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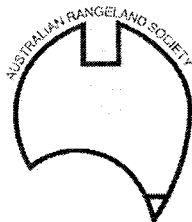
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NATURE CONSERVATION  
AS A LANDUSE IN THE RANGELANDS

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ABSTRACT

The two main aims of conservation, that is, sustainable development through better land care, and maintenance of natural ecosystems and species diversity through nature conservation, are distinct although complementary. Nature conservation is justified, both on ecological and ethical grounds as a valid landuse which is all the more important in a landscape modified by other modern landuse practices. An outmoded philosophy that nature conservation was not a legitimate use for land which had other economic values has resulted in an inadequate nature conservation system. The formal conservation estate must have as its basis representative ecological systems, which are supported by other sympathetically managed areas. Through cooperation at all levels of the community, a combination of formal conservation reserves, local action to provide management over important conservation areas and conservative landcare on commercially productive areas will achieve the broad objectives of the State's Conservation Strategy.

INTRODUCTION

The title of this session is other landuses. We believe that there is now, throughout most pastoral areas, more recognition of conservation as a legitimate and important landuse in the rangelands, and one in which the wider community has a considerable interest.

We want to cover three main points relating to nature conservation as a landuse. Firstly, we will define conservation, and point out how two potentially competing aspects of that definition can be justified and made complementary. Secondly, we will provide a brief history of nature conservation in Western Australia- where we are and how we got here, and finally how we might achieve our various conservation goals, particularly in relation to the State's rangelands.

NATURE CONSERVATION- A LEGITIMATE AND ESSENTIAL LANDUSE.

Firstly then, conservation-what is it and why is it relevant to rangeland managers?

The State Conservation Strategy for Western Australia, prepared via a consultative process involving industry, conservationists and Government, endorsed the following definition based on the World Conservation Strategy.

Conservation is "The management of human use of the biosphere 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. Thus conservation is positive, embracing preservation, maintenance, sustainable utilisation, restoration and enhancement of the natural environment".

This definition emphasises the interdependence of living resource conservation and sustainable development, and essentially is concerned with the inter-relationship between man and the environment. This concept is very familiar to rangeland managers.

The five objectives of the Conservation Strategy for Western Australia, which have been accepted by the State Government, and which are based on the definition above are:

1. to maintain essential ecological processes and life support systems;
2. to preserve genetic diversity;
3. to ensure the sustainable utilisation of species and ecosystems;
4. to maintain and enhance environmental qualities,
5. to optimise the quality of life for Western Australians.

The above objectives are not necessarily complementary; some can be achieved without necessarily achieving others. For instance, highly modified ecosystems may be capable of maintaining their ecological processes, even though alteration of the ecosystem may have included a decrease in the biological or genetic diversity.

The applied aspects of conservation are familiar to all pastoralists - that is, maintaining soil, feed and water as the basic resources on which their livelihood depends. In recent years it has become clear that different land types on the same property may require very different management in terms of rates and periods of stocking. With survey, mapping and advice being provided by the Department of Agriculture, land-care (applied conservation) can be practised by all pastoralists. With the influence of groups such as the Land Conservation District Committees and the Rangeland Society, such management should become the norm rather than the exception.

Nature conservation on the other hand is about maintaining natural ecosystems, ecological processes, and the plants and animals they support with as little modification as possible. Its value or relevance to the rangeland manager is much less obvious, especially if it means that some area of the property will not be used for productive purposes.

However, there are many good reasons why nature conservation, including the maintenance of biological and ecological diversity, is important, both in the pastoral areas and throughout the world. A selection of relevant arguments is presented below.

1. Natural ecosystems and the species they support provide many largely unseen ecological services to humans which include: the breakdown of organic matter; the physical structuring of soils; the use of carbon dioxide and emission of oxygen; pollination of flowering plants, including ones beneficial to humans; pest control by predators, parasites and pathogens; the provision of shade and shelter; and the protection of soil and water quality.

The overall result of these services is the conditioning of Earth's environment, especially soil and air, so that the planet provides the resources to sustain human life. (2)

2. Not all physical factors, or all species, contributing to the provision of ecological services exert the same influence in maintaining healthy ecosystems. That is, there are key factors and "keystone" species which may have a controlling influence. For instance, a relatively rare predator may act as a "keystone" species, by keeping down the number of large herbivores, which in turn may entirely control the growth and existence of species of plants. In many cases, we have inadequate knowledge to identify key factors or processes, or keystone species. Thus, the maintenance of as much ecological diversity as possible can be seen as a safeguard against inadvertent but major ecological changes.
3. Natural species are real or potential resources for direct human use. This is very clear in the case of the pastoral industry, where throughout most of its range plant species native to the area provide the food resource for grazing animals. Given the increasing knowledge of science and the power of techniques for genetic manipulation, there is an almost infinite potential for particular products (e.g.

pharmaceutical drugs) or characteristics (e.g. drought tolerance) of specific species to be utilised. Many of these potential values may be quite unapparent at present - they await changes in knowledge and technology as well as in human tastes and lifestyles.

4. There is a myriad of ecological processes and interactions with other species (many of which might be quite obscure) which supports the survival of species which are already directly useful to humans, or which have as yet unrecognised potential to be so. Thus, the loss of any species may have effects on ecosystem function, species diversity and upon potential human benefits, which it is impossible to predict.
5. Point 4 above can be generalised; as ecosystems become more diverse, they provide more microhabitats and opportunities for more and more species, i.e. diversity supports the generation of further diversity (3) and the planet becomes biologically richer with time.
6. Because of the interdependence of species, the growth in diversity can be slowed or reversed by species lost to ecosystems as a result of human activities. That is, each species, in some way, is a resource for other species, and its absence will affect those species, directly or indirectly.
7. Extinction of each species is irreversible - "Those components of life that vanish during the next few decades will be gone forever: those that remain will provide future options for humanity" (4).
8. Allied with the points above is the fact that as species are lost from an ecosystem, the possibility of significantly adverse effects becomes larger and larger. That is, although the likelihood that the extinction of any one species will have a catastrophic ecological result may be minute, such likelihood increases greatly as more and more species are lost.
9. There is little doubt that the trend to increasing global diversity has been reversed over the last thousand or so year of human dominance. In the Australian context at least 12 mammals (overwhelmingly in arid and semi arid region), one bird and 97 plants are thought to have become extinct since European settlement. At least a further 19 species of vertebrates have undergone massive range reductions, and a total of 64 are considered endangered by Australian wildlife agencies (5) Further, Leigh and Briggs (6) have identified 3 329 species of plants as rare or threatened, with 209 species endangered ("species in serious risk of disappearing from the wild state within one or two decades if present land use and other casual factors continued to operate":6).

We have no figures for invertebrates and microorganisms which may have been lost independently or as a result of the decline of the vertebrate species. Nor do we have information on the present conservation status of the vast majority of such species.

10. The ethical argument for nature conservation, especially the protection of species diversity, is threefold.
  - (i) Each generation of humans has an ethical responsibility to leave to future generations the same range of resources, options and opportunities that they enjoy themselves.
  - (ii) "Humans have evolved in a world of other species with values outside and above any practical or economic merit we may ascribe to them".(5) That is, in an ecological and evolutionary sense, each species has its own intrinsic value.
  - (iii) Along with human understanding and power over our environment goes the ethical responsibility to respect other species -

organisms which we have not created, and which we therefore have no specific right to eliminate. (4)

Applied conservation (in our context the good management of rangelands to avoid degrading vegetation, soil and water) will go a long way towards meeting the needs of nature conservation. Nonetheless, the setting aside of representative areas for the express purpose of protecting natural ecosystems, processes and species, is an important part of Western Australia's strategy for protecting natural diversity, for the following reasons.

1. Areas deliberately managed to protect natural ecological systems act as important reference areas, against which to judge the effects of other management practices on surrounding lands.
2. Vesting in the Crown is currently seen as the best way of ensuring the purpose of nature conservation over the long term: it provides a safeguard against altered land use resulting from changes in ownership, attitude or economic conditions.
3. A patchy area, containing a variety of ecosystems at various stages of development has greater total diversity than a more homogeneously managed area, and will provide greater regenerative capacity for over-exploited or depleted areas.
4. A special case of 3 above is that a representative reserve system can act as a reliable source of seed and other propagating material for natural regeneration and for deliberate reseedling.
5. A widely representative system of reserves, capable of being managed specifically for nature conservation, may be an essential tool for protecting ecological processes and species diversity in the light of potential climatic changes. Such a reserve system should incorporate as much linkage between protected areas as possible.

#### HISTORY OF THE CONSERVATION SYSTEM

In Western Australia the community made its first commitment to conservation in 1894, when a reserve of 65,000 hectares on the Bannister River was set aside for the Preservation of Native Flora and Fauna. At this time in Western Australia the need for a representative system of reserves was not considered. This was largely because the population was relatively low, 50,000-60,000 in a state covering 2.4 M sq km, and the urgency of the problem of conservation was not recognised. However, scientifically at this time there was the beginning of an awareness of the need for such an integrated system. One century ago, in his inaugural speech to the Australasian Association for the Advancement of Science, von Mueller(7) a prominent botanist, said:

" Choice areas, and not necessarily very extensive, should be reserved in every great country for some maintenance of the original vegetation,.....Such spots should be proclaimed for all time the people's unalienable property, and every inhabitant or visitor of the locality should consider himself the co-preserver of such areas, so as to aid in preventing accidental invasion or casual ignition or intentional spoliation."

However, it was not until the 1950s that a deliberate attempt was made to select representative areas. In 1958 the Academy of Science caused a Western Australian Sub-Committee to examine and make recommendations on the situation of reserves in the state. It was their role to plan an integrated system of reserves. The sub-committee presented it's report to the Academy in 1962(8).

The delay between recognising the need to have a representative system of nature conservation reserves and identifying them has had two unfortunate

consequences. Firstly there has been a failure to incorporate into the conservation system representative samples of those areas of land alienated for agricultural and pastoral activities in the early days of settlement, and those which have been considered of greater benefit for forestry, water catchment, or urban and industrial use. Secondly there has persisted a philosophy, or attitude of mind, that land for nature conservation should be areas unsuitable for other purposes and which can be reserved without economic loss or at no great cost to the community. Thus, the existing set of reserves was not designed as a representative system. This philosophy is now out of date. Nature conservation must be considered in parallel with other interests and landuses.

We have been slow to protect representative "reference" samples of our ecosystems, and now there is a greater urgency than ever to protect them because of increased pressures from many different landuses.

To bring us up to date with the history of conservation in WA, in 1972 the then newly created Environmental Protection Authority (EPA) established the Conservation Through Reserves Committee. In their report (9) to the EPA they reviewed and updated the 1962 recommendations of a sub-committee of the Australian Academy of Science (W.A.) with respect to National Parks and Nature Reserves of the State. Subsequently the EPA made its recommendations to Cabinet who endorsed them, in what are now colloquially known as the 'Red Books' (10).

The Red Book recommendations are not definitive, and it was always intended that they be reviewed, with increases in scientific knowledge. This has been done for the Kimberley region by the Department of Conservation and Land Management as a submission to the Kimberley Region Planning Study.

#### ACHIEVING A REPRESENTATIVE CONSERVATION SYSTEM

##### Adequacy of the present system

The maintenance of genetic diversity, through the conservation of flora and fauna, is one of the objectives of the State Conservation Strategy, but is not sufficiently provided for in national parks and nature reserves at this time. An essential requirement, therefore, is that the conservation reserves system contains a representative sample of the State's many and varied ecosystems. The variety of vegetation types found in Western Australia has been described by Beard (11). Ideally each major ecosystem should be protected in more than one reserve in case a natural or other disaster should occur and seriously degrade a reserve.








In Western Australia the conservation system does not yet conserve even one example of each major terrestrial ecosystem even though the CALM estate covers 15.2M Ha which is reserved either as national park (4.834M Ha) or nature reserve (10.419M Ha) (12) (Figure 1). This represents a total conservation estate of 6.0% of the terrestrial area (252,550,000 Ha) of Western Australia.

The Specht Report (13), which is a comprehensive study of the conservation status of Australia's major plant communities (alliances), identified the plant communities of the arid and semi-arid zone (which includes the rangelands) as having particularly poorly conserved. Sixty per cent (60%) of the structural formations and alliances in pastoral regions were not represented in conservation reserves in 1974. Since then, there has been little significant change.

The question of how much and how many areas are required for conservation is always difficult because of the diversity of the ecosystems and the priority species which are being protected. The assessment of the adequacy of a reserve to conserve the communities of plants and animals it contains must be largely subjective until long term ecological studies have been made on each ecosystem.

# CALM ESTATE

## KEY

- State Forest 
- National Park 
- Nature Reserve over 2000 ha. 
- Nature Reserve under 2000 ha. 
- Marine Park 
- Conservation / Recreation Reserve 
- Region Boundary 

## SCALE

0 100 200km.

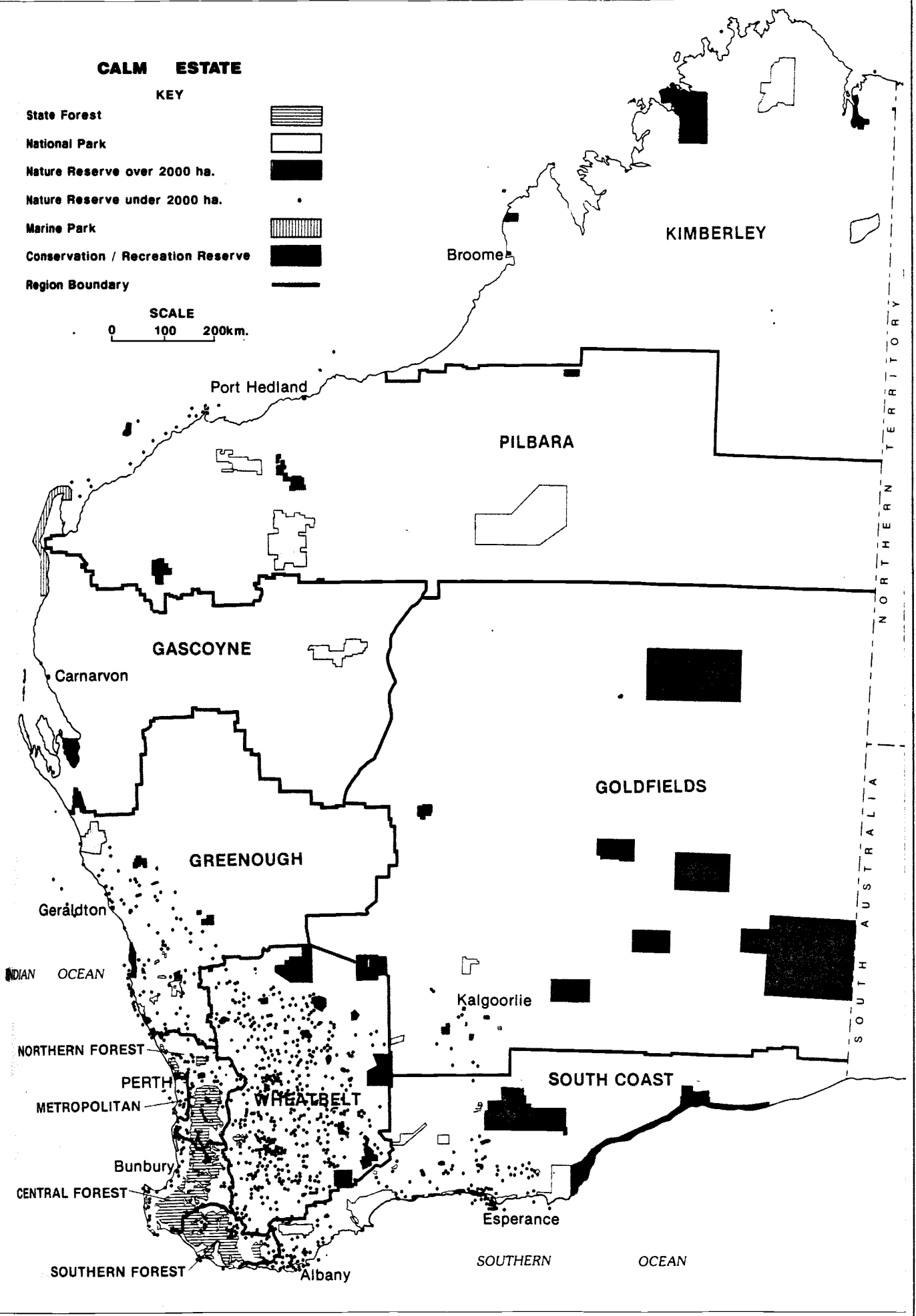


Figure 1. The Calm Estate

Curry and Hacker (14) report that after nearly a century of widespread over-grazing the number of known possible plant extinctions appears to be only two throughout the southern shrublands of Western Australia. However, plant surveys in the early part of this century were not extensive and may not have represented the full extent of the native flora by which we can compare today's species complement, and therefore may under-represent the number of known extinctions. Habitat disturbance caused by pastoral activity appears to have contributed to a decline in the geographic ranges of many vertebrate species. Burbidge and McKenzie (15) suggest that this can be attributed to diversion of environmental productivity and resources to increasing human populations.

Those species which are poorly conserved, although not extinct may be endangered, vulnerable, or rare, and in many cases there is insufficient information on which to classify their conservation status. In most cases the identification and protection of whole, viable ecosystems is an essential first step to the conservation of such species.

From our history of conservation it can be seen that although the need for a representative conservation system has been identified for 100 years our system is still not adequate. The challenge which faces us now is how to achieve such a system. To date it has been assumed that if conservation is necessary then it is the obligation of the Government alone to provide for it. We question whether this is now a realistic expectation.

#### Options for management

There are four ways in which satisfactory protection of important conservation areas can be achieved. They are:-

- reservation as national park or nature reserve;
- formal agreement between landholders and CALM;
- private action to protect areas of conservation value, and
- conservative landcare practices on areas outside reserve areas so as to conserve the natural values of the area and to maintain the ecological processes.

#### Formal areas for conservation

Adding to the existing formal system of reserves inevitably has the constraints of competing landuses and restricted funding for acquisition and management. Never-the-less, several mechanisms do exist.

- i Funds may be reallocated by Government as a result of public pressure, or additional funds raised to buy areas as they become available. For instance, in the United States, money for a Land and Water Conservation (Trust) Fund is raised from the sale or lease of non-renewable resources, primarily offshore oil and gas.

It is possible that this concept could be used to raise additional funds from a variety of sources; for example, revenue for lands leased from the Government; levies on mining operations and so on.

- ii Under the terms of the previous draft amendments to the Pastoral Land Tenure Bill, the Government had proposed that identified areas of conservation value are acquired at the time that the leases are transferred.
- iii Additionally, pastoralists themselves may identify areas of conservation value on their leases, possibly in conjunction with the Department of Agriculture, and/or CALM. These areas could then be excised and vested with the National Parks and Nature Conservation Authority (NP&NCA) Through this mechanism, funds can be made available from CALM to finance management of the area.

#### Agreements for the management of private lands.

The Conservation and Land Management Act under section 16 allows for agreements to be entered into with the owner for the management of the land



for a variety of purposes including nature conservation. Under these agreements the land remains as part of the lease. There is no automatic long-term commitment, such as a covenant on the title or lease.

This mechanism may be useful where there is multiple use of an area. For example, both pastoral and recreational activity, particularly in coastal areas. Pastoral activities may be continued and managed by the lessee whilst CALM controls public access and manages the area for the conservation values. The advantage with this mechanism is that the land remains within the lease, and may be managed through a consultative process between CALM and the lessees. On the other hand, little financial help could be given by CALM if the land is not provided with some form of protection over the long-term.

#### Private Actions

Some leaseholders may wish to protect some areas of their property for nature conservation, but maintain management in their own hands. Departments such as CALM and WADA are pleased to provide information and advice to assist landowners in such endeavours. However, as with the agreements referred to above, some long term protection for the area, such as the purpose being registered on the land title, would be required before Government could contribute significant resources. This would apply to fencing subsidies like those provided for remnant vegetation on private land in agricultural areas. It may also be possible to pursue other incentives such as taxation relief, for protection of these areas.

#### Informal-land outside conservation areas

Outside conservation areas land managers can help nature conservation and the viability of their properties by observing the principles of good land management promoted by the Department of Agriculture through the Land Conservation District Committees. Ideally, areas outside and adjacent to reserves should be managed sympathetically, as a buffer zone, with the objectives of nature conservation in mind.

#### Boolarly Open Country Paddock: an example

Degradation of the Murchison Catchment System has been obvious for many years, accentuated by drought no doubt but also by a very generous and accessible supply of water. The Murchison River catchment area has generally a very shallow water table plus semi-permanent fresh water pools and creek systems that feed the main river. The Murchison River itself is mostly a saline water course, as described by Forrest's diary of his expedition of 1874. Even then scalded flats with saline perennials were abundant on flood plain areas.

The creeks and drainage systems that flood into the Murchison River are mostly fresh and grow numerous varieties of sweet herbage and perennials. This country was being taken up for pastoral use from 1872 onwards and before large-scale fencing occurred all semi-permanent pools in these catchments were being shepherded, mainly with sheep. With the discovery in the 1890s of the shallow water table, landholders expanded their flocks and commenced their fencing programs in a big way. Much of the area was beautifully fenced indeed, north, south, east and west by the compass.

In association with the Lands and Survey, and Agriculture Departments leaseholders were made more aware of our degenerating land systems in the mid 1980s by the revolutionary method of satellite monitoring, and a technical process known as albedo change imagery, by which the condition of vegetation could be determined.

During the Murchison Rangelands survey, which was once again a combined effort of all Departments, an obvious piece of land on the south east corner of Boolarly gladdened the heart of the survey team. This piece of country, with some very attractive creek systems, was still in a virgin state in comparison with anything else seen. It had been excluded by fencing from the rest of the leases for two reasons. First, the abundance of Kite Leaf Poison

growing in the area; this notable controller of feral animals was discovered very early in the taking up of land. Secondly, the water table in the creek systems was very saline and unpalatable and the creeks had largely saline perennials growing along them.

CALM was informed of the conservation value of this area, and the survey team members had the audacity to suggest that it should be excluded from grazing and used as a reference for the area! The then Principal of Boolardy was in agreement with this suggestion but definitely for scientific purposes only.

The Boolardy leases changed hands in 1989 and the incoming Principals were most interested in re-fencing Boolardy to land system boundaries after seeing the badly eroded river and catchment systems by land and on maps. On being told of the interest shown by the various Departments and the local Murchison Land Conservation District Committee in the Boolardy open country paddock, the new Principals were unanimous that part of the area could be excised from the Boolardy leases to be used for Reference and scientific purposes. Under this arrangement access by the general public would not be encouraged.

Since then, and following meetings with staff from the Departments of CALM and Agriculture, funds are being raised to assist in fencing the exclusion, to eradicate any feral animals within it, and to carry out a biological survey. The survey will help to determine the exact boundary of the excluded area so that fencing can proceed according to the land systems on the station.

Management generally will be by CALM but in close liaison with the management of Boolardy and the Murchison LCDC. This arrangement gives the great advantage of the input of local knowledge and continual surveillance of the area, with little management cost to any individual, or department. The LCDC would act as an advisory committee to CALM, so saving that Department the task of establishing a new committee.

For the future of those involved in the Rangelands we see a united effort by both the users and those that help to manage these areas that are so fragile. By co-operation in ventures like the Boolardy example we can ensure that these areas are kept as they are for generations to come.

## CONCLUSION

In conclusion, we have tried to show that conservation, in its broadest sense is about the inter-relationships between people and the environment. It encompasses, on the one hand "applied conservation " which is about land-care for sustainable development and on the other hand, nature conservation which is about maintaining natural ecosystems and species diversity. The arguments for conservation are both utilitarian and ethical. We have also argued that Nature conservation makes an essential, often unrecognised, contribution to land care, and that the two forms of conservation are inextricably linked.

Our present conservation system does not represent the diversity of ecosystems found throughout the rangelands. It is important that further representative areas are set aside in perpetuity, through formal reservation, for the purpose of nature conservation. Also, through community interest important additional areas may be identified and managed for their nature conservation values. This provides the opportunity for pastoralists to become personally involved both in the identification and management of areas which will be beneficial to the long term maintenance of the rangeland ecosystems.

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