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RANGE MANAGEMENT NEWSLETTER

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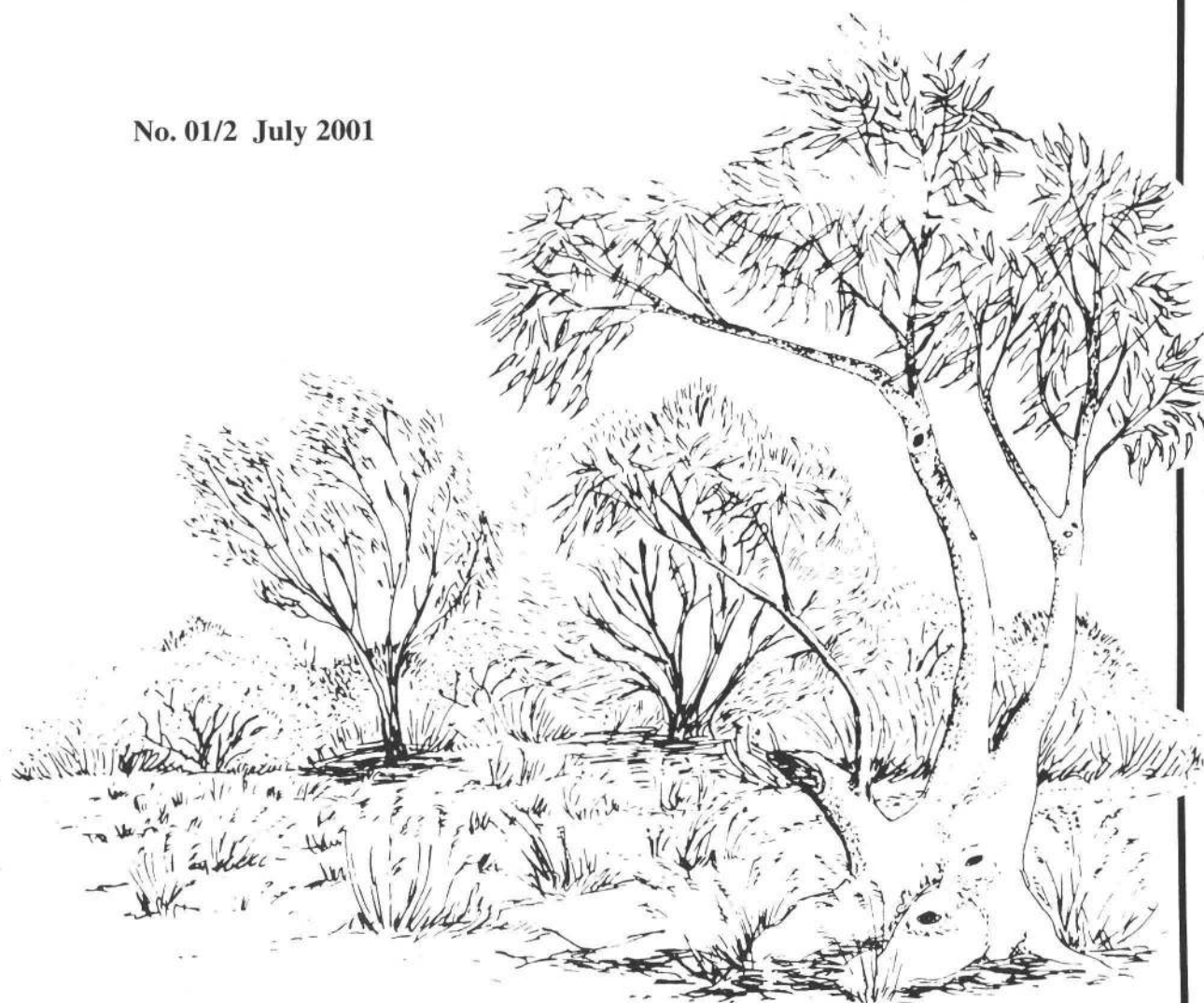


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FROM THE EDITOR

Noelene Duckett, 5 Amery Street, Ashburton VIC 3147

Welcome to another issue of the Range Management Newsletter. This issue includes a number of articles which should interest readers.

Firstly, there is a very interesting article from Gary Bastin and his colleagues examining the use of ponding banks to aid recovery of degraded land. This investigation, the first such study carried out in central Australia, looks at the soil chemistry, microbial activity and vegetation behind ponding banks varying in age from recently constructed to 15 years old. The simplified outcome of this study was that ponding banks can be used to restore pastoral productivity if they are properly sited and constructed.

Rodger Tynan has written an article exploring some of the issues involved in accreditation for ecologically sustainable rangeland beef production. While Rodger describes some possible accreditation tools for *clean and green* beef, he also highlights a few of the challenges to overcome before a credible certification system can be put in place. Hopefully this article will continue to be debated in future issues of the newsletter.

This issue also contains an update of progress in the rangeland monitoring activities of the National Land and Water Audit. Maria Kraatz, the new Coordinator of the Rangeland Monitoring Theme, and Rochelle Lawson, one of the Audit Project Managers, describe some of the past achievements and also future activities for 2001/02. As some of you may know the Australian Natural Resource Atlas, the interactive web-based information system developed during the Audit, is now up and running. Why not check it out at www.nlwra.gov.au/atlas.

Some important ARS Council information can also be found in the issue of the newsletter: there are highlights and reports from the AGM held in May, descriptions of the recent changes to the ARS constitution and information about why the travel and scholarship grants have been deferred this year. Sandra Van Vreeswyk also updates us on plans for the next Biennial Conference in Kalgoorlie in September 2002.

In this issue I have continued with the Information Snippets section I started in the previous issue of the newsletter. I hope this will become a regular feature, containing a variety of short items of interest to readers. Contributions to this section would be welcomed.

Finally I must tell you that changes are afoot for my family and I once again with a likely move overseas. I am not sure how this will affect my editorship of the newsletter at the moment. Over the next few months my email address (nduckett@ozemail.com.au) should still work – alternatively you can contact Leigh Hunt, Chair of the Publications Committee (huntla@bigpond.com).

Please note that the deadline for the next issue will be mid-October.

SOIL AND VEGETATION RECOVERY FOLLOWING WATER PONDING

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Summary

Ponding banks that are properly sited and constructed are an effective means of restoring pastoral productivity to eroded and degraded land. Banks work because they arrest the flow of water, halt erosion and recreate fertile soil patches. Eventually, moisture is able to infiltrate a surface that may have been impermeable, and deposited sediment slowly fills in former rills and gullies. Plant nutrients and seeds may also be deposited in sediment and litter.

Information about soil chemistry, microbial activity and vegetation collected behind ponding banks of varying age built at Woodgreen Station, central Australia, show that:

- The highest levels of plant nutrients (organic carbon, available nitrogen and available phosphorus) occur near the surface of soil profiles, even on severely degraded soils.
- Following ponding, plant nutrients start to accumulate at the soil surface within the ponded zone. This process is slow at first and is probably directly related to establishment of the first colonising (or pioneer) plant species. These plants extract phosphorus from the soil and their death and decay, including their roots, add phosphorus, nitrogen and organic carbon to the upper soil profile. Slowly accumulating nutrient levels and increased moisture availability allow plants of higher successional order to establish and contribute increasing amounts of plant nutrients.
- The highest concentrations of organic carbon, available nitrogen and available phosphorus occurred at the soil surface near the oldest (15-year) bank. Available P was near the highest level recorded amongst Australian rangeland soils while the concentrations of available N and organic carbon were moderate by rangeland standards.
- Soil microbial activity was low in the early stages of vegetation recovery behind the younger banks (0-5 years) and was much higher within the ponded zone of the oldest bank. These data indicate that soil microbial fauna which break down litter and plant roots become much more active, and effective, as organic matter (i.e. vegetation residue) accumulates.

- The endpoint of successful regeneration behind ponding banks at Woodgreen is the establishment of vigorous native palatable perennial grasses. These grasses were most abundant (in terms of cover) within the ponded zone of the oldest bank. This forage contributes significantly to the constancy of beef production on Woodgreen.

Introduction

In many parts of the rangelands, grazing is concentrated on "fertile patches". These occur as islands of enriched soil growing more palatable vegetation amongst extensive areas of infertile soil. Excessive grazing, particularly during droughts, can degrade these more productive areas. Degradation occurs through reduced cover and vigour of pasture and loss of palatable perennial species. Increased runoff from sealed surfaces may initiate or accelerate erosion. Rainfall is lost to creeks and rivers rather than being redistributed as sheet flow across the former gently undulating landscape. This process is self-perpetuating once a threshold of runoff is exceeded:

- concentrated water flow in rills and gullies transports greater volumes of sediment, increasing erosion and loss of nutrients for plant growth;
- the proportion of runoff as overland flow decreases and runoff becomes increasingly concentrated in rills and gullies cutting down into, and therefore bypassing, former runoff or sink areas; and
- the sinks decline in area while the grazing pressure continues to increase on them – further accelerating degradation.

Ponding banks are an effective method for arresting this degradation process and reclaiming eroded country (Cunningham, 1987; Rhodes, 1987; Bastin, 1991). In central Australia, banks have been built over the last 30 years to effectively reclaim much of the formerly productive country on Woodgreen (formerly Atartinga) Station (Purvis, 1986) and are now being constructed by several other pastoralists in the region.

Bob Purvis, the owner of Woodgreen, has significantly modified the location, design and construction of banks from that first recommended by soil conservation officers to maximise their effectiveness on his station (Purvis, 1986; Bastin, 1991). Small banks are built near the top of degraded catchments and these slow the downslope flow of water. These smaller banks allow longer banks ponding larger areas to be safely built on flatter country at the base of slopes (Bastin, 1991).

Design and Location of Banks

Banks are typically built on gently sloping ground (<2% slope) and are often constructed above gully heads that are migrating up-slope. This diverts water out of the gully head and halts such active erosion.

Banks are built slightly off the contour so that the deepest area ponds water to a depth of 100 – 150 mm (Fig. 1a). Excess water is spilt around one, or both, ends of the bank

into lower banks before it is safely disposed of into a stable (flat and/or well-grassed) area.

Once suitable locations in the landscape are identified, the line of the bank is surveyed with a dumpy level and staff, or, in these days of modern technology, perhaps with a vehicle-mounted laser level (Salmon, 1987). The area below the bank is ripped and soil pushed into the bank with suitable earth-moving machinery.

Recovery Process

Water accumulates (ponds) over a variable area above the bank depending on rainfall, slope and amount of vegetation cover. Intuitively, vegetation recovery would seem to occur through:

- Slowing of water flow leading to increased infiltration and soaking of the soil. This may help leach salts down the profile where salinity is a problem (Rhodes and Ringrose-Voase, 1987).
- Wetting of the often formerly impermeable soil profile causes hard-setting loam soils to swell. Cracks then form as these soils dry and shrink. This swell-and-shrink cycle creates a "nutty" soil structure where infiltration is increased and plant roots are able to penetrate and access the increased soil moisture stored at depth.
- Initial colonisation by pioneer species. Decomposing plant roots and accumulating litter both add organic matter and contribute to slowly increasing soil fertility. Subsequent recovery then occurs via plant succession as increasing moisture availability and soil fertility enable perennial species to establish and increase (Bastin, 1991; Rhodes, 1987).

Ecologically, the above processes are intuitively plausible. However, there are few studies that have quantified the rate at which restoration processes occur with ponding, and none in central Australia. In this article, we report on levels of soil nutrients and vegetation attributes above banks of varying age at Woodgreen.

Methods

Ponding banks

Four banks of varying age (time since construction) were selected on Woodgreen Station, 180 km north of Alice Springs in the southern half of the Northern Territory. These bank locations were named after their paddock of origin and age:

1. Unrappa New - a recently constructed bank (abbreviated to Un-0),
2. Unrappa Old - two-year old bank (Uo-2),
3. Yerrick - five-year old bank (Ye-5), and
4. Aldardrama - 15-year old bank (Al-15).

At each location, five lines were permanently positioned for sampling the soil and vegetation. Each line extended from the bank directly upslope (Fig. 1b).

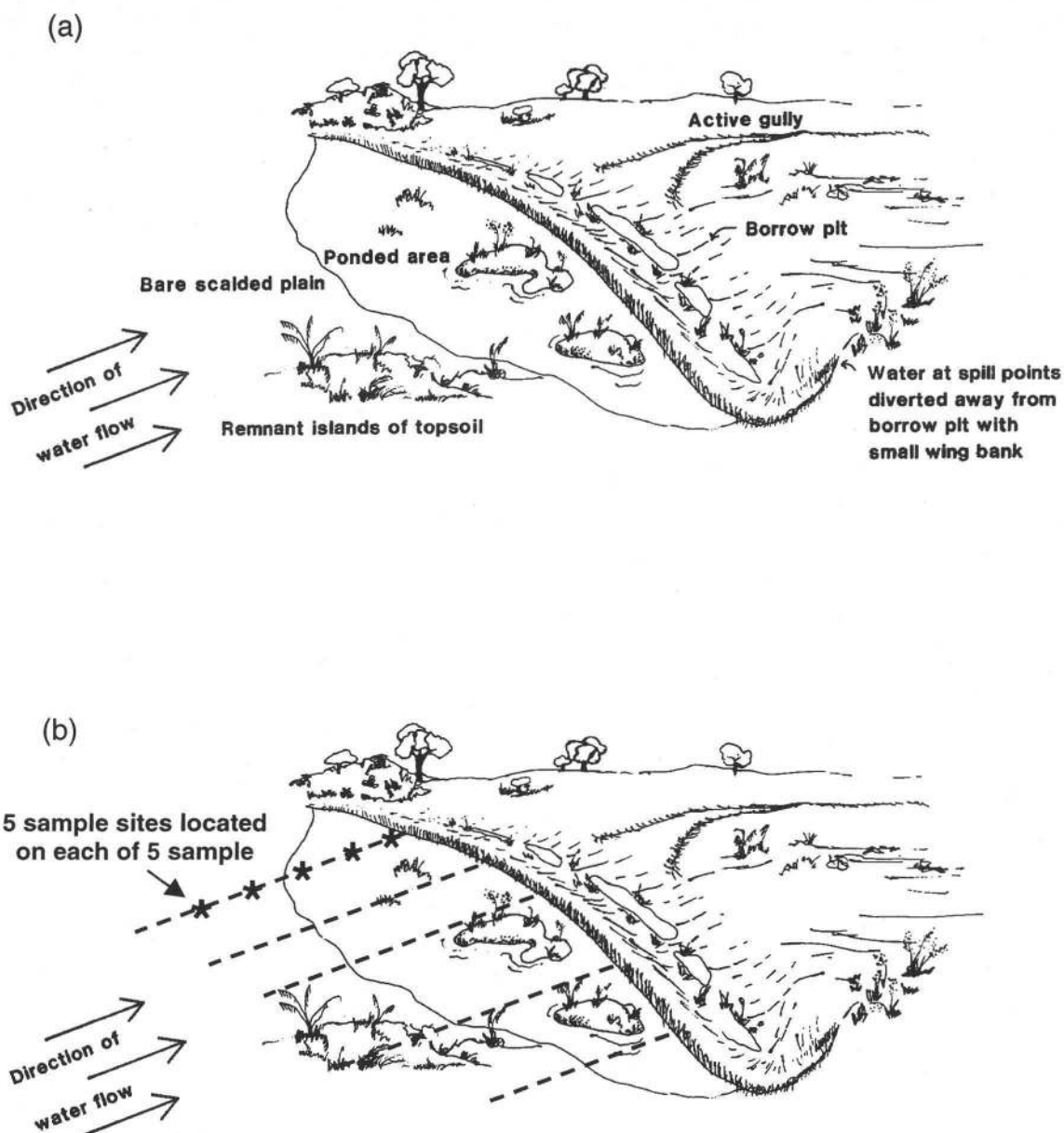


Figure 1. Design of (a) a typical ponding bank on Woodgreen and (b) location of soil sampling sites and vegetation sampling lines.

Soil measurements

Five sampling sites were located along each line. For all but the youngest bank, one site was about 3 m from the foot of the bank, two others within the ponded (restored) zone and two above the ponded area (i.e. source area and not subject to restoration activities). Because recovery had not yet commenced at the youngest bank, sample distances similar to Uo-2 were used – ensuring that the furthest upslope positions were well above any expected ponding level.

At each sampling position, 100-150 gm of soil were collected at 0-1, 1-3, 3-5 and 5-10 cm depth. Each sample

was analysed for organic carbon, available nitrogen and available phosphorus (see Tongway and Hodgkinson, 1992 for details). Soil microbial respiration was also measured at each soil sampling location to provide a measure of microbial activity. (The procedure is described in Tongway and Hodgkinson (1992). Briefly, we primed microbial activity at each site by wetting the soil and then collected carbon dioxide evolved by microbial respiration in dilute potassium hydroxide. The concentration of CO_2 was measured with an EC meter and calculated in units of $\text{mg CO}_2 \text{ m}^{-2} \text{ h}^{-1}$.)

Vegetation measurements

At each sample line, aerial cover by species was estimated in contiguous 1 m² quadrats extending from the bank edge to well past the highest soil sampling position. Here, to simplify data presentation, we report only the cover of long-lived perennials present in the vicinity of each soil sampling location.

Results

Soil chemistry related to fertility

Distribution of nutrients down the soil profile

At almost all sampling sites above all banks, the highest levels of organic carbon, available nitrogen and available phosphorus occurred at the soil surface (i.e. the 0-1 cm layer). This result is similar to that previously reported by David Tongway (Tongway and Ludwig, 1990) and others for rangeland soils elsewhere in Australia. The level of each nutrient at the soil surface was similar at all sampling distances from the youngest bank (Un-0). These data indicate that prior to ponding, there was no pre-existing spatial pattern in the distribution of organic carbon, available nitrogen or available phosphorus.

Non-ponded areas as a baseline

Amongst sampling sites that never ponded, the Yerrick bank (Ye-5) had the lowest levels of organic carbon (0.11-0.13 %), available nitrogen (0.79-1.12 ppm) and available phosphorus (5.3-9.8 ppm). The carbon values were extremely low, even for arid zone soils, consistent with the soils being degraded. The Yerrick bank also had the smallest gradient in nutrient concentration down the profile suggesting that it was the poorest soil of those examined. Aldardrama (Al-15) had the highest levels of available phosphorus in the non-ponded zone (30.5 ppm at surface, 15.1 ppm at depth) indicating that the soil in this area was inherently more fertile than the soil at other locations. Both Unrappa banks had the highest levels of organic carbon suggesting that the general vicinity, as indicated by sampling the source area, had greater biological activity and was less degraded than the Yerrick and Aldardrama areas prior to reclamation.

Increased fertility and microbial activity in the ponded zone

Ponding consistently increased the concentration of plant nutrients at the soil surface. Surface organic carbon and available nitrogen accumulated rapidly in the early stages of recovery following ponding (Fig. 2). The data for Un-0 suggest that surface nutrients were evenly distributed prior to ponding and thus nutrient concentrations in the source areas of other banks should have approximately indicated the base level for each area prior to recovery. The level of surface organic carbon near the bank at Uo-2 was 53% higher than the mean of that present at the two most distant sample sites. Ye-5 was 363% higher at the bank than its base level derived from the two source areas. Sample sites 2 and 3, both within the ponded zone, were 326% and

242% higher respectively than the base level. Al-15 was 160% higher at the bank, 71% higher at site 2 and 54% higher at site 3 than the mean of the samples from the source area. The increase in available nitrogen near each bank compared with the corresponding source area was Un-2, 39%; Ye-5, 422%; and Al-15, 238%.

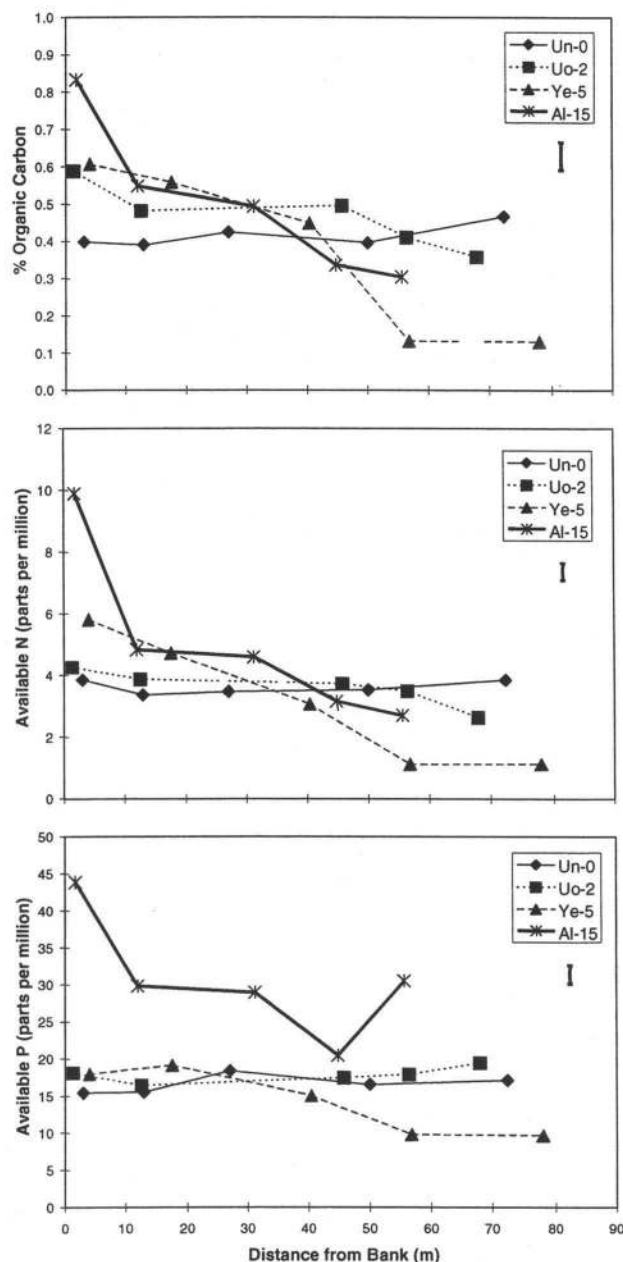


Figure 2. Levels of organic carbon, available nitrogen and available phosphorus at the soil surface at the different distances from four ponding banks at which soil samples were collected.

The I bars indicate approximate standard errors and can be used to judge which means are significantly different from each other.

The concentration of available phosphorus also increased with length of ponding (Fig. 2) but more slowly than organic carbon and available nitrogen. Available P was up to 12% less than that on the source area at Uo-2 but

increased to 85% and 72% higher near each bank at Ye-5 and Al-15, respectively.

Soil microbial activity, as measured by CO₂ respiration, was substantially higher at Al-15 compared with younger banks (Fig. 3). At these younger banks, respiration rates within the ponded areas of Ye-5 and Uo-2 were a little higher than that measured at the youngest bank, Un-0. There were some trends with distance from the bank; most significantly, respiration rates on the non-ponded areas of Al-15 and Ye-5 were considerably lower than those measured within the ponded zone of each bank.

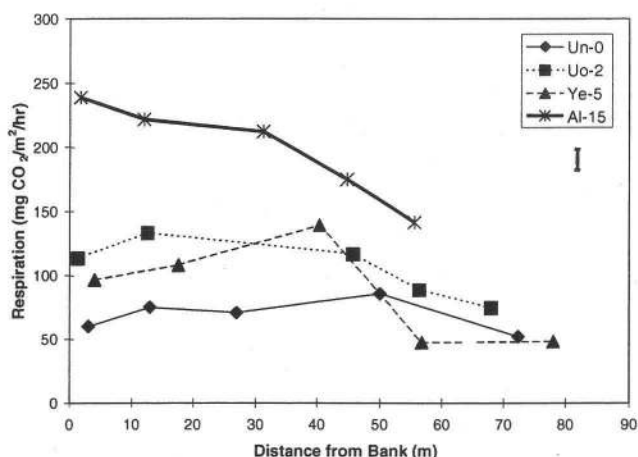


Figure 3. CO₂ respiration as a measure of soil microbial activity at different distances from four ponding banks. The I bar indicates the approximate standard error and can be used to judge which means are significantly different from each other.

Vegetation response

Vegetation cover of all species at the soil sampling sites was higher within the ponded area compared with the source area once recovery was initiated following the first ponding (data not shown). Total cover also increased with age of bank (Photo 1). The cover of ephemerals and annuals, containing the first colonising species of bare soil, propagated away from the bank as bank age increased:

- at Un-0, early colonising species comprised the greater part of total cover at all soil sample sites and cover was highest at the two sites closest to the bank;
- Uo-2 had highest cover of ephemerals and annuals at the intermediate sampling distances (sites 2, 3 & 4); while
- the two oldest banks had highest cover of early colonising species near the edge of the ponded area (site 3).

Most significantly, there was a clear trend in the cover of long-lived perennial grasses with distance from bank and age of bank (Fig. 4). These grasses were mainly the native perennials silky browntop (*Eulalia aurea*) and curly windmill grass (*Enteropogon acicularis*), and buffel grass

(*Cenchrus ciliaris*) hand broadcast into loose soil immediately following construction of each bank. Cover of long-lived perennials was less than 10% near the bank at both Ye-5 and Uo-2 and was barely recorded at the two further soil sampling sites within the ponded area of each bank. By comparison, cover of long-lived perennials was very high near the bank at Al-15, moderately high at the second soil sampling site and just present near the ponded margin (Fig. 4).

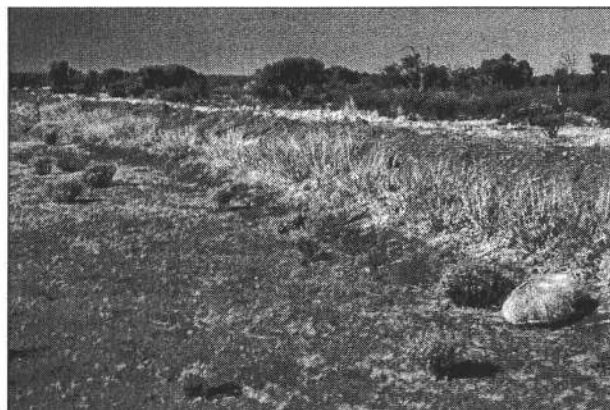


Photo 1. Un-0 (top) and Al-15 (bottom) ponding banks. Both photos were taken one year after the soil measurements during which time, buffel grass had established along the Un-0 bank following initial ponding.

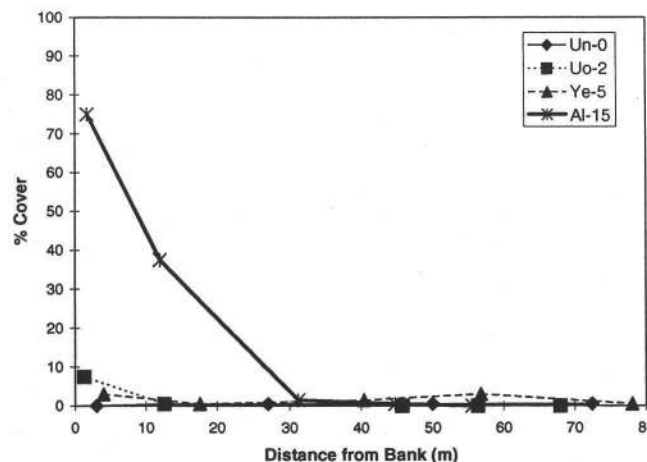


Figure 4. Percentage cover of long-lived perennials at the locations of soil sampling sites from four ponding banks.

Note that perennials (mainly buffel grass) were only present at the bank at Un-0.

Discussion

Ponding banks at Woodgreen are used to halt erosion and increase the availability of long-lived palatable forage for grazing by beef cattle (Purvis, 1986). The soil chemistry data presented here show that reinstating vigorous biological activity has led to much greater rates of nutrient cycling and formation of fertile zones.

Restoration via correctly engineered banks works because harvesting water, and small amounts of sediment, creates a favourable environment to reinvigorate biological activity. Establishment of the first coloniser plants starts the accumulation of organic carbon and plant-available nitrogen. Slowly accumulating plant nutrients and assured moisture availability following rainfall further increase biological activity which, in turn, leads to much greater rates of nutrient cycling. The end result is the restoration of fertile islands of a different shape, and at a different scale, to those that formerly existed in the landscape.

Management of water flow is the key process in the early stages of recovery following ponding. For example, cattle were removed from the Yerrick area for 25 years prior to building banks with no appreciable change in the eroded landscape (Purvis, 1986). The hardsetting nature of the scalded soils meant that rainfall was rapidly lost to rills, gullies and creeks. Although we did not measure infiltration rates directly, priming of microbial activity by initial wetting indicated that the non-ponded area at Ye-5 had an infiltration rate of <1 mm per day (amongst the lowest we have observed in rangeland Australia). In contrast, water added to prime respiration sites in the ponded zone indicated infiltration rates approaching 20 mm per hour. This evidence at the fine scale is consistent with Bob Purvis's experience and long observation that retention of water above banks reinstates infiltration, albeit often at a very slow rate (Purvis, 1986; Bastin, 1991). Cracks form as clays shrink on drying and subsequent wetting then occurs more rapidly as the swell-shrink cycle continues. The increasing vascular plant activity augments this mainly physical process.

Successful establishment of the first colonising species immediately contributes to the slow increase in the concentration of plant nutrients. Plants extract phosphorus, nitrogen and other nutrients from the soil and accumulate carbon through photosynthesis. Death of these first pioneer plants then releases these nutrients near the soil surface as microbes decompose litter. Significantly also, available nitrogen, phosphorus and organic carbon slowly accumulate in the upper soil profile as plant roots die and decay. Increasing nutrients and more assured moisture availability enable longer-lived species to establish, which with colonisers contribute to greater plant cover and increasing biomass. This further enhances accumulation of plant nutrients in the upper soil profile, again through decay of both surface litter and plant roots.

Seemingly, when some threshold of nutrient concentration and water availability is reached, desirable native perennial grasses are able to establish and persist and it is likely that soil fertility then rapidly increases as these robust grasses accumulate significant amounts of above and below ground biomass.

The respiration data quantify the biological activity of microbial soil fauna, as distinct from that of plants. In the early stages of plant recovery, microbial activity was low (Fig. 3). There were also slight differences with distance from individual banks (e.g. Ye-5) that may have been associated with depth of ponding and degree of waterlogging. The biological activity of microbial decomposers increased significantly as plant organic matter accumulated (ponded zone at Al-15), a direct result of greater carbon substrate available for decay.

Ponding banks are of greatest importance to stability of pastoral production at Woodgreen because they enable long-lived perennial grasses to progressively establish as soil quality improves (Fig. 4, Photo 1). Palatable varieties of buffel grass, sown at the bank edge, are the first to establish. This species slowly spreads from the bank onto higher areas that are inundated for only short periods as soil nutrients start to accumulate. Spread of this species then tends to be naturally checked by rapidly establishing native perennials as further recovery occurs away from the bank. Dominant amongst the native perennials are moderately palatable curly windmill grass and silky browntop.

Robust perennial species increase the resilience of pastoral production in two ways. Firstly, they provide persistent dense cover decreasing the risk of banks being breached following intense or sustained rainfall. When sufficient banks are built and effectively established, they can ensure catchment stability by (a) eliminating accelerated erosion, and (b) retaining water and nutrients entrained in sediment to maximise plant growth. Secondly, perennials respond rapidly to small rainfall events, common in dry and drought years, to produce palatable and nutritious "green pick" for cattle. Rainfall use efficiency (mass of pasture per mm of rainfall) is substantially improved. Cattle continue to grow or reproduce satisfactorily in these dry years largely because of this continuity and quality of forage supply (Purvis, 1986). This contributes to more constant turnoff and stability of annual income.

Thus, the recovery processes in soil and vegetation behind ponding banks described here are important contributors to the resilience of the environmental and economic components of pastoral production in the arid zone.

Yerrick Postscript

In a footnote to the Yerrick story, Bob Purvis reports that much of the better country surrounding ponding banks in Yerrick Paddock now has substantial grass cover. This has occurred with the past two wet summers and follows the initial 25 years of destocking and almost another 25 years of strictly controlled light and intermittent grazing. It appears that the formerly degraded soil has passed some threshold of recovery, a seed bank has slowly accumulated

and excellent seasonal conditions have allowed grasses to proliferate. Fifty years is a long time to wait but this Yerrick example shows that we should be cautious about writing severely degraded areas off as being permanently "stuffed". Time and judicious management can heal many injuries.

In a further postscript, Bob recognised that waterlogging could impede recovery when building banks on the impervious eroded soils at Yerrick. He thus installed PVC pipes through some banks so that impounded water would drain in three to four days. Bob says that areas above these drained banks have recovered more slowly than where no drainage was installed.

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BEEFECOLOGY – A TASTE OF THE FUTURE?

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Introduction

Imagine a UK supermarket shelf lined with packages of Australian rangeland organic beef but also carrying certification that it was produced using environmentally, or even better, ecologically sustainable production methods (Beefecology). Imagine the premium, both to the producer and the environment, generated through the market place. Could such a product and certification system become a reality? It would certainly challenge conservation agencies to define ecologically sustainable production (ESP) methods. Which ecological framework would be chosen as the most appropriate, equilibrium or non-equilibrium, and would the market place care anyway? Would it use the concept of properly functioning ecological processes (Ludwig *et al* 1997) to determine if the production systems were ecologically sustainable?

I suggest that the above scenario is achievable, as some producers are already targeting overseas niche markets for organic beef. The *clean and green* bandwagon is being promoted by many industries, including the wine industry in Australia and New Zealand. The *clean* image can be verified by chemical residue analysis of finished products conforming to international standards. However, the *green* side of the equation lacks a clear definition, is open to misuse and lacks credibility. If you say you are green you will need credible evidence to back up these claims to be accepted internationally.

The green record

We have to admit our past record is pretty shaky. Land degradation in Australia, and in particular South Australia, has a long history (Tynan 2000). Early regulations (1851) required pastoral lessee to stock at the rate of 100 sheep per square mile as a minimum! Three Royal Commissions into the SA Pastoral Lands (1867, 1898, 1927) reported widespread soil erosion resulting from inappropriate grazing management practices. Ratcliffe's (1936) study in SA on soil erosion led to the introduction of stocking limits for pastoral leases in an attempt to reduce the damage, however the decline continued. The fundamental problem was defined as too many stock on permanent waters for too long. Feral predators, foxes and cats, have also severely degraded our biodiversity quality.

More recently in South Australia, as part of a legislative requirement, a lease assessment program has been completed that resulted in every paddock on each pastoral lease being inspected and evaluated for land condition. The results reveal most leases were well managed however, instances of paddock based land degradation were detected on many leases. The administration spends double the amount it receives in rent trying to police and detect management practices that result in land

degradation (Tynan 2000). At present there is little direct economic reward, or recognition, in the market place for pastoralists to pursue environmentally sustainable practices. It would be far better for the market place to provide the incentive for this through premiums for accredited products.

Accreditation tools

There are several tools available that could be integrated to assist the administration to predict the likelihood of degradation. These same tools could also be used to support an ESP accreditation system.

GIS

The lease assessment program in South Australia established a Geographic Information System (GIS) that shows every waterpoint, fenceline and track on every pastoral lease in SA covering over 409,000 km². It is supported by a large database of ecological information, photopoints, paddock based land management issues and stock figures. The area has been broadly mapped into land systems depicting areas with similar geology and landscape characteristics. A major benefit of a GIS is that other digital information can be integrated with this system, particularly satellite imagery and modeling packages.

AussieGrass

This program (www.dnr.qld.gov.au) uses complex modelling (Hall *et al* 1998) to supply digital images (5km² resolution) of estimated total standing dry matter (TSDM). It is linked to climate forecasting and enables agencies to determine, on a fortnightly basis, where pasture growth is low in response to rainfall. Other images are also available and information can be down loaded from a web site and integrated with GIS layers. This is a powerful tool as it allows the administration with limited inspection resources to target areas with the highest risk of degradation. The information could also help pastoralists to plan flexible grazing strategies to match predicted biomass availability.

Grazing Gradient Analysis

This method uses satellite images obtained after large rainfall events to indicate change in vegetation cover with distance from water and to show where pasture response (*resilience*) to rainfall is above or below expected values (Bastin *et al* 1993). Areas beyond the normal grazing range of stock demonstrate an ecological benchmark that could be used as a tool in an accreditation system. The degree of departure from this benchmark would indicate the level of sustainable management. A large area of South Australia was assessed using this method and it could be applied to many other regions (Bastin *et al* 1998). The method also has application for biodiversity planning within a property or region by identifying areas remote from water. This may be difficult in areas where leases are highly developed and all areas are normally accessible to stock.

Biograz

This program is an extension of research conducted by CSIRO (Landsberg *et al* 1997) in collaboration with the South Australian Department of Environment, Heritage and Aboriginal Affairs (now Primary Industries and Resources South Australia), and could form an important information base for an ESP system. The impact of grazing on biodiversity was investigated through evaluating changes in biodiversity indices with distances from water. A major component of the research was to work with the pastoral community to identify areas that could be managed for conservation objectives. This would involve a district plan that enabled a proportion of the landscape within each land type to remain beyond the normal grazing range of stock. If successful, this project would enable products from this area to be promoted under a *clean and green* label with a plan for ecologically sustainable production, backed by credible scientific research.

Biological Survey

A Biological Survey of South Australia (Forward and Robinson 1996) is also being conducted to provide an inventory of biodiversity. This program, which provides important material on the status of habitat and wildlife could form an important link in an accreditation scheme.

Facilitating Accreditation

I believe that it would be possible to implement an accreditation system with the support of government administrators and the pastoral industry. Firstly, administrators could facilitate and provide guidance for an accreditation system and assist with its implementation. They could ensure that the system was credible and that it was backed up with regular inspections and monitoring. This would be possible in states such as South Australia where government has recently completed a thorough lease assessment program, established a GIS, and installed a monitoring and surveillance system.

For an accreditation system to be successful, the pastoral industry would also need to establish some stringent guidelines. The industry would need to develop an environmental code that incorporates environmentally sustainable management principles which have a strong scientific basis. The industry may also need to work more closely with conservation agencies to establish wider ecological criteria. For example, pastoralists may require information and advice on wildlife habitat management and biodiversity. Additionally, it may be appropriate to develop a hierarchical system of accreditation, whereby the pastoralist could chose the appropriate level. In this case, sustainable, environmentally sustainable and finally ecologically sustainable levels would require increasingly stringent requirements.

Is it possible?

There are of course many gaps in our ecological knowledge and it would be a courageous decision for a rangeland scientist to certify that grazing management

practices are environmentally or ecologically sustainable. Equally, it would be inadvisable for the industry to claim they were environmentally sustainable without credible evidence. However, the onus of proof is on the industry if it wishes to convince the market place of its credentials. There is a challenge here for scientists, pastoralists and administrators. Ecologically sustainable production offers potential benefits for pastoralists through market premiums for the products and also benefits for conserving biodiversity. The public should also feel confident that rangeland resources are well managed. Ecologically sustainable production appears to be economically, environmentally, socially and most importantly, politically acceptable. Pass the Pinot noir and sauce please.

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THE AUSTRALIAN COLLABORATIVE RANGELAND INFORMATION SYSTEM

Progress in rangeland monitoring activities of the National Land and Water Resources Audit

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Rochelle Lawson, Project Manager, National Land and
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2601

The development of an Australia-wide rangeland monitoring system able to meet the needs of managers at a wide range of scales and for a variety of objectives is recognised as a key national challenge.

The Rangeland Monitoring Theme is one of a series of monitoring, assessment and reporting initiatives fostered under the National Land and Water Resources Audit (Audit), a program of the Natural Heritage Trust. The goal of this initiative was:

To define elements of a comprehensive monitoring and reporting program that provides regular Australia-wide reports and provides for better decisions to be made affecting land use and management within Australia's rangelands.

Over the last four years, much progress has been made towards this goal. Major project areas included:

- assessment of change in ecosystem function, trends in intensity of use and history of climate and fire;
- trends in economic, social and institutional factors influencing land use and management in the rangelands;
- developing an adaptive framework for monitoring biodiversity in rangelands; and
- packaging and presentation of information.

These project areas have previously been described in more detail in this newsletter (00/2, 99/2) by Ian Watson, the former Coordinator for the Audit's Rangeland Monitoring Theme. (Ian has now returned to full-time commitments with the Western Australian Department of Agriculture, but will continue to be involved in Audit activities.)

Further information regarding the above projects will soon be available with the release of the Audit theme report *Rangelands - Tracking Changes: The Australian Collaborative Rangelands Information System*. This report outlines the key achievements of Audit projects, describes information products integral to an Australia-wide monitoring system and proposes a coordinating mechanism for bringing together rangeland information from a wide range of sources. The report also summarises state and Northern Territory rangeland monitoring

activities. In the meantime, individual project reports can be found on the web at www.nlwra.gov.au/atlas.

Key Achievements

The key achievements of the Audit's Rangeland Monitoring Theme have been:

- the development of a framework for monitoring biodiversity within the context of overall rangeland management;
- demonstration of an operational system using remote sensing that enables monitoring across huge areas of rangelands in northern and central Australia; and
- development of an approach to rangeland management driven by landscape function rather than use.

More specifically, for example, Audit projects have led to the development of data sets containing context information such as land tenure, land use and seasonal quality and have ensured that good linkages to other work such as fire scar mapping and Aussie GRASS pasture monitoring are in place. A set of indicators for monitoring change in the social and economic factors that have an impact on improved land management have also been developed, in recognition that such change can be just as important to rangeland management as biophysical change.

While these technical achievements are important, the Audit fostered the collaborative interaction of state/NT and Commonwealth agencies. There is now a much better understanding of the monitoring systems currently in place and a great willingness to share and pool data to provide an Australia-wide picture of change.

More about the Information System

Many of the issues facing Australia's rangelands extend across jurisdictional boundaries. A coordinated and collaborative Australia-wide information system is required to integrate data management and reporting across the states and the Northern Territory. The aim will be to foster efficient and effective monitoring and assessment across Australia's rangelands, making information readily available and providing regular updates.

The system will build on capabilities established as a result of Audit activities and advocate further investment in rangeland assessment and management. A series of interlinked activities is proposed to produce regular standard reports, as well as other specifically commissioned products as demanded by client need. The latter may involve, for example, biodiversity monitoring, the expanded application of remote sensing techniques or reports produced from existing data for new or different client needs.

Information will be collated, interpreted and presented at a range of scales based on data collected from existing activities and will be disseminated through the Australian Natural Resources Atlas (see below) and through regular

assessments on the condition of Australia's rangelands. An *Operational Manual* has been developed specifying standards for data collection, analysis and reporting.

In the early stages, the information system will obviously not be able to meet the needs of all its clients. The aim will be to provide a foundation upon which better information, analysis and reporting can be continually developed.

An Australia-wide collaborative approach to progress the work done by the Audit to date is currently being considered by national Standing Committees comprised of senior representatives from all jurisdictions.

2001/02 Activities

State/Northern Territory projects

To assist in the implementation of the information system, the Audit has funded activities for 2001/02 in New South Wales, Queensland, South Australia, Western Australia and the Northern Territory, the aims of which are to:

- develop a framework that links:
 - existing pastoral monitoring programs;
 - contextual information;
 - new monitoring data from a range of agencies; and
 - provides for regular regional and state/Northern Territory-wide rangeland reports;
- define and plan activities and data collection protocols for biodiversity monitoring; and
- improve data management so that synthesis and reporting of existing activities can be efficiently undertaken as part of the information system.

Aboriginal information needs

Roland Breckwoldt (RPM) and John Childs (Tropical Savannas CRC) have commenced an Aboriginal information needs project to:

- determine the special information requirements and data needs specific to Aboriginal land use and management (eg bush tucker, cultural resources).
- determine the special requirements of Aboriginal land managers for information dissemination;
- identify areas of skills development among Aboriginal land managers required in order to build an appreciation and understanding of natural resource management issues in the rangelands and the links to community values (eg health); and
- better understand Aboriginal land ownership across Australia's rangelands and the implications for land management.

Further information regarding this project can be sought from Roland (Ph: 02 6232 6956).

Australian Natural Resources Atlas

The Australian Natural Resources Atlas (Atlas) is an interactive web-based information system, which provides

information to aid decision making across all aspects of natural resource management. It can be found at www.nlwra.gov.au/atlas.

The Atlas covers the broad categories of water, land, agriculture, people and ecosystems and can present information at a local, regional or national scale. A data library supports the Atlas, with links to Commonwealth, state and Northern Territory data management systems. A feature of the Atlas is that it provides users with the ability to produce summaries and maps according to specific queries. The Atlas is continually updated as new information becomes available and will be the key reporting mechanism of the information system.

The National Rangeland Monitoring Coordinating Committee

The National Rangeland Monitoring Coordinating Committee has overseen Audit rangeland monitoring activities and the development of the proposed information system. It comprises representatives of state, territory, Commonwealth and national bodies including:

Rod Applegate - (Chair), Department of Lands, Planning and Environment, Northern Territory

Paul Jenkins - Indigenous Land Corporation

Eric Anderson - Queensland Beef Industry Institute, Queensland Department of Primary Industries

Sue Walker - National Farmers Federation, Environment Committee

Paul Novelty - Department of Agriculture, Western Australia and Tropical Savannas CRC

Lionel Wood - Agriculture, Fisheries and Forestry Australia

Annmarie Watt - Environment Australia

Ken Hodgkinson - CSIRO Wildlife and Ecology

Daryl Green - NSW Department of Land and Water Conservation

Brendan Lay - Primary Industries and Resources SA

Colin Creighton - National Land Water Resources Audit

Further Information

If you'd like more information on the Audit's rangeland monitoring activities contact members of the Committee or the following:

Maria Kraatz
M4K Environmental Consulting
Ph/Fax: (08) 8927 3116
e-mail: mariak@austarnet.com.au

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Ph: (02) 6257 3109
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OUTCOMES FROM THE AGM

Merri Tothill, President, PO Box 357 Port Augusta 5700.

The AGM, held in Adelaide on 25th May 2001, was attended by Viv Van Mook, Don Blesing, Greg Campbell, Sarah Nicolson, Robyn Cowley, Leigh Hunt, John Maconochie, and Merri Tothill.

Copies of the Reports were tabled at the meeting. Please refer to these published in this newsletter edition.

The main body of the meeting focussed on the Business Plan. A motion endorsing the plan (as tabled) and as approved at a previous Council meeting was passed. A further motion, proposing that Council be made up of 7 members, reflecting the national, inclusive, skills based membership was also passed.

Robyn Cowley spoke to the tabled draft changes to the Articles of Association. A paper on Changing the Constitution under Corporations Law was tabled at the meeting, for Council's information. It was noted that in the revised Articles, all positions are referred to as "officers". The meeting agreed that there be 2 Directors (President & Finance and Audit Officer) and a Public Officer (the Secretary). A motion was passed that the changes to the Articles, as tabled at the meeting, be accepted. Robyn has summarised these in a separate article in this newsletter edition.

Nominations for new Council were accepted for the following positions:

President	Merri Tothill
Vice President	-
Secretary	Sarah Nicolson
Finance & Audit Officer	John Maconochie
Member Services Officer	Robyn Cowley
Membership Officer	-
Communication Officer	-

Subsequent to the AGM the 3 remaining positions were nominated and endorsed by the Council at a meeting on 18th June. These are:

- David Lord of Thackaringa Station, NSW as Vice President;
- Lachlan Pegler of Department of Natural Resources and Mining, Charleville, Queensland as Communications Officer; and
- Ian Watson of Department of Agriculture, Northam, Western Australia as Membership Officer.

We will publish some brief biographical information about all of the Council members in the next edition of this newsletter.

Myself, Sarah Nicolson and John Maconochie, being members of the previous Council and having already served two years will be resigning after our next two year term to allow for the half roll over of Council. The Publications Committee was re-appointed for a further two years.

I look forward to the next two years as President of your society. With the other members of Council and your support and assistance, we aim to ensure that ARS remains strong and able to perform its unique role as a national Rangeland body, providing a forum for the free interchange of ideas and information among people with an interest in the rangelands.

I would like to take this opportunity to thank outgoing Council member, Viv Van Mook and also Rob Richards, Subscriptions Manager for their contribution.

I would also like to thank Don Blessing and Viv Van Mook for their tireless efforts in writing the Business Plan. Thank you also to members who contributed by way of comments.



Photo 1. Former ARS Council members and the Business Planning team photographed at the March 2001 planning meeting – (back row, left to right) John Maconochie, Rob Richards, Don Blessing, Leigh Hunt, Sarah Nicolson and Robyn Cowley (front row) Viv Van Mook and Merri Tothill.

CHANGES TO THE ARS CONSTITUTION

Robyn Cowley, Member Services Officer, NTDPF, PO Box 1346, Katherine, NT 0851.

Changes to the ARS constitution recommended by Council were passed at the AGM in May. Listed below are the changes made to the ARS constitution, as summarised in the mail-out to all members in April. Copies of the full updated ARS constitution will be available to members in the future from the ARS website which is currently being developed.

The new structure and roles of the ARS Council members, agreed to following extensive consultation with members and listed in the ARS Business Plan, were incorporated into the constitution. The new officers of the Society and their relationship to former council roles are listed in Table 1.

Table 1: Council members / Officers of the Society

Past Council member role	New council member role
President	President
Vice-President 1	Vice President
Vice President 2	NA
Immediate past president	NA
Honorary Secretary	Secretary
Honorary treasurer	Finance & Audit Officer
Subscription secretary	Membership Officer
NA	Communications Officer
NA	Member Services Officer

The new selection of council members from any state of Australia, and with half the council retiring every two years was incorporated into the constitution as parts of Article 11. *Officers of the Society* (see below). This provides for continuity of council knowledge, as half of the ARS Council members will have been on Council for two years at any one time.

- (c) All officers shall hold office from the end of the annual general meeting at which they are elected or succeed to their respective offices until the end of the next but one annual general meeting. (This means for a term of two years).
- (d) No officer shall serve as a member of the Council for a period in excess of four years. If any officer has served as a member of the Council for four years or will have served for four or more years at the next annual general meeting, that officer must retire at or prior to such annual general meeting. No officer may accept a nomination as a member of the Council for a third term. This paragraph (d) shall not apply to the position of Immediate Past President.
- (e) Half of the inaugural Council will retire every two years to ensure corporate memory remains.
- (f) Neither a Director nor an Officer can assign his/her office to any other person.

A new article titled *Directors* was added to conform with Corporations Law. Two Directors will be listed with ASIC. They are the current President and Finance and Audit Officer of the Society, with the Secretary listed as the Officer of the Society. See below.

15. DIRECTORS

- (a) The Society shall initially have two Directors.
- (b) One Director shall act as the President.
- (c) One Director shall act as the Finance and Audit Officer.

- (d) There shall be no restriction on the number of Directors but the Society may by resolution in general meeting:
 - a. Set a maximum number of directors;
 - b. Set a minimum number of directors;
 - c. Increase or reduce the maximum or minimum number of Directors so determined;
 - d. Change the job description of any Director.

A new article titled *Payment to Directors* was also added.

16. PAYMENT TO DIRECTORS

- (a) Subject to clause (b) of this Article, no Director shall be paid any fee or remuneration by or on behalf of the Society in relation to his/her position as a Director of the Society.
- (b) The Society may reimburse a Director of the Society for costs properly incurred by the Director in performing his/her duties as a Director of the Society.
- (c) The Council must approve a payment to a Director pursuant to clause (b) of this Article before it is made.

Typographical errors were amended. These are thought to have been inadvertently introduced when transferring the Society's constitution to digital format.

Gender – while the constitution was on the operating table we thought it opportune to update gender references to inclusive language, as is now standard procedure in legal documents. Chairman was changed to chairperson; he to he/she; and him to him/her.

ACKNOWLEDGEMENT TO FOX & THOMAS SOLICITORS

The Australian Rangeland Society gratefully acknowledges the donation of time and legal assistance by *Fox & Thomas Solicitors and Consultants* for the modification of the ARS constitution.

Fox & Thomas Solicitors and Consultants are based in the rangelands at:

78 The Terrace, St George
Ph (07) 4625 3300
Mail@fox-thomas.com.au

36 Marshall Street, Goondiwindi
Ph (07) 4671 6000

Aburn Street, Moree
Ph (02) 6752 8088

2002 BIENNIAL CONFERENCE – KALGOORLIE, WESTERN AUSTRALIA

Sandra Van Vreeswyk, WA Branch President, Department of Agriculture, Locked Bag 4, Bentley Delivery Centre WA 6983

Planning for the Society's 2002 Biennial Conference to be held in Kalgoorlie, WA from 2 to 5 September is forging ahead. Please see the flyer in this newsletter for information about the conference. David Wilcox, the Program Committee Chair, is pulling together a stimulating program.

The conference will be held in Kalgoorlie. Kalgoorlie offers many things to see and contemplate for anyone interested in nature, mining, agriculture, history, art and nightlife. Did you know Kalgoorlie has the biggest hole in the ground in the southern hemisphere – you have to see the Super Pit to believe it! For the plant enthusiasts Kalgoorlie is the centre of the greatest speciation of eucalypts in Australia and the largest arid zone forest in the world. The gumbelt supports an understorey of chenopods, and in September, a carpet of wildflowers. And of course Kalgoorlie is adjacent to the Nullarbor Wonderland – I encourage you to travel over by train to get a feel of the vastness of The Plain. You can also fly from Perth or directly from Adelaide.

The host for the conference is the new Centre for the Management of Arid Environments and the venue is the Western Mining Corporation Conference Centre which has a purpose built tiered auditorium with breakout seminar rooms and a huge catering/exhibition hall. There are many motels and hotels in town to choose from, and we will select the best venues for social functions.

As I said in the last newsletter the Organising Committee are working hard to make this conference an important event for the Society. Hope to see you there.

ARS AWARDS DEFERRED

About this time of the year, applications are sought for the ARS Travel Grant and Scholarship Awards, however Council has decided not to pursue these awards for the coming year.

As most members are aware, over the past year Council has been attempting to identify ways and means of strengthening the Society's position both financially and through increasing membership. We feel that until we have a clearer picture of where our funding commitments lie, and their priority, that the Travel Grant should be put temporarily 'on hold'. At this stage, we anticipate that the Travel Grant will be an important member service in future years.

To consolidate membership levels we have decided that for this year the funds normally directed towards Society awards will go towards the development of the ARS Web Site. We believe a web site is essential to the Society's ability to attract new membership and as a means to increase efficiencies.

Council looks forward to bringing new services to members over the next year.

VACCINATION MAY MINIMISE LIVESTOCK 'EMISSIONS'

A major vaccination program aimed at significantly reducing the methane emitted by livestock is being undertaken by CSIRO researchers.

Sheep and cattle produce significant amounts of methane - a gas over twenty times more potent in greenhouse terms than carbon dioxide - as part of their normal digestive process, thereby accounting for about 14% of Australia's total greenhouse emissions. Based on their current experimental results in sheep, the vaccine developers at CSIRO Livestock Industries expect to be able to reduce each vaccinated animal's emissions by about 20%, or a total saving (at target vaccination levels) equivalent to roughly a 300,000 tonne reduction in carbon dioxide. Other potential benefits of the vaccination include modest gains in animal growth and wool production, as a reduction in methane production (a process requiring 2-12% of a beast's energy intake) should leave more nutrients available for use by the animal. The vaccine is being made available at minimal or no cost for some or all of the program.

Australian farmers have already shown great interest in getting involved, with over 635,000 sheep and 410,000 cattle signed on to participate so far. CSIRO's goal is to have two million sheep and one million cattle available for vaccination every year from around 2005 to 2012. Cattle and sheep producers interested in nominating their herds or flocks or keen to get more information should contact CSIRO Livestock Industries.

For further information contact Anton Coppins by email (anton.coppins@li.csiro.au) or telephone (08 9333 6684). Alternatively you could visit the group's website at www.csiro.au/methanevaccine.

INFORMATION SNIPPETS

Website for the Next IRC

There is a website for the VII International Rangeland Congress which is to be held in Durban, South Africa from 12-17 July 2003. For the time being it can be found at www.ru.ac.za/institutes/rgi/irc2003/IRC2003.htm. Closer to the Congress, it is expected that the site will be moved to a more direct address (I presume, however, that you will be forwarded to the relevant location from the current site).

A quick preview of the site suggests that it is still under construction although there are some preliminary indications of the session themes and the pre- and post-congress tours.

4th Annual Australian Women in Agriculture Conference and AGM

Theme: 'Bridging the Gaps'

When: 24 - 26 August 2001

Venue: St Hilda's College, University of Melbourne

Women throughout Australia are invited to the AWiA Bridging the Gaps Conference. This will be a great opportunity to hear a range of guest speakers and learn more about women's achievements in Government, industry and rural activities.

AWiA Conference 2001 Registration can be made by post to PO Box 209, Sale Victoria 3850. Further details are available on the AWiA website (www.awia.org.au/) or from:

Jeanette Severs

Ph: 03 5156 4888

Email: severs@ozemail.com.au

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Email: teslage@netspace.net.au

Science, Technology and Innovation Email Service

Here is another new email newsletter you can subscribe to: Australian Research & Development Review has launched R&Dinfo, a free fortnightly science, technology and innovation email service. It will include information about conferences, seminars, workshops, employment opportunities and collaboration opportunities. You can also advertise in it.

To subscribe, send an email to hallmark@halledit.com.au with the words 'Subscribe R&Dinfo' in the message box.

For further information contact Ros Stirling on (03) 9521 0269 or email hallmark@halledit.com.au.

Framework for Biodiversity Monitoring

A team from the Tropical Savannas CRC has completed a massive report into biodiversity monitoring in the rangelands, carried out under contract for the National Land and Water Resources Audit (NLWRA). The project developed a framework for monitoring biodiversity across Australia's 49 rangeland bioregions and found that biodiversity had been affected in all rangeland environments. The report on the project, *Developing an Analytical Framework for Monitoring Biodiversity in Australia's Rangelands*, summarises the many threatening processes operating in the rangelands including change in fire regime, pastoralism, feral predators, other feral animals, weeds, mining, hunting and harvesting of native species, clearing, horticulture, pesticides, changed water regimes and climate change.

The background papers and case studies are used to identify the many questions that a monitoring strategy might seek to answer. The monitoring strategy is set out in considerable detail including the establishment of a common reporting framework and the integration of analysis of monitoring results. Copies will be available for purchase later this year.

The document is available in PDF form on the newly launched NLWRA 'Australian Natural Resource Atlas' website http://audit.ea.gov.au/ANRA/atlas_home.html#. Click on rangelands (the windmill graphic), then on biophysical resources and scroll down the page to the 'Further Information' section.

For more information contact:

John Woinarski
Parks & Wildlife Commission of NT
Ph: (08) 8944 8451
Fax: (08) 8944 8455
Email: john.woinarski@nt.gov.au

New Website on Sustainable Use of Rangelands in the 21st Century

A new website which may be of interest to readers can be found at http://www.cse.csiro.au/nsw_rangelands.

The people of the Western Division care what their future will be and how they will get there. They want land use to be sustainable in three tightly linked dimensions: environment, society and economy. Working alongside staff from CSIRO Sustainable Ecosystems and the Department of Land and Water Conservation, and representatives of stakeholder sectors, lobby groups and state agencies, they have sketched a vision of that future. The vision includes how they could use and share land and how policies and laws need to be changed if their goals are to be achieved. This website documents how that vision was created.

At present the site mostly contains summary material which will be progressively updated and improved. If you want more information you can register your e-mail address via the web site and you will be kept informed of major changes when they are released.

Further details may be obtained from:

Art Langston
CSIRO Sustainable Ecosystems
PO Box 284
Canberra ACT 2601.
Ph: (02) 6242-1632 Fax (02) 6242-1565
Email: art.langston@cse.csiro.au

Live Export Database Online

The Meat & Livestock Australia (MLA) website now features the Live Export Research and Development Database, commissioned by Meat & Livestock Australia and Livecorp to ensure that a sound scientific knowledge base underpins the Australian live export industry standards and practices. This information can be found at <http://www.infoscan.com.au/contents/lexintro.htm>.

Australian Agriculture and Natural Resources Online (ANRO)

Australian Agriculture and Natural Resources Online includes three databases which contain information about agriculture and natural resources research. Each of these databases complement each other with very little overlap. ARRIP contains information about current research; ABOA has abstracts on published documents with an agricultural and primary production flavour and Streamline covers Australian natural resources generally and sustainable land and water use specifically. You also search across the ARRIP, ABOA and Streamline databases simultaneously using Power Search. Go to <http://www.infoscan.com.au/contents/index.html>.

Science Meets Parliament Day

The annual 'Science meets Parliament' event, organised by the Federation of Australian Scientific and Technological Societies (FASTS), will be held in Canberra on August 22. Two hundred scientists and technologists are expected to come to Canberra for personal meetings with Federal Parliamentarians."

Parliamentarians are asked to choose issues from a list of topics which includes:

- Water and salinity;
- Agriculture and quarantine;
- GMO engineering, biotechnology;
- Environment and biodiversity;

- Education and training - school, university and industry;
- Commercialisation, innovation, industry research;
- Mining and resource industries;
- Climate change and greenhouse; and
- Communicating science to the community.

Further details are available from Toss Gascoigne on Ph: (02) 6257 2891.



The Australian Rangeland Society

REPORTS FROM THE 2001 ANNUAL GENERAL MEETING

ACN 008 784 414

(Ed. – Please note that the Directors' and Treasurer's reports were not available for inclusion in this newsletter. They will be included in RMN 01/3)

SUBSCRIPTION MANAGER'S REPORT

Rob Richards, Department of Land and Water Conservation, PO Box 235, Condobolin NSW 2877.

As I am heading overseas shortly I have for this years Subscription Manager's report thought it necessary to forward project my report into what looks like a challenging but exciting future for the Society (just in case I extend my leave by a few years).

Membership

As can be seen from the trend graph below membership to the end of May reached an all time low in the 2000/2001 period (373/371 members respectively). This was due largely to a lack of economic, social, and institutional investment in Australian rangelands at the time. Many professional Societies were suffering the same fate at this time. Surveys conducted in 1997/98 suggested that many members were moving from the rangelands for work related reasons.

In 2001 the South Australian National Council developed a visionary business plan for the Society. While implementation of the business plan took until late 2002, the true benefits were demonstrated in a successful conference in Kalgoorlie 2002. A national ARS website, member and student discount registration rates, presentation awards, a mentoring scheme and a challenging conference theme "Shifting Camps" made the conference successful.

In 2003 a turning point was reached, with the recognition of rangelands on the national agenda. This was bought about by a number of factors:

- a more sympathetic government as a result of the November 2001 election including large injections of funds into rangeland areas as carbon sinks, salinity prevention models and biosphere reserves;
- the international recognition of Rangelands Australia as a cornerstone institution for rangelands education hence resulting in substantial international investment;

- the adoption of a National Rangelands Action Plan and recognition of the cultural, social, economic and heritage value of Australia's rangelands;
- the implementation of the marketing/promotion strategies of the ARS business plan; and
- increased recognition of rangelands through the "Year of the Outback".

Membership appears to have levelled out at just over 700 members in 2006 which is comparable to the membership of the early 1980's. Analysis of the membership structure suggests that unlike the membership of the 1970/80's period there is a large proportion of members from rural corporations who need to show environmental accreditation and city based conservationists who are now aware of rangeland issues.

Database Administration

In 2001 further modifications were made to the national database as part of the business plan. These modifications enabled more efficiencies to be made such as accounting procedures, member profiles, member contact and feedback, international profile and transference of use. In 2002 reciprocal membership with the U.S. Society for Range Management increased the Societies profile through a shared database. The introduction in 2002/03 of web membership and automatic membership renewals through electronic fund transfers greatly improved membership processing.

Council

The introduction of a "national skills based Council" in 2001 including a member from the Publications committee and the coming conference committee greatly improved Councils ability to coordinate ARS issues on a National basis. Greater communication with the Publications committee, accounting and subscriptions roles was achieved. In 2003 Council provided policy statements on a national rangeland crisis issues. In doing this the ARS became recognised as an authority in rangelands issues and has consequently been the peak body for consultation on rangelands issues. The Society continue to conduct regional policy forums and regional "hypothetical debates" with rangeland users.

I thank Council for their courage and commitment in taking positive action to ensure the survival of the ARS in 2000-2002. Without this commitment and continued positive contribution and maintenance of the ARS "spirit" the future may have been very dim.

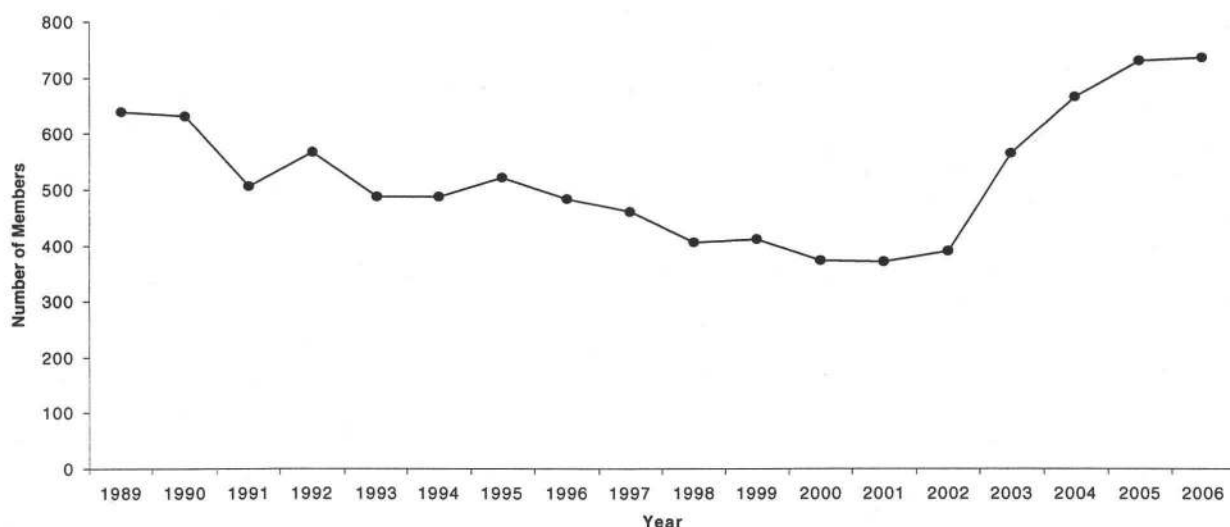


Figure 1. Membership as at the end of May. Actual numbers for years 1989-2001 and 'projected' numbers for 2002-2006.

ANNUAL REPORT OF THE PUBLICATIONS COMMITTEE

Leigh Hunt, Chair, Publications Committee, 6 Gwendoline Court, Coromandel Valley SA 5051

It has been a bit of a quiet year for the Publications Committee. This was partly due to my absence overseas for some of the year. Of course the usual frenetic activity by our editors and production manager continued during this time, ensuring that *The Rangeland Journal* and the *Range Management Newsletter* appeared without problem. Once again, we must acknowledge the efforts of the Journal Editor, Wal Whalley, the Journal Production Manager, Malcolm Howes, and the Newsletter Editor, Noelene Duckett, for their efforts and commitment to producing excellent publications for the Society and its members.

A meeting of the Publications Committee was scheduled to be held during the conference in Broken Hill in August. However, this did not eventuate since there were insufficient members of the Committee at the conference to form a quorum. As usual, we conducted most of the Committee's business by e-mail and phone.

During the year Wal Whalley was busy commissioning special issues of the Journal. As you would have seen, the issue celebrating the contribution of Fowlers Gap Arid Zone Research Station to understanding and managing rangelands appeared in June last year. Thanks to Ben Macdonald for acting as guest editor for the issue. Next month a special issue containing the keynote addresses from the Broken Hill Conference will be published. I was unable to attend the conference, but from what I have heard of these presentations, these papers should prove interesting and enlightening. Publishing them in Journal so they are widely available to those who were unable to attend the conference is a sensible move. Jim Noble was

guest editor for the issue and I would like to thank him for his contribution.

Another special issue that is being developed will address the issue of clearing of native vegetation in rangelands, with the Queensland situation acting as a focal point for the issue. The idea for this issue came from Clive McAlpine, Sue McIntyre and Rod Fensham, with the initial hope being that it would be published as an additional issue for the year (i.e. on top of the two regular issues). External funds were sought to cover the cost of this extra issue, but unfortunately adequate funds were not available. Consequently, the issue is now scheduled to appear in June 2002. The issue of vegetation clearing is certainly very topical at present in view of the concern about greenhouse gas emissions and carbon sequestration, maintenance of biodiversity and ecosystem function. Clive, Sue and Rod will act as guest editors for the issue and they have a wide cross-section of papers planned that will cover biophysical, socio-economic, management and implementation issues. These papers should enable the elucidation of many broad principles and consequences associated with vegetation clearing.

In addition to these special issues, Wal reports a good supply of papers for the regular issues of the Journal.

Early in the year, Professor John Holmes resigned as an associate editor for the Journal. John has been with the Journal for many years, making an important contribution as the associate editor with expertise in the areas of social issues and policy in rangelands. John was also guest editor for the special issue entitled 'Contemporary Explorations; Values, Goals, Needs and Expectations of Rangeland Users', published in December 1994. The Publications Committee would like to express its gratitude to John for his efforts over the years. We would also like to welcome Neil MacLeod as John's replacement. Neil is well known from his years with CSIRO Wildlife and Ecology in Deniliquin and more recently with CSIRO Sustainable

Ecosystems in Brisbane. He has wide experience in rangelands and in particular brings to the position expertise in rangeland economics and the analysis of social issues that have an impact on rangeland management.

Noelene Duckett has settled well into the role of editor of the Range Management Newsletter. She produces interesting issues, partly because she puts a great deal of effort into sourcing articles from the rangeland community. This usually requires a great deal of persistence in encouraging people to sit down and write articles. Noelene has made an effort to make the newsletter more 'newsy' by including various topical announcements and notices. She has also achieved some savings in printing costs. While she is not entirely happy with production quality at present and is aiming to improve it, there appears to be the opportunity to maintain this reduction in printing costs.

One possible new initiative that was briefly discussed by the Committee during the year was for the ARS to commission the publication of books addressing issues relevant to rangelands. The initial concept was for a book that brings together some of the important new ideas and thinking that have emerged in recent years - in a sense an update on CSIRO's book 'Management of Australia's Rangelands', published in 1984. An alternative idea was for a book that focuses on sociological issues influencing Australia's rangelands. Neither of these suggestions has become anything more than just an idea at present because of the potential problems of finding authors who have the time for book writing and finding the funds to cover initial production costs. However, I don't think we should immediately dismiss the idea. Establishing a partnership with a commercial publisher would probably be a necessity if we were to take it any further. I am interested to receive comments on these ideas from Council and the general membership and whether this is seen as an appropriate service for the Society.

As usual in my annual report I would like to draw attention to the people that contribute in various ways to the Society's publications, and acknowledge their contribution. Our hardworking editors and production manager are vital elements of the production team. But we must not forget the Associate Editors, Journal referees, authors and members of the Publications Committee. The strong support for the Journal and Newsletter that was evident in the recent feedback on Council's draft business plan was pleasing and is a sign that the general membership appreciates the time and effort these people commit to the Society's publications.

AUSTRALIAN RANGELAND SOCIETY

MEMBERSHIP APPLICATION FORM

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

I, [name]

of [address]

Postcode..... Email address

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

☐ Enclosed is a cheque for \$AU..... for full/part* membership for an individual/student/institution* for the calendar year 2001

☐ Charge my Mastercard VISA Bankcard AU\$.....for full/part* membership for an individual/student/institution* for the calendar year 2001

Card No.:_____ Expiry Date:

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

*delete as appropriate

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

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

Membership Rates:

	Australia	Overseas Airmail
Individual or Family -		
Full (Journal + Newsletter)/Student	\$73.00/\$56.00	\$96.00/\$73.00
Part (Newsletter only)/Student	\$40.00/\$30.00	\$51.00/\$39.00
Institution or Company -		
Full (Journal + Newsletter)	\$107.00	\$130.00
Part (Newsletter only)	\$56.00	\$68.00

Please Note -

- Membership is for the calendar year 1 January to 31 December. All rates are quoted in AUSTRALIAN currency and must be paid in AUSTRALIAN currency.
- Year 2001 membership rates include Airmail for all overseas subscribers.

For Office Use Only:

Membership Number

Date Entered in Member Register

Date Ratified by Council