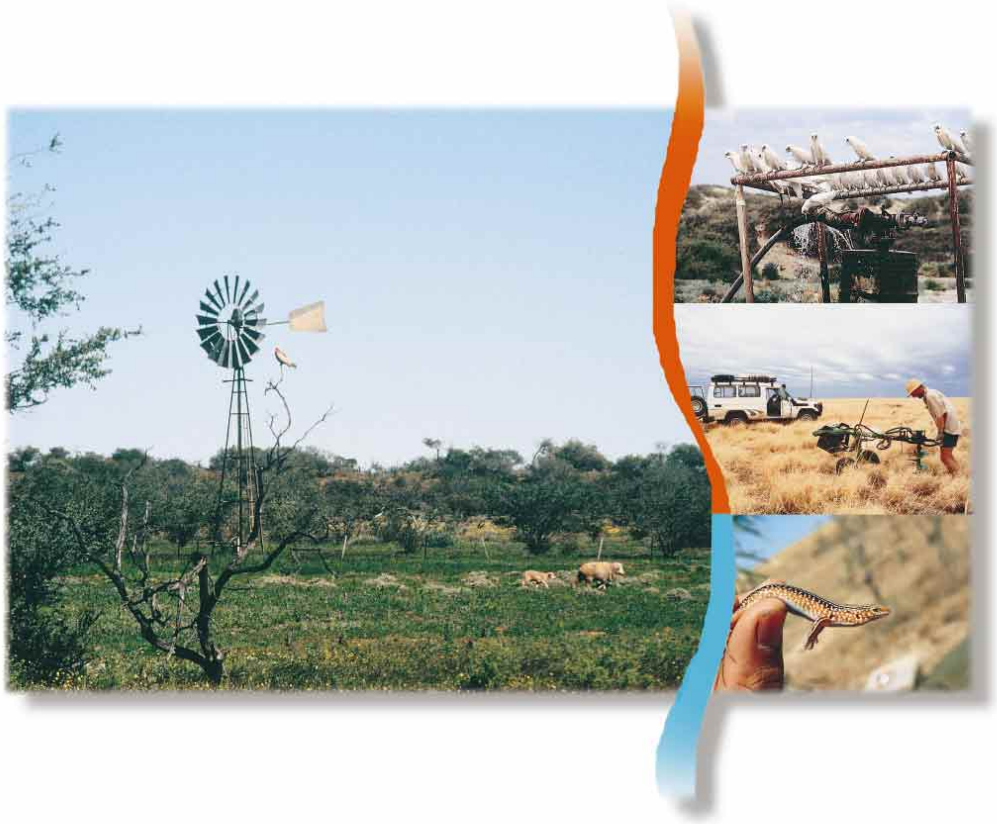
biograze

waterpoints and wildlife



"this document outlines how biodiversity conservation can be integrated with grazing in the dry rangelands in order to look after Australia's plants and animals, and to create a green marketing advantage for industry"

Final Project Report - November 2000

biograze

is a collaborative project by staff from CSIRO Sustainable Ecosystems, the Pastoral Board of South Australia, South Australian Department for Environment and Heritage, the Parks and Wildlife Commission of the Northern Territory, and land managers in the regions in which we work. The project was jointly funded by these research agencies and the Land and Water Resources Research and Development Corporation.

Photos by biograze team and Dave Albrecht, Graham Chapman and Hugh Pringle.

Front cover images:
Left: Sheep at water point, Carnavon WA;
Right top to bottom:
Corellas at Perni Bore;
Digging holes for pit traps, Barkley Tableland;
Ctenotus pulchellus.

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contents

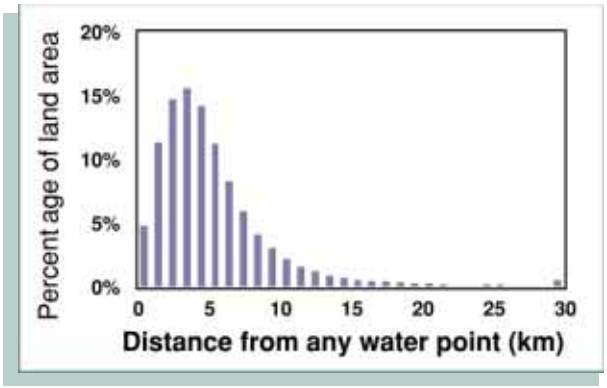
the current situation

"decreaser" species under pastoralism

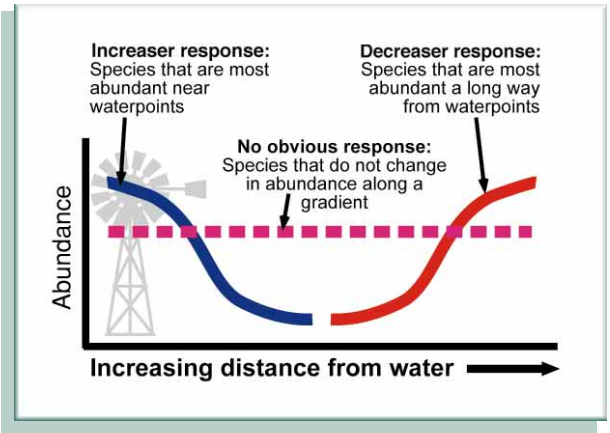
The biograze project is concerned with managing the interactions between grazing and biodiversity. The rangelands — the dry pastoral lands — make up about 60% of Australia and are home to many animals and plants. Many of these are not adversely affected by pastoral land use. Pastoralists know that there are grass and shrub species that change in abundance under different grazing pressures – some plants are decreasers under grazing, while others are increasers. We now know that this pattern applies to most types of plants and animals. Furthermore, some decreasers are so sensitive that they occur only where there is negligible grazing pressure.

Areas with very light grazing pressure are usually a very long way from water points. This is because domestic stock, native and feral grazing animals, all need to drink frequently during hot summers that occur in rangelands. This reliance on water limits how far they can walk to graze between drinks. The number of waterpoints in pastoral areas is increasing because it is good management to spread grazing pressure evenly. However, one result is that there is now little land left that is only lightly grazed (illustrated below). This may lead to the severe decline of those species that are very sensitive to grazing.

The proportion of land area at different distances from water, for a typical rangeland region in central Australia.



The diagram below shows how the composition of native plant and animal species changes with distance from an artificial source of water. The increaser species are most numerous near waterpoints, whereas the decreaser species are most numerous in lightly-grazed areas further from water. In some habitats there are decreaser species that are particularly sensitive to grazing and they are found *only* at water-remote sites.



key points

- most native plant and animal species in the rangelands are not affected by grazing
- but, decreaser species do decline in number because of waterpoints and grazing
- some decreasers are found only in areas a long way from waterpoints
- these areas have very light or no grazing
- there is less and less land remote from water where decreaser species can flourish

a new approach

property planning for production and conservation outcomes

The concept

To conserve rangeland species we must plan at a regional scale because:

- a few large national parks alone are inadequate for conservation in the vast and variable rangelands;
- grazing-sensitive, decreaser species must be provided for by retaining a regional network of areas in which grazing is very light or absent;
- the impacts of feral animals and weeds must also be controlled where they are having a detrimental effect – foxes and cats prey on native fauna; goats, rabbits, donkeys, horses and camels can contribute substantially to total grazing pressure; and weeds make conditions less favourable for many native species;
- kangaroos can also be numerous and contribute to grazing impacts.

key points

- decreaser species can be conserved by retaining areas where grazing is very light or absent
- feral animals and weeds should also be controlled where they occur
- a biograze conservation network should:
  - *cover up to 10% of the total area;*
  - *represent each habitat type;*
  - *contain a number of different areas of each habitat type*

The biograze project has focussed on integrating conservation with property planning to enhance the survival of decreaser species

Dealing with issues such as feral predators or localised rare and endangered species may require additional actions which can be linked with the biograze approach to encompass the range of conservation goals in a region.

The basic principle of biograze is to develop a network of lightly grazed or ungrazed areas in order to cater for decreaser species.

Ways to achieve this have been explored in a hypothetical way by:

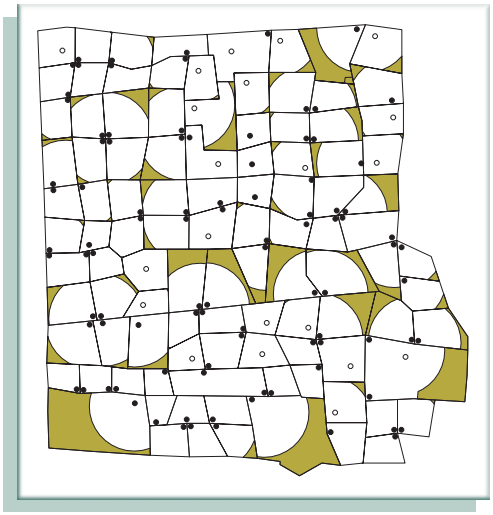
(i) retaining some corners of paddocks in a water-remote state, and
(ii) fencing off a selection of lightly-grazed areas.

For effective regional-scale conservation, the following principles are proposed:

- set aside an adequate area as lightly grazed or ungrazed – we suggest about 10% of the total area for sensitive landscapes and habitats, and about 5% for more resilient landscapes and habitats;
- represent each type of habitat in a region – because different habitats have different types of species;
- select a number of grazing-protected patches of each habitat – because it is good insurance to protect more than one example of each type of habitat; and
- try to get an even spread of grazing-protected areas across the region – this is so that no single person or property is overburdened with conservation areas; it also allows species to move between areas (*e.g.,* to track good rains or for breeding); and reduces the possibility that a 'catastrophe' will wipe out the entire population of a restricted species.

Usually, there are many different combinations of the available lightly-grazed areas that can be selected to achieve the goals outlined. Each different combination of areas has different advantages, disadvantages and costs associated with it. The biograze project has examined a range of examples for two regions. However, only local discussion and negotiation with land managers can determine which design is most *appealing* to managers, most *effective* for conservation in the region, and, importantly, least *expensive*.

Examples of biograze landscapes:
these two figures show how biograze planning may look in different regions.



*Filled circles are the current waterpoints; unfilled circles are the waterpoints that **could** be installed after a biograze conservation plan is developed*

Sheep-grazed area where 10% of the total area (shaded) is water remote, and retained for decreasers

Cattle-grazed area where 5% of the total area (shaded) is water remote and retained for decreasers

In both examples, some paddocks have been selected to meet conservation targets for decreasers. Paddocks not selected for conservation could be developed by adding new waterpoints (shown as unfilled circles). This scenario is likely to be ecologically as well as economically sustainable, because it caters for species that are sensitive to grazing, without placing too many constraints on pastoral development.

key points

- usually, many areas are available for a biograze conservation network
- only some of these areas need to be selected
- areas not selected for conservation can be developed
- regional planning can achieve conservation targets with minimum costs to production

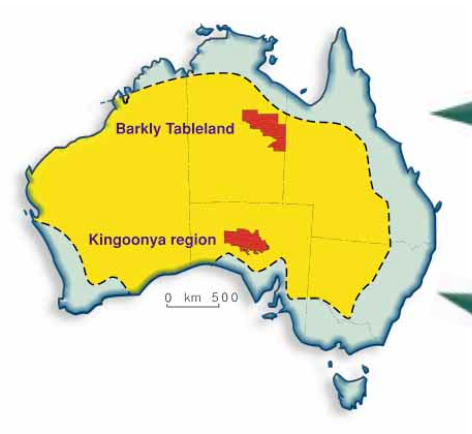
project goals

- to survey plants and animals in two regions to determine responses to grazing
- to develop regional conservation plans
- to assess realistic costs of implementing conservation plans

case studies in two regions

species' response to grazing

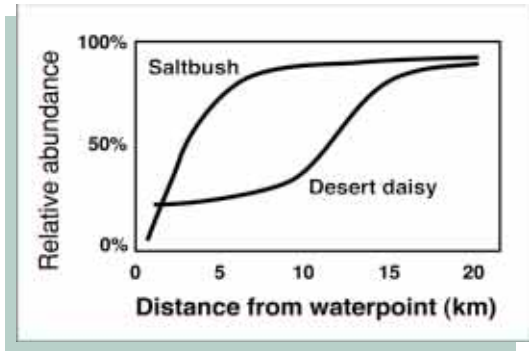
To develop conservation strategies for different pastoral areas, we studied two regions – the Barkly Tableland in the Northern Territory and the Kingoonya region in South Australia (see map). These regions were chosen because they have different grazing systems, climates, habitats, and economic potential, allowing us to compare and contrast the results. In the next four sections we outline the results of field surveys of species, how potential conservation plans were developed, calculation of economic costs, and an assessment of benefits for each of these regions.



We surveyed birds, plants, reptiles, mammals, and invertebrates (focusing on ants), and examined how many individuals of each species occurred at different distances from waterpoints. This allowed us to test whether distance from water was a useful surrogate of the impacts of grazing on biodiversity.

Here are some examples of the changes in abundance of native plants and animals that we found in the two regions:

Top: Desert Daisy (Vittadinia eremaea); Bottom: Saltbush (Atriplex vesicaria)

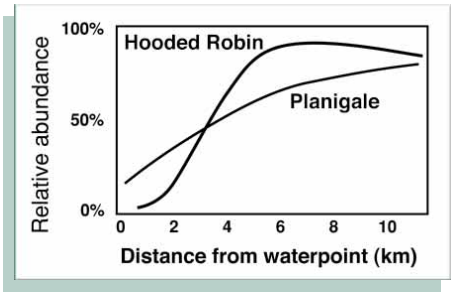


Bladder saltbush *(Atriplex vesicaria)* and a Desert daisy *(Vittadinia eremaea)* are two decreaser species with different response shapes in the Kingoonya region.

Bladder saltbush is reduced to low densities very close to water but quickly becomes more abundant outside the high-impact zone near water. By comparison, the Desert daisy is much more sensitive to grazing, occurring in high numbers only at sites a long way from water.

The Long-tailed Planigale *(Planigale ingrami)* is a mammal species that is widespread on the Barkly Tableland, where it lives in cracks in the soil. Small mammals occur in low numbers and it is hard to trap enough of them to detect their response to grazing, but it decreases moderately towards water. The Hooded Robin *(Melanodryas cucullata)* lives in mulga woodlands and has been declining in numbers over most of Australia for the last few decades. In the Kingoonya region, most Hooded Robins are seen at sites more than 6 km from waterpoints. It may be declining because areas this far from water are shrinking in number and size.

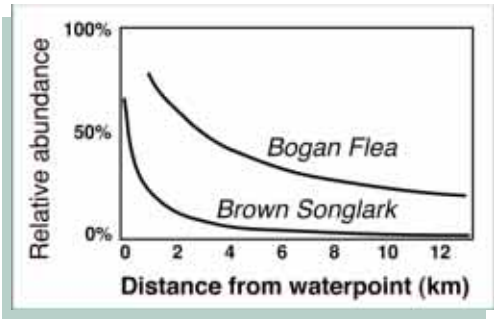
Long-tailed Planigale; Hooded Robin

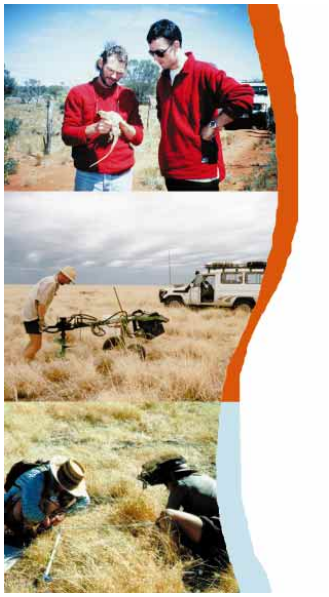


Not all species are negatively affected by grazing. Only about 10-15% of species in these regions are decreasers. A similar percentage are increasers, and the rest either show no obvious trend or we counted too few of them to be able to detect a trend.

The Brown Songlark *(Cinclorhamphus cruralis)* and the Bogan Flea *(Calotis hispidula)* are two species that increase close to waterpoints: Songlarks like the open space, and the Bogan Flea is a good coloniser of disturbed areas (sheep also help spread its burrs). Many 'weedy' native species, as well as some exotics weeds (e.g., Arabian Grass) have done well in the area of heavy grazing and disturbed soils around stock waterpoints. A number of bird species such as Galahs and Corellas are also commonly seen around waterpoints. This is of no great benefit from a biodiversity perspective, of course, because these species are already widespread and abundant.

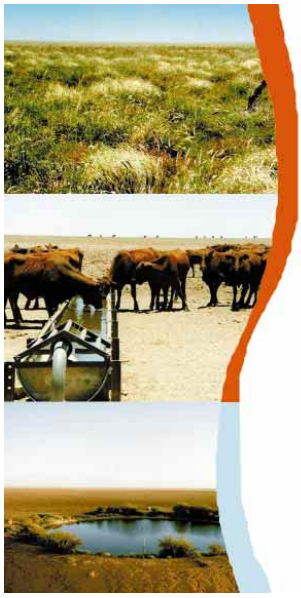
Top: Brown Songlark (Cinclorhamphus cruralis); Bottom: Bogan Flea (Calotis hispidula).





project results

- decreaser, increaser and neutral responses were detected in a range of species
- some decreaser species were plants that are palatable to stock
- some increaser species were plants that are "weedy" or animals that need to drink regularly



conservation plans

guidelines for regional-scale planning

We now apply the rangelands conservation principles from page 2 to the two case study regions. The project aimed to test a realistic process of planning so that we could make a meaningful assessment of possible costs and benefits.

However, the project did not aim to implement conservation plans in these

key points

- only small areas are more than 9km from water on the Barkly Tableland
- two main habitats: grasslands and wetlands
- cattle are restricted by fencelines
- strong grazing gradients in paddocks
- some fencing required for wetland habitats

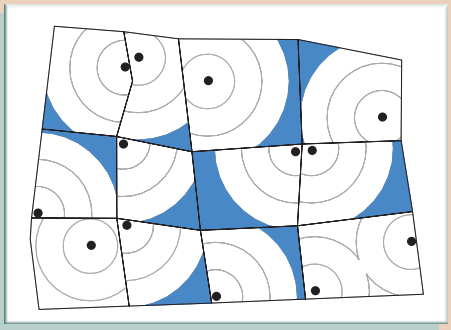
Resilient and "simple" landscape

Mitchell grasslands (Barkly Tableland)

- decreaser species not usually *restricted* to ungrazed areas
- relatively homogeneous vegetation types (2 grazed habitats)

Cattle are the main grazing animals

- grazing gradients are constrained by paddock fencelines
- lightly grazed areas are found at more than 9 km from water within a paddock



Conservation design principles that were applied

- lightly-grazed area target of around 5%
- need to represent two habitat types (Mitchell grassland and wetlands)
- aim to have even spread of conservation sites across region
- exclude paddocks and water-remote areas smaller than 20 km^2

Results

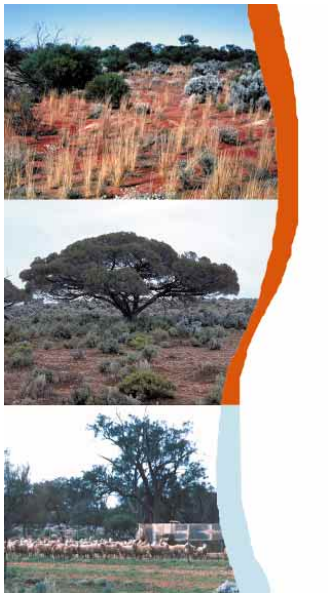
- existing areas more than 9 km from water (and more than 20 km^2 in area) only achieve 2.6% of total area
- therefore, not much flexibility in network design unless ungrazed areas are created by fencing off land

Implementation considerations

- fence off some wetland areas to prevent grazing but large water-remote areas do not require fencing
- it may be necessary to increase the area and improve the evenness of spread of water-remote grassland areas, by fencing and by moving waterpoints

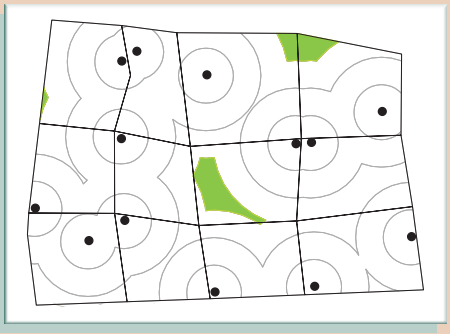
regions; this could follow if land-holders wish to pursue these ideas, and would require much more discussion.

In this section we present the "guiding principles" that were devised for the two regions. These can be adapted and applied to other regions in Australia. Comparatively, the Barkly Tablelands are resilient and fairly simple landscapes, while the Kingoonya region has a much greater mixture of habitats, some of which are not so resilient. This affects the responses of their plants and animals to grazing.



Less resilient and more "complex" landscape
Mulga woodlands and chenopod shrublands (Kingoonya, SA)

- some "decreaser" species occur *only* in ungrazed areas
- patchwork of different vegetation types (5+ habitats)



Sheep, goats and kangaroos all contribute to total grazing pressure

- grazing gradients cross paddock boundaries because of kangaroos (and goats in other regions)
- lightly grazed areas are found at more than 6 km from water (ignoring fencelines and allowing for prevailing winds)

Conservation design principles that were applied

- lightly-grazed area target of around 10%
- need to represent 5 different habitats
- aim to have even spread of conservation sites across region
- exclude paddocks and water-remote areas smaller than 10km^2

Results

- existing areas more than 6 km from water exceed 10% target for most habitat types
- therefore, many options for negotiation over which paddocks will be used for conservation network

Implementation considerations

- fencing is costly because goats and kangaroos cross normal fencelines, therefore an unattractive strategy
- careful planning of the placement of new waterpoints (and perhaps moving a few existing waterpoints) is the best option

key points

- moderate area more than 9 km from water in the Kingoonya region
- five main habitats including dry lakes, chenopod shrublands and mulga woodlands
- sheep are restricted by fencelines but goats, kangaroos and rabbits are not
- mostly strong grazing gradients in paddocks
- some fencing required to protect very sensitive species

key points

- setting-aside some areas for conservation has costs
- current pastoral production will not be affected much by biograze planning
- there are opportunity costs of not developing some areas
- fencing may be needed to control stock and other animals
- conservation agreements could be signed for most chosen areas

economics

calculating the costs of biograze conservation in rangelands

Nature conservation has costs. A realistic indication of the costs of the hypothetical regional plans for the two case study regions is shown in the table on the next page. The plans involve these actions:

- identifying paddocks with water-remote areas suitable for supporting healthy populations of decreaser species.
- choosing some of these paddocks to create a regional network of sites that meet the percentage area targets and habitat representation mentioned earlier.
- continuing to graze most of the selected paddocks as they are currently, but not allowing further waterpoint development in them in order to protect their lightly-grazed areas.

These actions result in some one-off establishment costs and other ongoing costs:

One-off costs

- some of the water-remote areas may be fenced off to help control grazing activity, resulting in fencing costs.
- sometimes it may be useful to move a waterpoint, in order to expand existing lightly grazed areas without net loss in production.
- if a non-functional or derelict waterpoint is decommissioned, there is a small clean-up cost.
- there will also be costs associated with negotiation and developing agreements.

On-going costs

- agreeing to keep the selected paddocks in their current state incurs opportunity costs of not being able to graze them in the future—this is potential production foregone for the sake of conservation.
- if water-remote areas are fenced, there may be (very small) reductions in current production levels.
- sometimes, producers may agree to forego some grazing production in order to create new ungrazed areas.
- there are ongoing costs for fenced off areas including fence maintenance, pest, weed and fire management.

The table on the facing page shows a realistic assessment of the costs of establishing and maintaining a network of water-remote sites in each region. These costs assume:

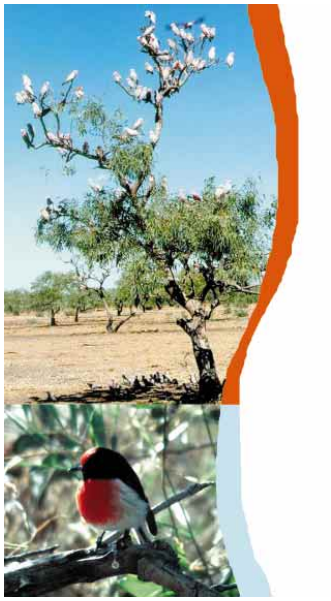
- no waters are closed down (only existing water-remote areas are used);
- the paddocks in the network can still be grazed;
- the water-remote areas are preserved for decreaser species either by retaining them as water-remote or by fencing them off, through agreement with the manager.

		Barkly Tableland 54,700 km²	Kingoonya 56,000 km²
Attributes of region	Percentage of whole region at different distances from water	1.0% is more than 12 km 4.9% in 9-12km band	3.3% is more than 9 km 16.5% in 6-9km band
Attributes of regional plan	Area targets	5%	10%
	Number (& %) of paddocks in region affected to reach the area target	48 (10%)	262 (30%)
Cost values	Net value of production per head per year	Cattle: $40	Sheep: $15
	Fencing (including labour)	$2,000 per km	$1,500 per km
	Cost of installing a new waterpoint	$38,000	$20,000
	Amortisation period for capital investment	10 yrs	10 yrs
Costs of conservation plan	**One-off costs** (if half of the areas were fenced)	$657,000	$4,484,000
	On-going costs:		
	Opportunity costs	$244,000	$ 351,000
	Lost production	$ 12,000	✻
	Maintenance costs	$186,000	$ 448,000
		$442,000	$ 799,000
Costs per paddock	One-off	$ 13,700	$ 17,000
	Per year:		
	On-going opportunity	$ 5,000	$ 1,300
	On-going lost production	$ 250	✻
	On-going maintenance	$ 3,900	$ 1,700

✻ Grazing value lost is negligible because fenced areas are so far from waterpoints.

Fencing is not necessarily required in all situations: depending on the sensitivity of species or a habitat to grazing, or whether grazing at a particular time is detrimental, agreements not to install new waterpoints, or to control total grazing pressure, may be sufficient protection.

These figures, especially ongoing costs, are not exceptionally large given the size of the regions (1/50th of the area of the grazed rangelands), and the total value of stock production. It should also be borne in mind that implementation of property and regional planning, and the one-off costs associated with them, would be spread over a number of years. The benefits of biograze could accrue both to Australian society and to the industry, as discussed on the next pages, so the costs should be shared appropriately.



key points

- fencing costs are substantial - but not always necessary
- opportunity costs are for areas set aside for conservation
- lost production costs are negligible because biograze chooses areas not much currently grazed
- maintenance costs relate mainly to fences
- overall, costs are modest given the size of the areas and value of pastoral production
- costs should be shared appropriately among government and industry

key points

- biograze data can illustrate changes in numbers of a species due to waters & grazing
- most sensitive decreasers have potential to be put at major risk
- a number of questions still remain unanswered
- refinements to the regional planning approach can be made
- biograze planning needs to be implemented and tested in a few regions

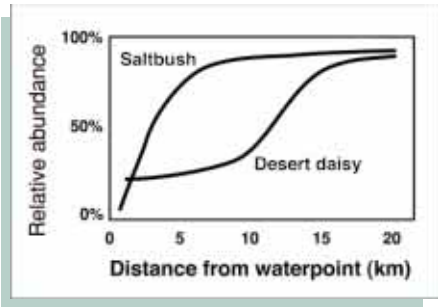
biodiversity benefits

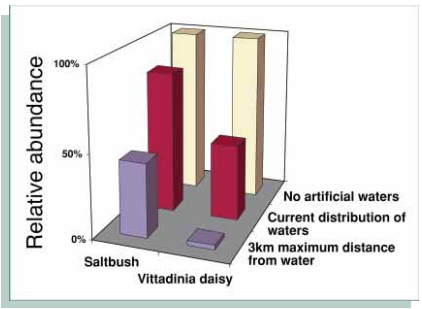
larger numbers of decreasers with biograze

Our survey results allow us to estimate the population size of species at different distances from water. Hence we can estimate the risk to native species of future developments of waterpoints across a region by comparing changes in population sizes:

- as they may have been before waterpoints and stock grazing were introduced;
- as they are now in a typical paddock; and
- as they might be if waterpoint development proceeds to even grazing distributions, with no areas beyond 3 km from water.

Imagine decreaser species with population responses like Saltbush and the Desert daisy (shown on page 4). The proportion of each population type expected to remain with different levels of water development is shown in the figures below.





If waterpoint development for even grazing was complete (6 km spacing), some decreaser species would be reduced to very small population sizes, scattered across the landscape. This is likely to lead to the extinction of these species in the region.

will it work?

The principles and plans that have been developed in the biograze project have not yet been *proven* to guarantee the regional conservation of a range of decreaser species. However, they are based on the best information we have about how Australian species have responded to pastoralism, and the best available conservation principles.

Some of the questions that still need to be answered to help plan for the long-term conservation of species are:

- how big, how far apart, and how numerous should lightly-grazed areas ideally be?
- does lowering the stocking rate in a paddock change the distance from water at which decreaser species occur?
- do decreaser species do better if managers spell paddocks or rotate animals from one water point to another?

There are no answers to these questions yet. They can only be tested in a large-scale co-operative "experiment" undertaken by land managers and wildlife researchers. While more information is being collected to refine planning, action can be taken now to manage better for decreaser species, and to seize the opportunity to create "environmentally-friendly" marketing opportunities.

benefits for pastoralists

creating opportunities

The economic costs of the biograze proposals, as described on page 9, are relatively small but not inconsequential for individual pastoralists. So what benefits could there be?

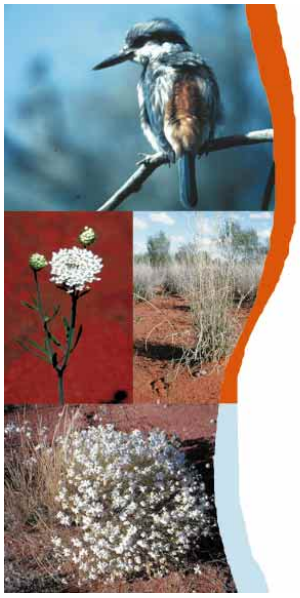
- **potential access to "green" markets**
  There is a growing awareness among consumers that unplanned development for food production is one of the main reasons for environmental problems like loss of biodiversity and increasing salinity. Thus, there are more people calling for assurances that food production and environmental health are compatible. Rangeland regions in Australia are ideally placed to lead into this emerging market niche because they are based on natural, uncleared ecosystems where it is possible to establish "biodiversity friendly" credentials with relatively small effort. Benefits of this approach will mean guaranteed market share and market access as this consumer trend develops. Moves to establish environmental-performance certification procedures (e.g., using ISO 14000), and the product brands that go with it, are already underway in a number of areas in Australia. While it will take some time to develop performance and monitoring procedures, and brands, biograze can be implemented now to help pastoralists establish best-practice, biodiversity-friendly management which will ultimately be of benefit in "green" markets.

- **credit for biodiversity-friendly management**
  Governments are also looking to reward producers for good environmental performance through "credit" systems. While it is early in the development of a Biodiversity Credit system, there are potential financial benefits such as improved capital value for properties that are recognised for their contribution to biodiversity management.

- **opportunities for planned property development**
  Once some paddocks have been identified for a decreaser species conservation network, other paddocks on a property can be developed. Property planning with biograze removes some potential conflicts between development and conservation and provides greater certainty for long-term capital investment by pastoralists.

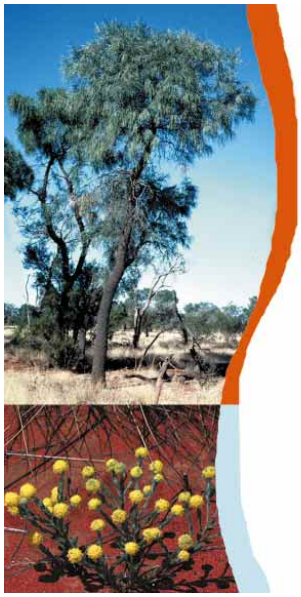
- **indicative costs for land stewardship**
  Costs shown in this booklet are a guide to the possible amounts that might be allocated as stewardship payments for work a pastoralist could undertake for conservation management.

Another benefit is an improved conservation network at lower cost. In rangelands, relatively small areas are currently reserved and managed for biodiversity. Distances between reserves are large, making them rather inadequate as a conservation network. The biograze approach aims to fill in gaps between reserves by establishing a network of areas that caters for the needs of most species under the influence of stock (from lightly to heavily grazed). Combined with management to control total grazing pressure and feral predators, a large proportion of native species should be maintained across the landscape. Costs of conservation through a biograze network are lower than those for an equivalent area of reserves.



key opportunities

- **demonstrated commitment to biodiversity management leads to:**
  - *development of environmental credentials;*
  - *access to "green" markets as they develop;*
  - *possible access to "biodiversity credit" schemes when they develop;*
  - *property development plans that can be justified as environmentally-friendly;*
  - *improved standing in society as good land managers;*
  - *effective conservation at lower costs to Australians*



key points

- biograze planning is flexible and simple
- the steps summarised at right do require expert guidance
- the biograze project team is willing to advise you
- contact details are given on the opposite page

actions

steps toward implementing biograze

The conservation solutions suggested in this booklet are flexible. In most cases the targets can be achieved with little disturbance to existing production. In some regions the area needed for decreaser species may not be achieved without small adjustments to existing fences and waterpoints. Taking action to develop a regional plan for decreaser species will demonstrate that pastoralists are acting to make the industry ecologically sustainable.

What actions can you take? Biograze can be implemented through these steps:

- identify areas on your land that are lightly-grazed. Usually these will be a long way from water within a paddock – say beyond 7 km in sheep country and 12 km in cattle areas. If you have many kangaroos or goats (which cross fences), lightly grazed areas must be a long way from any water, irrespective of fences. Rabbits do not usually need to drink so they can be found at any distance from water and can also graze an area heavily.
- some regions have little land at these large distances from water. Other lightly grazed land (e.g., more than 8 km from water for cattle, or more than 4 km from water for sheep) can still be valuable for supporting decreaser species.
- estimate what percentage of the land area is lightly grazed. At this stage, we suggest that decreaser species need around 10% of the total area, until more work is done to verify this figure.
- using a vegetation or landsystem map, identify the different major types of country. Are all country types available in a lightly grazed state? Usually not, on a single property. This is one reason for taking a regional approach – see below.
- decide which areas are to be kept lightly grazed as part of a conservation network for decreaser species. Usually, not all areas will be needed. Try to allocate 10% of each country type. This is usually hardest with the most productive types of country.
- encourage other managers in your area or Landcare group to do the same – it is easier to find enough of each country type across several properties. Try to pick water-remote areas to get a fairly even spread of each country type across the region.
- consider contacting the biograze project team, or government wildlife and pastoral management personnel, to discuss a network plan that you have devised, or for help in doing the above.
- consider entering into voluntary conservation agreements for these areas and persuading wildlife experts to help monitor decreaser species. The market opportunities discussed on the previous page will come from demonstrating both commitment to, and the success of actions.

If your Landcare group is interested and would like help with the process, contact any of the project team named inside the back cover, or your local government officers.

more information

list of technical fact sheets available with this booklet

The following Technical Fact Sheets are available for more information on specific parts of the biograze project. If you would like copies of any of these, contact one of the people mentioned below, or download them from our web site shown below.

- GIS procedures for biograze planning
- Regional planning for off-reserve conservation in rangelands
- Economic costs of biograze conservation in rangelands
- Voluntary conservation agreements
- Environmental Management Systems and biodiversity

Further reading

- Fisher A. (1998) Achieving off-reserve conservation goals in the Barkly Tableland. Australian Farm Journal, August Volume 16.
- Landsberg J., James C. D., and Morton S. R. (1997) Assessing the affects of grazing on biodiversity in Australia's rangelands. Australian Biologist 10: 153-162.
- Fisher A. (1999) Conservation assessment and identification of gaps in protected areas in the Mitchell Grasslands, particularly in the Northern Territory. Final Report to Environment Australia. Parks & Wildlife Commission NT, Darwin.
- James C. D., Landsberg J., and Morton S. R. (1999) Provision of watering points in the Australian arid zone: a review of effects on biota. Journal of Arid Environments 41:87-121.
- James C. D. (2000) Clean, green and profitable grazing is possible. Farming Ahead 100: 81-82.
- James C. D., Stafford Smith D. M., Landsberg J., Fisher A., Tynan R., Maconochie J. and Woinarski J. C. Z. (2000) Biograze – Melding off-reserve conservation of native species with animal production in Australian rangelands. *In*: Saunders D., Craig J. (eds) Nature Conservation 5: Conservation in Production Environments: Managing the Matrix. Surrey Beatty & Sons, Sydney, pp. 290-300.
- James C. D. (2000) Biograze - Conserving Australia's rangelands. Australian Landcare June 2000: 20-21.

Contact details

- Alaric Fisher (Parks and Wildlife Commission of the NT). ph (08) 8944 8471; alaric.fisher@nt.gov.au
- Craig James (CSIRO Centre for Arid Zone Research). ph (08) 8950 7100; craig.james@cse.csiro.au
- Jill Landsberg (James Cook University) ph (07) 4042 1443; jill.landsberg@jcu.edu.au
- John Maconochie (SA Department for Environment and Heritage). ph (08) 8204 8865; jmaconochie@deh.sa.gov.au
- Hugh Pringle (Agriculture WA). ph (08) 9021 0888; hpringle@agric.wa.gov.au

Web site

This Booklet and other information is available on our website: http://www.cazr.csiro.au/biograze

if you have any questions about:

- biograze;
- biodiversity credit schemes;
- green markets; or
- environmental certification;

contact:

- Alaric Fisher, Darwin;
- Craig James, Alice Springs;
- Jill Landsberg, Cairns;
- John Maconochie, Adelaide;
- Hugh Pringle, Kalgoorlie.

overview

This document outlines how biodiversity conservation can be integrated with grazing in the dry rangelands, in order to look after Australia's plants and animals, and to create a green marketing advantage for industry

key points covered:

- most native species appear to be surviving well in grazed rangeland areas.
- most native species should not be at risk from future pastoral developments if sustainable management is practiced.
- but, a significant number of decreaser species are vulnerable to the effects of further waterpoint developments.
- some decreaser species have declined in abundance and geographic extent; these trends will become more pronounced in the future if no action is taken.
- although much is already known about how to minimise grazing impacts on soil and perennial forage species in rangelands, less is known about how to minimise impacts on decreaser species.
- this booklet outlines how future development in rangeland regions could be designed to maintain decreaser species.
- these designs have implementation costs, such as the capital costs of fences, and ongoing opportunity costs; examples are given of these for different strategies in different regions.
- the costs associated with improving the biodiversity conservation component of pastoral management are not great, and should be shared between industry and government.
- grazing and conservation can be integrated in the rangelands, creating large opportunities for pastoral enterprises such as "biodiversity credits" and the marketing of "environmentally-friendly" products.
- a system that caters for the habitat needs of the most grazing-sensitive species can be developed at low cost now, and has potential for financial rewards and additional market options in the future.

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