Lands Department. The Government has not enforced key
land management provisions contained in Acts and regulations,
due in part at least to these provisions being unworkable.

Any review of Land Policy and Administration in Queensland
must not be rushed but rather be deliberate and thorough, with
land care and range management rather than rents the primary
objective.

A Perspective on Range Management in Queensland

In comparison with countries such as the USA and South
Africa, Australia has to date placed a low priority on teaching
Range Science. There is no Chair in Range Science in any
University and few, if any, institutions teaching range
management as a degree major. Range research is carried out
by agricultural scientists and ecologists in Queensland.

Range management extension requires a long term
commitment. It is in contradistinction to 'recipe' type extension
associated with crop industries and animal husbandry. This
means before you can get managers to manage native
vegetation, they need to be taught what are the useful desirable
species, what are the best indicator plants etc. Most of the
QDPI technologists can't identify our range plants - so what
hope the land manager or land administrator? The same could
be said for rangeland soils.

The fundamental range management approach for pastoral
lands is TO ADJUST STOCK NUMBERS TO FEED
AVAILABLE. All things being equal, this approach could be

dovetailed in with pasture models which predict feed available
from rainfall events. This is the conundrum of macro advice -
while you can take a broad regional approach to range condition
using Landsat imagery and even dare to predict rainfall based
on El Nino and the Southern Oscillation Index, there will
always be paddock, property and district variations reflecting
'noise' and antecedent conditions.

In the end the manager needs to intelligently and educatedly
assess his own paddock carrying capacities. It is impossible to
imagine a mechanism whereby each individual paddock can
be assessed at a detailed level by land administrators. Thus
there is a crucial need for improving the RANGE
MANAGEMENT KNOWLEDGE of all people dealing in
rangeland management - technologist, extension officer, land
manager and land administrator.

Means of Achieving these objectives in Queensland Rangelands

RE: OBJECTIVE 1. Land Care - To ensure that the land
resources are maintained in a satisfactory and productive state
and to ensure land does not become derelict or a source of
pollution or a financial impost on the Government.

Two alternatives are considered; the first being that the Lands
Department merge with Queensland Department of Primary
Industries Land Utilization Division to form a body similar to
the Western Lands Commission in NSW. - this is the favoured
option. The emphasis must be on sound land management, not
valuations. Therefore a change in training and qualifications
is needed. There needs to be a much reduced emphasis on
valuers and lawyers and an increased emphasis on rangeland
scientists.

Alternatively, the Lands Department should regionalize and
change its emphasis to focus on the condition of the land and
steadily build-up range management / ecology trained staff -
at least two in each of the Maranoa, Far South West, Central
West and North West Regions.

It is fortunate that land use surveys have been conducted over
almost all of Queensland's rangelands. The Western Arid
Land Use Studies conducted by the QDPI and other surveys
conducted by CSIRO and others provide the basis for land
monitoring programs. Care is needed to avoid duplicating
what is already happening in QDPI - use should be made of the
results of their research and their extension expertise to
implement a resource monitoring program that can be used by
landholders for land management and by land administrators
as an objective tool for improved overseeing of regional
resource management.

"There is a need to focus the attention of land administrators
on the condition of the land and not the livestock which use it."
(Young, M.D., 1982).

The education process is very important - for administrators,
extension staff and land managers. Few of these groups have
been really exposed to range management/ecological concepts
in this state. A group of Lands Department staff received

training to enable them to undertake a land degradation study in south-western Queensland in 1985 (Mills, J.R., Turner, E.J. and Caltabiano, T., 1989). To our knowledge this was the first such initiative in the State. The lack of range management / ecological skills is illustrated by the failure of all three groups to recognize the impending disaster from the invasion of Mitchell grass lands by *Acacia nilotica* (Prickly acacia) until "after the horse has bolted". This is despite the plant being a declared noxious weed since at least 1950. There are many other examples; eg Burdekin catchment, poorly implemented land clearing policies etc.

The recent Arid Land Administrators Conference in Charleville included people from a wide range of disciplines and this was a positive move toward better communication and recognition that administration of land cannot be isolated from other aspects of its use.

No matter what type of land tenure is exercised, it is important to remember "the land user is always the land manager. Land administration can only seek to influence the decisions land managers make." (Young, M.D., 1982).

There is a need to define minimum standards of range condition consistent with proper land use in each region.

To determine rangeland management policy for a region, Rangeland Management Boards could be established. Three boards are recommended for the pastoral areas of Queensland. These boards could cover regions such as the southern inland south west mulga and Mitchell grass (based in Charleville), the central west Mitchell grass downs and eastern and western desert country (based in Longreach), and the north west, gulf country and the Cape cattle country (based in Charters Towers). The Rangeland Management boards would transfer decision making power to regional centres for increased flexibility and response to market forces. It is envisaged that the members of the board would be drawn from local landholders, representatives from the local land care groups, a local government representative, representatives from the departments of Primary Industries, National Parks, Water Resources as well as from Lands.

The boards would be responsible to the Minister for the administration of the Act.

Some support exists for this regional approach in previous work. For example "to be effective, regulations must be

- technically based,
- equitable,
- subject to appeal and applied regionally.

- In our view, regulatory action can only be justified when objectively collected information clearly demonstrates that a significant negative trend has occurred over a quantified period of time. To be effective it is also desirable that the system used is supported by a pastoralist's peers." (Young, M.D. and Wilcox, D.G., 1986); and it has also been said that "sound land use will be most readily achieved in Queensland by fostering a community ethos of sensible land use and competent land management. It is desirable then, that the various government departments involved in the areas be

perceived by the community to be making a concerted effort in achieving efficient and sustainable land use. Particular attention needs to be given to easing impediments to sound land use, such as the criteria for drought declarations. Increased emphasis on range management extension programmes, which outline and demonstrate appropriate land management practices, should be considered." (Mills, J.R., Turner, E.J. and Caltabiano, T. 1989).

There is a real need to establish a workable, yet only semi-formal, mechanism whereby professionals in different Government Departments can interact and have input into land management decisions. The biggest need is for biologists, especially soil and landscape specialists, to have an input into policy relating to water resources, land tenure, mine planning and roadside maintenance eg. noxious weed management, management of tailings released from irrigation schemes etc where engineers, architects, economists and lawyers predominate.

Re: OBJECTIVE 2: To oversee orderly and efficient allocation and utilisation of Crown lands.

Basic issues involved are living areas, who can hold the leases, security of tenure, rentals and types of leases.

LIVING AREAS - lease areas must be sufficient to allow land managers to practise sound land management during commodity busts, droughts etc. Living areas would vary from region to region. Areas of unreliable rainfall (eg west of 147 degrees longitude) require greater flexibility in living areas.

Restrictions on property build-up should be limited to providing some control on entry of overseas and local large companies into areas where family properties have been the norm. There is a need to actually facilitate build up in living areas in regions where lease sizes have been demonstrated to be too small. There should be some encouragement for large family operated properties by allowing them to expand to a number of living areas.

WHO CAN HOLD LEASEHOLD LANDS - Some restrictions on foreign and "absentee" landlords are desirable. Some regional rangeland management extension could be given to out of region buyers before Ministerial approval is given for transfer of leases. This would attempt to address the problem of over estimation of productive potential and then the resultant flogging the land sometimes receives as new landholders attempt to meet their commitments.

SECURITY OF TENURE - the SA system* is acceptable but there is a risk of it being misapplied. The risk is probably worth taking for the sake of the land. There is a need for some sort of peer review system to stop "narks" in Lands Department just trying to grind graziers out of existence. (* 42 year lease with a review after 14 years and a conditional extension of 14 years based on the results of the review. This seems like a good idea in theory.)

RENTALS - Returns in Primary Industries are low so any idea of leasehold land being a goldmine should be forgotten.

Basis of rents -

- a) using stock numbers is too difficult;
 - b) per hectare of each different land system in the lease.
- This would work with indices of distance from road, rail and service town built in. Current values should be set so that the rental bill comes out much as it is now for a basis to start from.
- c) per unit of production - very difficult;
 - d) per \$ unimproved capital value.

TYPES OF LEASE - "Unlike other states, Queensland has developed a very complex system of land tenure which is designed to evolve closer settlement and individual ownership of land throughout the entire state. Only companies and individuals with large amounts of capital are permitted to lease large areas of undeveloped land on the condition that they develop it for subsequent subdivision." (Young, M.D., and Vickery, J., 1978). Some landholders hold up to five types of lease within their business. This is unnecessarily complex and must lead to unnecessary cost when transfers or assessments are made. The leases within a Rangeland Management Board region should be reduced to the minimum necessary for efficient administration; eg for the area between the Warrego and Bulloo Rivers, is there scope to have just one form of lease?

FREEHOLD OR LEASEHOLD

Some comments - "the main difference between a freehold title and most leasehold tenures rests not so much in the different rights attached to each title but more in who administers the land they describe. Freehold land is administered through the planning system, whilst on leasehold land, use is administered through both the planning and the tenure systems." (Young, M.D. 1982).

"One obvious option is the conversion of all pastoral leases to freehold and their subsequent regulation through soil conservation ordinances etc. Another is the maintenance of pastoral leases with modified conditions and terms." (Young, M.D., 1981).

Whatever the types of tenure, the principles of rangeland management are the same and the "land care" ethic should be encouraged as it ignores tenure, involves managers in land management education and applies peer pressure to all land managers.

SYSTEM FOR RESOLUTION OF DISPUTES/ GRIEVANCES

Biological processes can be very difficult to prove in traditional courts of law. Many organisms interact, often at random, to produce an end result. Therefore appeals and grievances should not be summarily put before a court but rather arbitrated upon by some sort of tribunal. This would at least allow the real issues to be focussed upon later in a final court appeal, if the dispute could not be resolved by the tribunal.

The membership of such a tribunal should reflect the nature of the dispute and should have one legal expert, one land resources expert and one community representative from the area under dispute.

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6TH BIENNIAL CONFERENCE - CARNARVON

Tim Eckersley, Dept. of Agriculture, Carnarvon.

As you are aware, the 6th Biennial Conference is to be held at Carnarvon, Western Australia in September. For those of you who are coming to the Conference from the eastern states, we thought you might be interested to know a few background facts and figures about Carnarvon.

Where is Carnarvon?

By road, Carnarvon is 1000 km north of Perth. Since the roads are fairly straight up here, it is not much less than 1000 km as the crow flies!

The town of more than 7000 people is situated at the mouth of the Gascoyne River which flows into Shark Bay. While the Gascoyne and its tributaries have a catchment area of some 6.7 million hectares, river flows are infrequent and for most of the year the river is dry.

Climate

Carnarvon is located midway between the tropical north and Mediterranean climate of the south of Western Australia and consequently has a moderate arid climate.

Moderate can only apply to Carnarvon town itself. Inland, extremes of both heat and cold are felt with maximum summer temperatures often above 40°C

Rainfall is variable and averages 237 mm per year, most of which falls between May and July. Summer rainfall is dependant on cyclonic activity which adds to the rainfall variability.

History

White settlement of Carnarvon began in the 1870's to develop a port for shipping livestock and wool. Early activities in the area were mainly associated with the pastoral industry, sandalwood cutting and some fishing. Over the years the fishing industry increased with whaling and Australia's first pearling industry in Shark Bay.

In the early 1920's banana plantations were established along the banks of the Gascoyne River where good quality underground water was freely available. The horticulture industry has expanded to be the major vegetable supplier to the south west of the state during the winter months.

Australia's first earth station for satellite communications was set up in Carnarvon during the 1960's. It operated between 1966 and 1975 as a support to the NASA space probe.

Industry

The Carnarvon economy is based on pastoralism, horticulture, fishing, mining and a burgeoning tourism industry.

The pastoral industry produces mainly wool, however cattle numbers have been on the increase over the last 20 years. The horticulture industry is also changing, with decreasing banana production and increasing vegetable and tree crop (eg. mangoes, avocados and citrus) production in recent years. Fishing is for scale fish, prawns and scallops predominantly. Most mining activities are centred around salt production on Lake McLeod north of Carnarvon.

Points of Interest

The marine environment of the Carnarvon region is unique. Shark Bay is home to the world famous stromatalites and the "friendly" dolphins of Monkey Mia. Dugong are also plentiful on the sea grass beds in the shallow waters of the bay.

To the north of Carnarvon the Ningaloo reef, Australia's longest fringing coral reef, begins. Since whaling ceased in the 1960's, numbers of whales have increased. Humpback whales, which migrate to the region to calve and mate are now commonly seen.

CONTROL OF SEEDSET IN SPEARGRASS (*Stipa* spp.)

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Introduction

Speargrass (*Stipa nitida*) formerly known as part of the variable speargrass (*S. variabilis*) group, is very widespread across the southern rangelands of Australia. It occurs in a wide variety of woodland, shrubland and grassland communities and is often the dominant pasture plant over large areas of country. It is probably the most abundant grass of western NSW found on many soils except the clays. The plant is classified as a facultative perennial.

Germination and growth usually occur in the cooler months of the year, especially in winter dominant rainfall areas. Extended dry summers will kill most of the plants, and in this situation it will act as an annual.

Most years have some speargrass, but prolific growth only occurs in odd years of high winter rainfall (speargrass years). The plants grow into dense swards up to 1 metre tall, with masses of mature seed which usually fall in October. The seed has a very sharp pointed tip and a single corkscrew shaped awn which assists penetration. There are always large seed reserves in the ground of this hard seeded species. Speargrass does

form a large part of the diet of sheep, but its nutritional value is quite ordinary, particularly when dry.

Speargrass has been estimated to cost the Australian sheep industry millions of dollars annually. The direct losses associated with the grass come from the damage caused by the seed which penetrates the fleece and skin, and accumulates in large quantities. Sheep can be so heavily infested around the neck that they are unable to reach the ground to feed! Seed affected sheep become like walking pincushions and will often die of thirst rather than suffer the pain of walking to water. Sites of skin penetration also act as wicks for bacterial entry and many sheep may become infected or flystruck, and die, especially if the situation is aggravated by wetting. Pleurisy and pneumonia are not uncommon when the seeds penetrate the chest wall.

Survivors of speargrass infestations become illthrift and may join poorly. Weaner sheep are most at risk, being smaller and inexperienced, they collect more seed and are more easily set back by the associated appetite depression.

Other losses are caused by increased vegetable matter in the wool which decreases its value, reduces wool cut and lowers values for seedy skins, and reduces carcase value. The sale value of seedy lambs is also well down.

Indirect costs associated with the grass seed involve being 'locked into' a general spring shearing, which includes lambs, and autumn-winter lambings, both of which may not, in the absence of grass seed, be the most profitable options.

Alleviation of the speargrass problem has only been achieved in the past by shifting the sheep to seed free country. This may

be simple if other non-infested land types are readily available or can be done more expensively by agistment or locking up mobs and hand feeding. Other options, such as slashing tracks or flogging out small paddocks have proved ineffective or of limited use.

We describe the results of pasture topping using glyphosate (Roundup CT) to achieve favourable changes in speargrass pastures eg. increased palatability of weeds or to control seed set.

Location

'Banoon', Arumpo is approximately 80 km north of Euston in far south west New South Wales. The station is owned by Daryl Richardson and has been in his family for 40 years. The property has very large tracts of open grass country interspersed with bluebush and belah, covering an area of 39,970 ha (98,000 acres). Stock consist of approximately 4400 breeding ewes, 1800 ewe hoggets and 40 cows with calves. Stocking rate is below the district average. Long term average rainfall is 300 mm (12 in) but has been higher in recent years.

A run of wet winters and dry summers has seen water supply problems, and prolific speargrass growth, emerge as the worst problems facing the property. Rabbits and kangaroos are also abundant.

On advice from Steve Facer (Monsanto), who had some trial data on spraying speargrass in the Griffith area in 1988, Mike Lucy helped Daryl with the implementation of a pasture topping programme on 'Banoon'.

With encouragement from VIVCO (retailer, Mildura) Daryl

Table 1. Data gathered from the Rate Trial Area

DATE	CRUDE PROTEIN (%)	DIGESTIBILITY OF DRY MATTER (%)	METABOLIZABLE ENERGY (MJ/kg)	TOTAL DRY MATTER (T.D.M.) (kg/ha)	* ESTIMATED DRY MATTER AVAILABLE IF 50% USABLE FEED LEFT IN SITU (kg/ha) (T.D.M. x 0.35)
15.9.89 - AT SPRAYING	8.3	55	8.2		
3.11.89 - MATURE UNSPRAYED	4.25	49	7.4	4580	1603
- SPRAYED (GLYPHOSATE/ha)					
200ml	4.5	49.9	7.5	5040	1764
400ml	5.1	52.4	7.9	6480	2268
600ml (recommended rate)	4.9	50.9	7.6	6280	2198
800ml	4.4	51.5	7.7	4980	1743
24.11.89 - UNSPRAYED	3.9	47.4	7.1		
- SPRAYED (600ml)	4.3	48.8	7.3		

* Feed available calculated assuming that 30% of total dry matter is unavailable ie. rotted and crumbling dead vegetation, grass seed and other inedible material, and fudges for uneven and lower density distribution of the grass cover.

sprayed several thousand acres of his open speargrass country with Glyphosate CT (Roundup) at an estimated rate of 400 ml/ha through a boom spray.

Mike Lucy also established a small herbicide rate trial on a representative stand of speargrass with the help of Doug Camin (farm staff A.R.A.S., Dareton), with Roundup CT supplied by Monsanto. The following is a summary of the trial and discussion of the results:

Date Sprayed:

15th September, 1989

Spray Details:

6m Hardi Boom Spray - linkage mounted
40 psi - 70L/ha; various rates of glyphosate (Roundup CT) as specified and 250ml Agral 60 per 100L of water.
Weather - overcast and mild, no rainfall.
Each rate was replicated 3 times.

Grass Stage:

Head exertion through to flowering.

Grass Identification:

Nearly all *S. nitida* with some *S. drummondii* present (identification by National Herbarium).

Feed Analysis:

Samples of the above ground portion of the speargrass plant were taken at the following times:

At spraying (15.9.89); on the 3.11.89, (when the sprayed areas would have been grazed by sheep). Some samples were also taken on the 24.11.89, at which stage sheep would normally have been removed from the sprayed area.

All analyses were performed by the Nutrition and Feeds Evaluation Unit (Department of Agriculture).

Dry Matter Estimation:

An estimate of the dry matter present on the spray rate trial replicates was made on 24.11.89 (Table 1). A one half square metre quadrat was used taking one cutting from two of the replicated sprayed areas (ie 1m²/treatment) at a visually representative site for that treatment. The herbage was removed down to ground level and included fallen seeds, burr, etc.

Results:

Grass Appearance:

In control areas, the speargrass grew tall (1 m) and rank. Maturation and seedset occurred normally.

At 200ml glyphosate/ha, the grass was only minimally affected, still green and active, but with some stunting evident. There was a visually estimated 50 to 70% reduction in viable seeds.

At 400ml glyphosate/ha, the speargrass plants were obviously affected. A few died, most were stunted, but some did resume head development and set 20 to 40% of viable seed. Many plants showed new green shoots at the butt. The sward was shorter and denser than the control.

At 600ml glyphosate/ha, plants were similarly affected to the 400ml treatment but no viable seed was set. Seed that had formed before spraying was immature with soft awns and no spike on the seed tip. These tended to be held in the flowering head rather than being shed as with normal maturation. Pasture height was 500-600mm.

At 800ml glyphosate/ha, nearly all the speargrass died and seed development was frozen. Pasture height was 400-500mm.

There was a very pleasing effect on the areas sprayed by Daryl. The result appeared to indicate an effective rate of 500ml/ha had been applied although the boom was set to apply a nominal rate of 400ml/ha. There was some variation in efficacy evident from day to day. Seed from sprayed grass did rub off on to sheep, but could not penetrate the fleece.

Photographs and slides have been taken to capture the changes in the sprayed pasture.

John Doyle on a nearby property 'Petro', also boom-sprayed a speargrass pasture with similar effect, indicating that the result was repeatable.

Discussion:

General: - The results of the pasture topping have been most impressive. The broadacres sprayed by Daryl carried several thousand weaners very comfortably with minimal seed pick-up. Tall dangerous patches that were unsprayed were shunned by the sheep in favour of the shorter, denser feed with leafy regrowth at the butts. The tall, unsprayed feed remained uneaten, even when much of the sprayed pasture had been consumed.

The recommended rate of glyphosate now, following this trial, is 600ml per hectare, as this level was gauged to provide best control of the seed with least cost. At this rate, close to optimal feed quality and quantity is attainable.

Note from the table that the available dry matter is about 40% greater than on the unsprayed areas. This is primarily as a result of further tillering following the set back after spraying. This tillering has provided a green pick right through the period that the speargrass would be intensively grazed.

We believe that this reshooting occurred through the effect of chemical following maintaining soil moisture reserves.

The results of feed analysis showed only minor variation between treatments, but are biased towards underestimating the true value of the sprayed pasture. Selective grazing by sheep would allow large volumes of the new green shoots to be eaten, as well as herbage from other available plants such as medic burr, etc.

The pasture ration of sprayed speargrass is likely to be suitable for maintenance only, especially for young sheep as protein levels seem to be quite deficient.

Spray damage to any perennial bushes was not noted in this trial. Bluebush, copperburrs etc. were unaffected. Medics and other broadleaves were set back or killed, depending upon rates used.

Potential Stocking Rates:- Given the situation where there is 2000 kg/ha of dry feed available and that a sheep would eat 1 kg of dry matter per day, then a theoretical stocking rate of 66 sheep per hectare for 1 month is sustainable.

In practice however, trampling, dust and lowered sheep selectivity would preclude such high stocking rates. Figures as high as 20 sheep per hectare for a month or so might, however, be reasonable.

More practical information is needed on this aspect of speargrass control.

Economic Considerations:- A few of the current options are examined to show the obvious benefits involved in pasture topping. (A mob of 3000 mature ewes is used as an example).
i) If little or nothing is done and the sheep become seedy, the consequences are:

Deaths, decreased wool cuts, increased vegetable matter and depressed lamb marking (weaning) percentages.

Monetary losses may be:

Deaths (2%) 60/3000 sheep at \$20 each \$1,200

Decreased wool cut by 5% (normal fleece 6.0 kg at \$5.00/kg) - \$1.50/sheep \$4,500

Increase in VM of wool, 2% up, may decrease wool value by 30c/kg ie - \$1.80/fleece \$5,400

Decrease in lamb marking percentages caused by weight loss in ewes and hoggets, irritation to testes of rams etc. 10% decrease, equivalent to \$1 per ewe \$3,000

Total Cost of Speargrass Infestation \$14,000

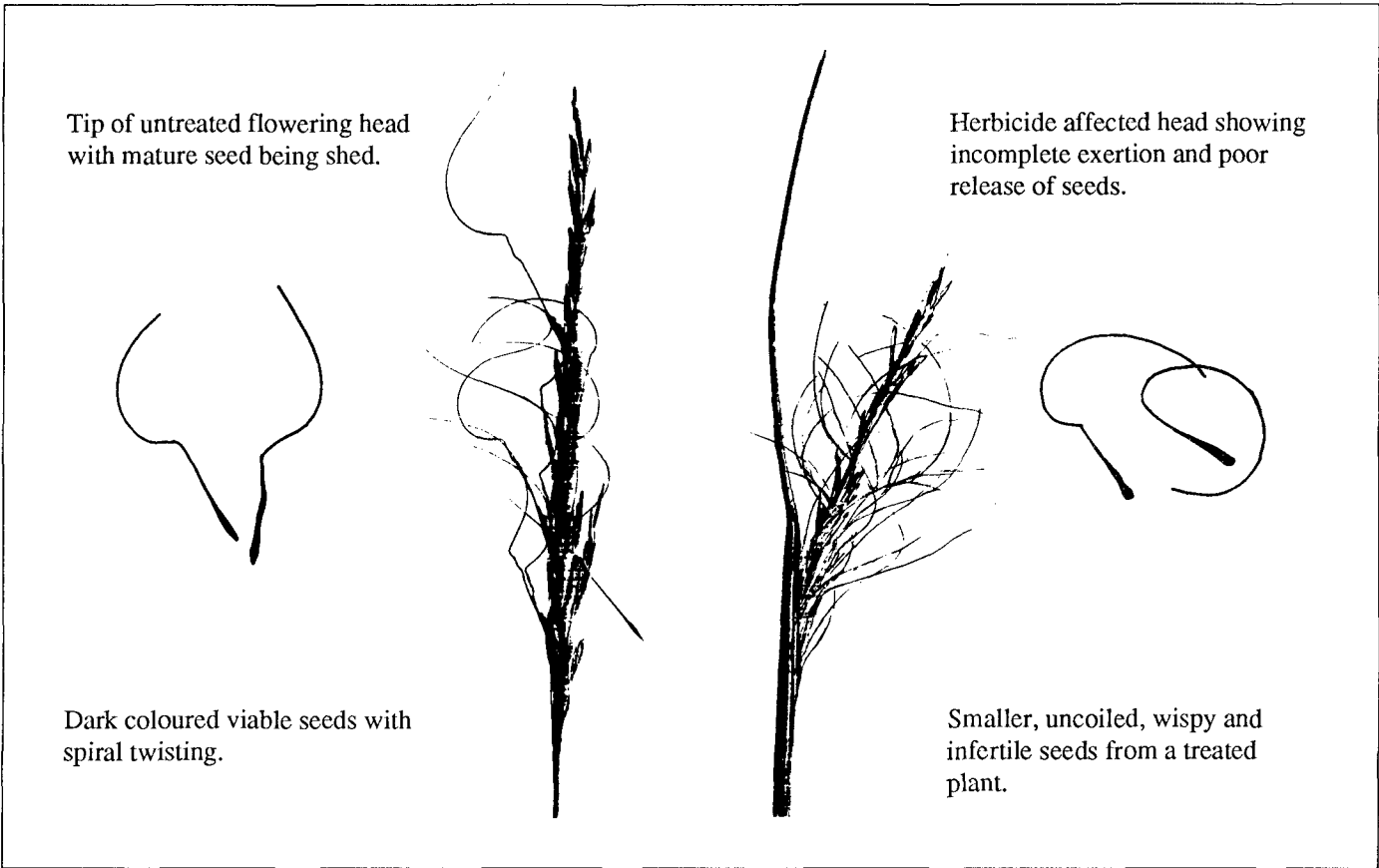
The real situation could be (and often is) much worse than this!

ii) Another alternative could be to agist the 3000 stock, say 200 km away. If the sheep are charged at 15c/head/week for one month, the agistment becomes \$1,800

If you can fit 200 sheep per truck, then the cost of transport of 15 loads is approximately \$6,150

Total cost of this option is \$7,950

Flowering Heads Examined (s. nitida)



iii) If pasture topping were used and an area of 250 hectares (600 acres) selected for spraying, the costs involved would be:

Chemical at 600ml/ha (\$3.50/acre)	\$2,100
Fuel and depreciation on boom (10m boom costing \$5,000)	\$480
Labour cost 10 ha/hr at a rate of \$10/hour	\$250
Total Cost	\$2,830

This is equivalent to \$4.40/acre or \$10.60/ha.

NB Aerial spraying would cost approximately \$6.00/acre (\$15/ha).

This option would have the sheep stocked at 12 to the hectare and provide ample feed.

Pasture topping with glyphosate is clearly a very cost effective option for protecting sheep against seed damage.

Conclusion

This technology is not new for barley grass control, but is an exciting recent development for the control of speargrass seed damage in sheep.

The herbicide rate trial has shown that good seed control of speargrass (*S. nitida*) is possible when sprayed with glyphosate at a rate of 600 ml/ha.

There was a suggestion from Daryl's spraying that the rate trial may have been sprayed a week later than optimal. It would have been better done on the 10th September rather than the 15th when the majority of seed heads were just emerging from the boot.

Susceptible stock (eg weaners) could be introduced to the sprayed area around the middle of October just before seed fall begins in the untreated pastures. Stocking rates of 15 to 20 sheep to hectare should be sustainable for 4 to 6 weeks on dense stands of sprayed speargrass, after which time seed fall is usually complete in untreated areas.

As well as spraying small fenced holding areas for sheep, glyphosate could also be used to advantage for creating seed free tracks coming into water or other heavily used areas. Aerial spraying could well be used to advantage.

Boom sprays have other pastoral uses and could satisfactorily chemically sterilize fence lines or produce fire breaks as required. These alternative uses would assist offsetting the unit purchase cost.

Future work needs to be done on checking the repeatability of these results; looking for variation in the response of other speargrass species; checking sheep performance on sprayed pastures; and monitoring the environmental safety of these practices.

Glyphosate is not registered for use on *Stipa* spp. but this could be something to look forward to in the future.

REVISED PUBLICATION

The University of New England has printed a revised edition of "Grasses of New South Wales". The book is designed to help students, agriculturalists and anyone interested in vegetation to identify grasses growing in NSW. Copies can be obtained from The Cashier, The University of New England, Armidale, NSW. 2531.

MEETING RANGELAND CHALLENGES IN SOUTHERN AFRICA IN THE 1990's

An international conference on "Meeting rangeland challenges in Southern Africa in the 1990's" will be held at the CSIR Conference Centre in Pretoria, South Africa from 6 to 11 May 1991. Further details can be obtained from the conference organizers (CSIR, P.O. Box 395, Pretoria, 0001 South Africa - Fax 012862856) or the South African Embassy, Canberra.