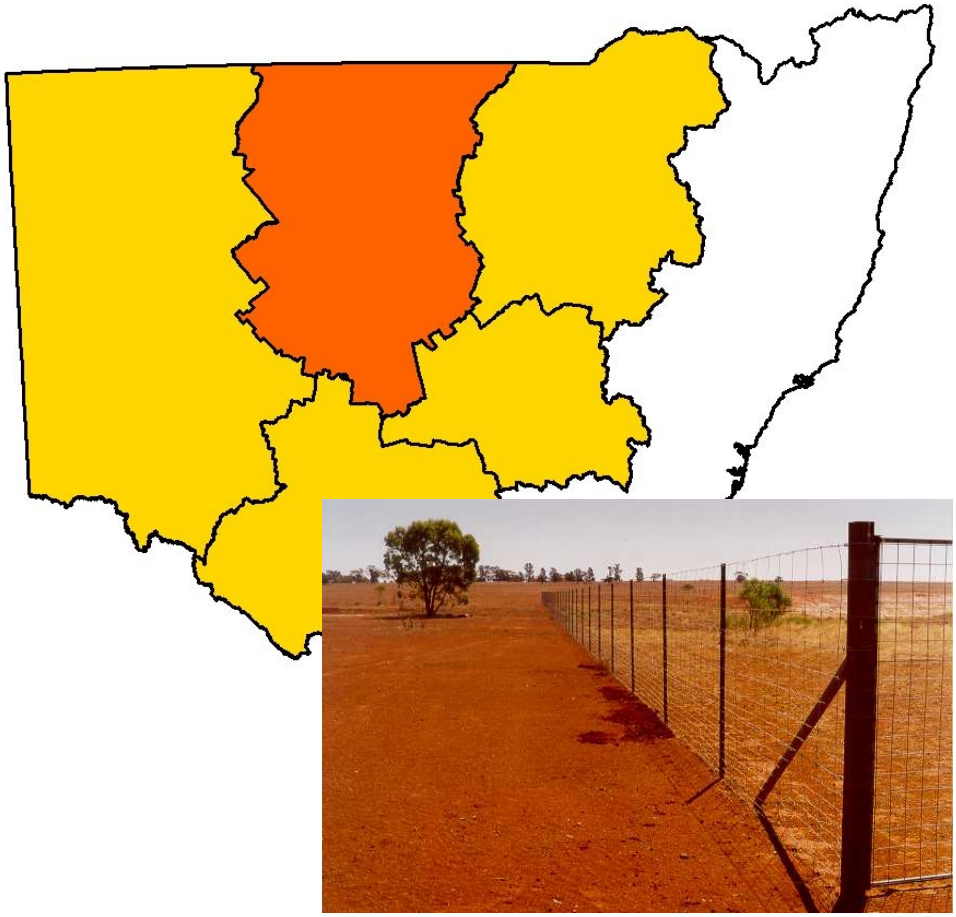
Upper Darling Region

Pest Management Strategy



2003 - 2006

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Cover image: Exclusion fences with drop down one-way goat ramps have been constructed around artificial water points in Yathong Nature Reserve. The exclusion fences will improve the control of feral goat populations and enable better management of other pest animal populations within the Reserve

Photograph by Michael Wales.

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Regional Pest Management Strategies

Foreword

Pest animals and weeds are the targets of the five regional pest management strategies for central and western NSW. The strategies are an initiative of the National Parks and Wildlife Service (NPWS) and have been released by the Western Directorate for public information. The release of the pest management strategies follows a two-month public exhibition of draft strategies during August and September 2002, which provided an opportunity for the community to have their say in how they were developed.

These strategies recognise that pest species are a problem across the landscape and they aim to maximise the effectiveness of pest control programs, particularly through cooperative programs with neighbours and others.

The NPWS is committed to a regional approach to pest management where the programs are developed and often undertaken in collaboration with neighbours, other government agencies, rural lands protection boards, local government councils, regional pest committees, CSIRO, universities and community groups such as Landcare, and Bushcare volunteers.

These documents identify the major pest populations within the regions, and establish priority control programs. The aim is to apply best practice, humane, cost effective methods, which will have minimal impacts on the environment. In general this requires careful planning, to ensure an integrated approach is adopted using a range of techniques at critical times of the year, and often, the targeting of more than one species.

The pest management strategies establish direction for pest management activities within the NPWS' western regions until 2006. The year to year focus of control activities will vary with climatic conditions and available funding. The annual work programs will be set out in Regional operation plans. For further information on these details I encourage you to contact the Regional Manager in your Region.

TERRY KORN
DIRECTOR WESTERN

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1 Background

1.1 Introduction

Introduced pest species can seriously impact upon the biodiversity of reserved areas by modifying species richness, abundance and ecosystem function. They can also have significant impacts on the economic and social values of neighbouring areas.

This Pest Management Strategy is a review of the 1996/1997 Cobar District Pest Strategy and establishes the strategic direction for pest management activities within lands managed by the National Parks and Wildlife Service (NPWS) in the Upper Darling Region over the period 2003 - 2006. Priorities and programs for recent additions to the NPWS estate are still being finalised and will be included in subsequent revisions of the strategies.

This strategy incorporates further information collated from weed mapping, neighbour liaison, field survey work and information received from key stakeholders. The strategy also includes pest planning for the recent new additions to NPWS managed lands and the changes to the Regional boundaries.

The aim of this strategy is to maximise the effectiveness of pest control programs. It identifies the major pest species populations within the Region, and establishes criteria for prioritising control programs. The strategy provides a brief summary of control programs to be undertaken. Specific details of individual programs are addressed in operational pest control plans.

It is envisaged that this review of the strategy will continue to improve the development, coordination and implementation of pest species management within Upper Darling Region.

This Pest Management Strategy outlines how the NPWS manages pest species. In this strategy, the term “pest species” refers to introduced species of weeds and pest animals.

1.2 Upper Darling Region

The Upper Darling Region is approximately 100,000 square kilometres in size and is located in a semi-arid region of NSW, with an average annual rainfall of approximately 300 mm. The reserves contained within the Upper Darling Region include Yathong/Nombinnie Nature Reserves, Mount Grenfell Historic Site, Gundabooka and Culgoa National Parks, Nocoleche Nature Reserve, Ledknapper New Estate, Quanda Nature Reserve and Paroo-Darling National Park (Thilta Karra section). The Region has a staff of 19. Figure 1 indicates the location of the Upper Darling reserves.

Yathong and Nombinnie Nature Reserves are located approximately 130 km south of Cobar. Collectively they comprises 162,000 ha. The area consists of plain and low ridge country and comprises large continuous sections of remnant mallee, open woodlands, and sections of open grassland. Yathong Nature Reserve is an internationally recognised World Biosphere Reserve.

Nocoleche Nature Reserve is situated approximately 320 km north-west of Cobar. It is 87,300 ha. The reserve contains 8% of the total length of the Paroo River in NSW within its boundaries and comprises low floodplain country (Cuttaburra Channels) with sandy ridges. Significant areas of Yapanyah trees, which in NSW is restricted to the Paroo River, are contained within the reserve.

Gundabooka National Park is located approximately 115 km north of Cobar. It currently comprises an area of 43,568 ha of former grazing land. The area consists of Bimble Box-Pine, Mulga and Red Box,

Bimble Box and Belah. It is densely populated with Turpentine and Hopbush. It is recognised as an area noted for Aboriginal heritage value and can be expected to be a high visitation area.

Mount Grenfell Historic site is located approximately 70 km west of Cobar. The site contains many examples of Aboriginal rock art as well as other occupational evidence.

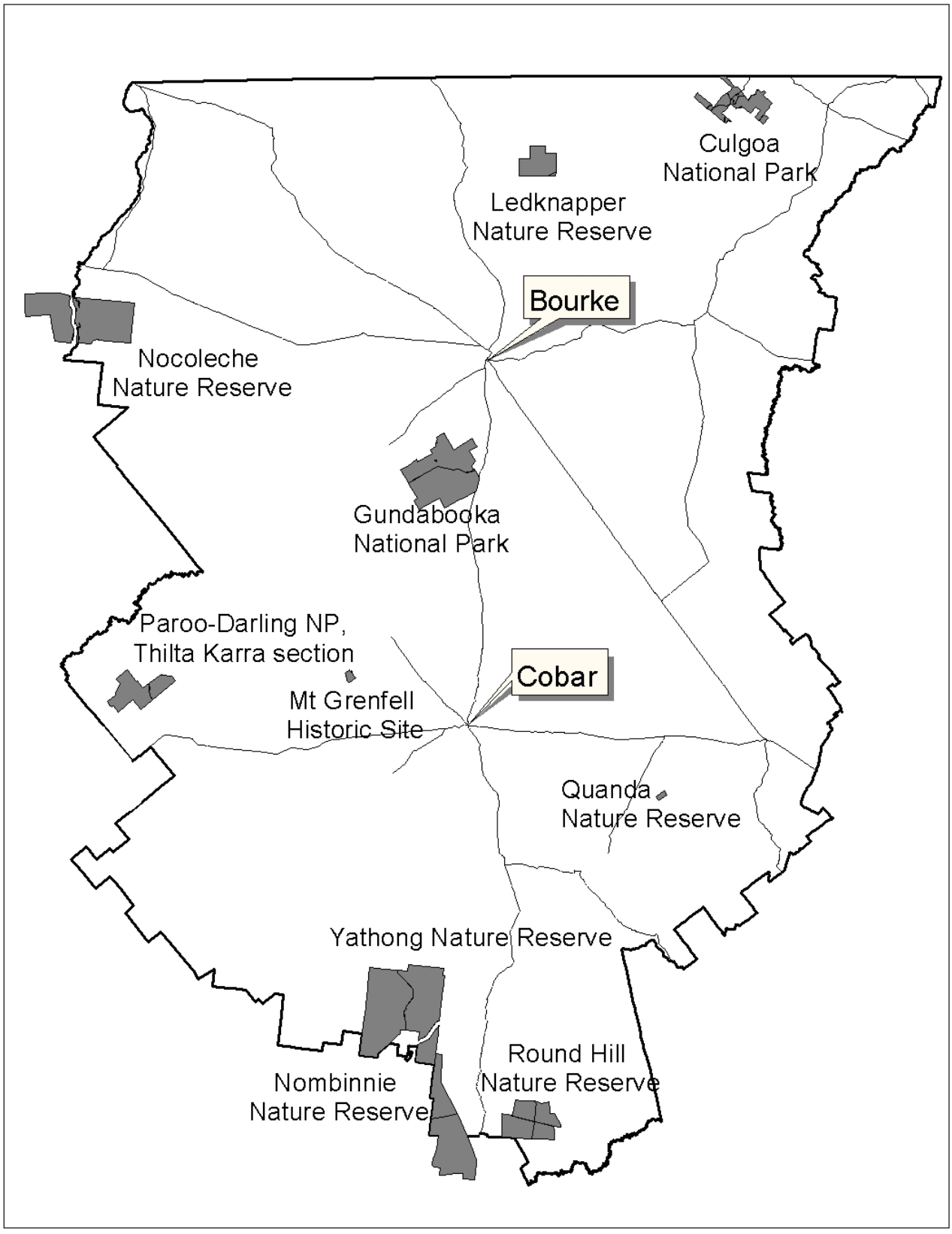
Culgoa National Park represents the grazing properties formally known as "Cawwell", "Byerawaring" and "Burban Grange" 40k South West of Goodooga and 100k North East of Brewarrina. This Park samples areas of Coolabah woodlands, River Redgum communities, natural grasslands, sandhills, Brigalow and Gidgee timber.

Ledknapper New Estate is a former grazing property of 16,000 ha. It is located 60 kms north-east of Bourke and comprises a unique vegetation community from spinifex to open woodland to hummock grasslands. It has great Aboriginal and European cultural heritage value.

Paroo-Darling National Park (Thilta Karra section) is a former grazing properties located 50 km south of Tilpa, 160 km west of Cobar, and covers 24, 225 ha. The property consists of open plains running into dispersed sandy rises and Poplar Box swamps, large areas of lakes filled from local and Darling River flooding, scattered Poplar Box, Coolabah and Lignum along channels and shorelines. It is sparsely timbered with Western Rosewood, Belah, Neila, Poplar Box, scattered Mulga and other Acacia species on sandy undulating country, and well covered with Copper Burr, Cannonball, Salt Bush and a large body of Speargrasses and herbages.

Quanda Nature Reserve was formally gazetted in 1963 and covered 854 ha. Combined with the adjoining pastoral property of "Millyvale", Quanda NR now totals 4,778.64 ha and is located 94 km east of Cobar and 50 km west of Nyngan. The reserve contains substantial stands of open woodland vegetation. Mallee, Red Box and Bimble Box dominate the woodlands. White Cypress Pine, Wilga and Kurrajong occur in association with the main canopy species.

Figure 1: Map of Upper Darling Region.



1.3 Legislation and Policy

The NPWS has a number of statutory responsibilities in relation to pest species management, and has also adopted a number of related policies.

1.3.1 *National Parks and Wildlife (NPW) Act 1974*

This Act vests the care, control and management of National Parks, Nature Reserves, Historic Sites and Aboriginal Areas with the Director-General of the NPWS. Key management objectives include conservation, provision of appropriate scientific and educational opportunities, and management of fire and pest species. These are achieved through the preparation and implementation of plans of management for each reserve, which identify pest species present, control strategies and priorities for that reserve. This pest management strategy incorporates actions identified in plans of management that have been completed within the Upper Darling Region.

1.3.2 *Threatened Species Conservation (TSC) Act 1995*

The main objective of the *TSC Act* is to conserve biological diversity. The Act provides for the listing of threatened species, populations and ecological communities. The Act also provides for the preparation and implementation of recovery plans for threatened species, populations and ecological communities and the designation of areas as habitat critical to the survival of those listed as endangered. The Act provides for the identification of key threatening processes, and the amelioration of these through the preparation and implementation of threat abatement plans.

One of the major features of the Act is the integration of the conservation of threatened species into the development control processes under the *Environmental Planning and Assessment Act 1979.* Thus, proponents are required to assess the likely impact of a development or activity on threatened species, populations or ecological communities or their habitats.

1.3.3 *Rural Lands Protection (RLP) Act 1998*

The pest animal provisions of the *RLP Act* commenced on 28 September 2001. The *RLP Act* sets out the conditions under which “animals, birds and insects” can become "declared" pests and provides for the control of such pest species.

Gazettal of pest species occurs through Pest Control Orders [s.143] which allow the Minister for Agriculture to specify which species are pests, either on a statewide or local basis, and the conditions or factors that apply to the control of each pest. Rabbits, wild dogs and feral pigs have been declared pest animals throughout NSW.

The *RLP Act* binds the Crown for the control of pest animals declared under the Act [s.142]. Public land managers such as the NPWS are required to eradicate (continuously suppress and destroy) pest animals "*…to the extent necessary to minimise the risk of the pest causing damage to any land*" using any lawful method or, if the Order specifies a method to be used, by the method specified [s.156(1)]. The Minister for Agriculture must consult with the Service before making a Pest Control Order that applies to lands managed by the NPWS [s.147].

Fauna listed under Schedule 1 or 2 of the *Threatened Species Conservation Act 1995* cannot be declared as pests [s.143(5)]. The Minister for the Environment must be consulted before any native fauna is declared a pest [s.144(2)].

The Pest Control Order for wild dogs, gazetted on 2 October 2001, provides for the general destruction obligation for lands listed in Schedule 2 of the Order

will be satisfied through a wild dog management plan [s.156(4)] that addresses both control and conservation objectives and has been approved by the relevant RLP Board for that District. Schedule 2 lists 254 reserves considered to contain high quality Dingo habitat on lands managed by the NPWS, State Forests of NSW, Sydney Catchment Authority and unoccupied Crown land managed by the Department of Land and Water Conservation.

1.3.4 *Noxious Weeds Act 1993*

Under this Act the Minister for Agriculture has the power to make Orders declaring plants as "noxious weeds" (listed in Schedule 1 of the Act). Weeds can be declared "noxious" if they pose a threat to agriculture, the environment or community health, and there is a public benefit from such declaration. A number of environmental weeds have now been declared under this Act, for example, bitou bush in all coastal councils and gorse in a number of tablelands and coastal councils. Noxious weeds are classified into four categories with different control requirements.

1.3.5 Wild Dog Destruction (WDD) Act 1921

The WWD Act requires landholders and occupiers in the Western Division to destroy all wild dogs upon such land and for the maintenance of the wild dog fence along the north-western parts of the NSW/Queensland and NSW/South Australian borders. The WDD Act does not bind the Crown.

1.3.6 Other Relevant Legislation

- *Environment Protection and Biodiversity Conservation Act 1999*
- *Agricultural and Veterinary Chemicals Code Act 1994*
- *Occupational Health and Safety Act 2000*
- *Environmental Planning and Assessment Act 1979*
- *Firearms Act 1996* and the *Firearms (General Regulation) 1997*
- *Heritage Act 1977*
- *Prevention of Cruelty to Animals Act 1979*
- *Pesticides Act 1999*
- *Occupational Health and Safety Act 1998*
- *Wilderness Act 1987*
- *Native Vegetation Conservation Act 1997*

1.3.7 NPWS Field Management Policies

A number of field management policies are relevant to this strategy.

Policy 1.9 *Exotic Plant Species* gives priority for control programs to exotic plants that are increasing in abundance and distribution, or displacing native flora and fauna, or where NPWS reserves adjoin land not infested or agricultural land. Programs that are practical and involve techniques with little harmful or residual environmental impact have preference.

Policy 2.3 states that *Introduced Animals* (with limited exceptions) shall not be allowed to remain on NPWS reserves as they may prey on native fauna or have other adverse impacts on vegetation, soils and water quality.

Policy 2.6 *Wild Dogs* acknowledges the complexities inherent in the need to conserve dingoes together with the need to control wild dogs. Baiting programs are only undertaken on NPWS reserves where there is adequate evidence of wild dogs

coming from those reserves and killing or maiming stock.

The *Firearms Policy* sets out procedures to ensure firearms are safely managed and used by NPWS staff in accordance with the relevant legislation.

2 Management Strategy

The Service is committed to a regional/catchment approach to pest management. The programs are developed and often undertaken in collaboration with neighbours, other government agencies, rural lands protection boards, local government councils, regional pest committees, CSIRO, universities and community groups such as Landcare, Farming for the Future, West 2000 and Bushcare volunteers and local Aboriginal land councils.

Upper Darling Region incorporates parts of seven Rural Lands Protection Board Districts: Cobar, Bourke, Brewarrina, Hillston, Wanaaring, Wilcannia and Nyngan. The Region is committed to working in conjunction with these organisations for more effective control of pest animals. Upper Darling Region encompasses three Shire Councils areas and the unincorporated area. Cooperation between the Region and relevant Council staff will be developed to improve and inform other stakeholders of control programs and potential cooperative programs.

The Service aims to manage populations of pest animals and weeds to minimise their adverse impacts. Many of the Service's weed control programs focus on environmental weeds because of the need to reduce the adverse impacts of these species on biodiversity conservation. However, to protect neighbouring properties, the NPWS also undertakes numerous programs targeting noxious agricultural weeds e.g. Serrated Tussock, Bathurst Burr, Noogoora Burr, Johnson Grass, Giant Parramatta Grass and Scotch Thistle. There is a clear recognition that the eradication of introduced pests over large areas is rarely, if ever, possible and resources must be directed to those species/localities where the benefits of control are likely to be greatest.

Wherever possible a strategic approach to pest management is adopted and the reader is referred to the pest management publications by the Bureau of Resource Sciences for greater detail on pest animals (see Further Reading list) or to various references for weeds (see Further Reading list).

The Service employs a large number of specialist staff to develop and implement effective pest management programs. The aim is to apply best practice, cost effective methods that will have minimal impacts on the environment. In general this requires careful planning, to ensure an integrated approach is adopted using a range of techniques at critical times of the year, (for example, the ground and aerial fox baiting program at Yathong NR), and often, the targeting of more than one species (e.g. foxes and wild dogs).

Integrated pest management is likely to result in the most effective long-term reduction in pest populations and avoid selection for bait shy pest animals, or herbicide resistant weeds. Biological control is incorporated into programs where effective agents are available, but in most cases biocontrol must be supplemented with conventional control techniques. The pest management approach adopted by the Service reflects a balance between the desire to use the most effective control technique (such as 1080 baiting for foxes) with a requirement to minimise non-target impacts and animal suffering.

The control of pest species in the Upper Darling Region is vitally important as pest animal species prey on native fauna, compete with native fauna for food and shelter, physically damage the landscape

and may be carriers of exotic disease. Plant pest species compete with native plants to the point of excluding some species, and may invade neighbouring areas.

Pest control is also important for neighbour relations so that reserves are not seen as a source of invasion of pest species. The reserves that make up the Upper Darling Region have a total of 57 neighbouring landholders. All reserve neighbours have grazing and/or cropping enterprises and as such rely heavily on pest control activities to maximise their viability. All efforts will be made by the Region to undertake and encourage cooperative pest management programs with these stakeholders.

As the lead conservation agency in NSW the Service has a duty to ensure its own activities comply with the law and are environmentally sound. All pest control activities proposed on NPWS land require an appropriate level of assessment of their environmental impacts. The level of assessment undertaken relates to the probable degree of impact and can range from an initial analysis, to a Review of Environmental Factors, to an Environmental Impact Statement.

All pest species control work will be carried out in compliance with the Regional Operational Plan, Plans of Management and the Malleefowl Recovery Plan. The Region will offer input into Threat Abatement Plans.

3 Objectives of Pest Control Programs

The overriding objective of NPWS pest control programs is to conserve biodiversity and cultural heritage.

Programs also have the following specific goals:

- Increase community understanding of the adverse impacts of pests on biodiversity and Aboriginal and historic cultural heritage
- Manage pest populations to minimise their movement into NPWS estate, or onto adjoining properties where they impact on agricultural production
- Satisfy legislative responsibilities eg. *Rural Lands Protection Act 1998, Noxious Weeds Act 1993* and *Threatened Species Conservation Act 1995*
- Support cooperative approaches to pest management with other agencies and the community
- Foster community support.

4 Pest Programs and Threatened Species

4.1 Past Pest Management

Prior to 1995, pest programs in Upper Darling Region were restricted to small annual programs and a number of reactive programs. These included:

- Aerial shooting throughout the Region was carried primarily in response to neighbour complaints or when money was available;
- Fox control was done on a localised basis, there was little ecological significance to programs. They were generally undertaken in conjunction neighbouring properties before lambing or as a reaction to noticeable increases in fox populations. There was no coordination of the programs across management areas and limited funding caused many programs to be sporadic. The initial neighbour NSW NPWS baiting cooperation at Yathong Nature Reserve prior to 1995 did assist to develop the extensive joint neighbour NPWS baiting program that

is in place today and is currently being expanded across the Upper Darling Region;

- Weed control was undertaken on high profile weeds and there was little ecological significance to the control programs. Control was concentrated along reserve boundaries and road easements. Limited funding caused many programs to be undertaken sporadically, thus often resulting in weeds proliferating during wetter periods when control is most feasible;

- Joint control programs with outside agencies were not carried out to their full potential, and little planning went into many of the programs;

- Yathong Nature Reserve was a high profile reserve and was the largest management unit in the former District prior to the acquisition of new reserves. This resulted in Yathong Nature Reserve drawing a major proportion of funding allocations, which in turn slowed the development of pest and weed programs in other areas across the District.

Since that time, the Upper Darling Region has adopted a more strategic approach to pest control management incorporating programs that were identified as high priorities in the 1996/97 District Pest Strategy. These included, weed mapping, integrated control techniques, development of short/long term coordinated strategies, environmental assessment, and monitoring and evaluation. The Upper Darling Region has also increased the number and scale of cooperative neighbour pest programs with cooperative programs operating at Yathong Nature Reserve, Gundabooka National Park and Culgoa National Park. It is hoped that by the end 2003 cooperative neighbour pest programs will be in place at all national parks and reserves in the region including the recently acquired areas of Thilta Karra New Estate, Ledknapper New Estate and the Millyvale extension to Quanda Nature Reserve.

The strategic approach to pest management in Upper Darling Region has become increasingly important as the number of reserves has increased in recent years.

Pest management priorities and programs for recent additions to the NPWS estate are still being finalised and will be included in subsequent revisions of this strategy.

4.1.1 Pest Animals

Pest animal programs are undertaken through out the Region and cover a number of species (Table 1).

Control of foxes is a high priority in Upper Darling Region because this species actively preys on many native faunal species. Fox control programs have been undertaken on all reserves throughout the region. Upper Darling Region has obtained a special permit to undertake aerial baiting programs to protect endangered Malleefowl populations from predation by foxes in the Yathong, Nombinnie and Round Hill Nature Reserves (undertaken in conjunction with Riverina Region). A special dried-meat bait has been prepared and a computerised navigation system based on GPS technology is used to monitor bait placement accurately. Aerial baiting of these reserves is complemented by an extensive ground baiting program on surrounding properties and state forests that is coordinated by the Hillston RLPB. The baiting program has resulted in sufficiently high survival of translocated Malleefowl to maintain a stable breeding population in the Reserves.

Foxes have been listed as a key threatening process under the *Threatened Species Conservation Act 1995* and the NPWS has prepared a threat abatement plan for foxes (NSW NPWS 2001a). This plan has direct implications for fox control

programs in the Upper Darling Region, in that additional funds have been provided for fox control activities in Yathong and Nocoleche NR. Fox control activities are undertaken in all areas according to best practice guidelines.

On other reserves extensive ground baiting programs are carried out on internal tracks and boundaries. Neighbours are involved with the program and free 1080 baits are supplied to encourage participation. Monitoring of bait takes and non-target species are recorded to monitor the success of individual programs.

The impact of Rabbits on vegetation and soil disturbance is well documented. Rabbit infestation is moderate but widespread at Yathong/Nombinnie NRs. Effective ongoing control is seen to be an integral part of assisting with the Malleefowl repopulation by reducing the food supply of predators. All other reserves experience much lower impacts associated with Rabbits, thus are listed as a lower priority for control. Monitoring occurs and control measures undertaken if the population or warren numbers increase.

Feral goats occur on all reserves within the Region with high priority given to Gundabooka NP and Yathong NR where mountain ranges are favourable habitat. Additionally, the potential for reintroduction of the Brush-tailed Rock-wallabies may exist at Gundabooka and Yathong NRs. The Region has entered into goat mustering contracts for Gundabooka NP, Yathong NR, Nocoleche NR and Paroo-Darling National Park (Thilta Karra section). The contracts vary from traditional contracts in that royalties are paid to the Service per goat removed. The money generated is put back into pest programs on the Reserves. Feral goats also pose a significant threat to the Aboriginal heritage sites, especially where feral goats inhabit the caves or rock overhangs and can damage art sites. The effect of feral goats on the overall total grazing pressure of western lease country is well known and must be significantly reduced.

Pigs occur primarily on Culgoa NP, Nocoleche NR, Ledknapper New Estate, Gundabooka NP and Paroo-Darling National Park (Thilta Karra section). Pigs cause large-scale damage to the landscape, particularly in the wetland areas of Nocoleche NR. This in turn impacts on the breeding areas of migratory birds, waterbirds and threatened species. Nocoleche NR is listed under the JAMBA and CAMBA agreements. Pigs also represent the principal pest concern of neighbours to Nocoleche and Culgoa NRs, and Paroo-Darling National Park (Thilta Karra section). Pigs are controlled on park by a combination of pig trapping and baiting and programmed ground and aerial shooting.

Cats occur in all reserves, with higher populations in reserves with greater rabbit infestations. As is the case with foxes, cats are active predators of native fauna and therefore require urgent and constant control. Current control measures include opportunistic trapping and controlled shooting as part of the spotlight counts when monitoring rabbit and fox programs. Research into an effective control agent for cats is of vital importance.

There are no wild dogs on lands managed by Upper Darling Region. Should they occur local eradication programs will be implemented immediately.

4.1.2 Weeds

Upper Darling Region weed control programs include:

- Chemical and physical eradication program of Spiny Burr Grass in Culgoa NP.

- Chemical and physical eradication of African Boxthorn at Gundabooka NP, Yathong NR, Culgoa NP and Ledknapper New Estate.

- Chemical control of Noogoora/Bathurst Burr at all reserves.

- Prickly Pear control around the old homesteads at Gundabooka NP and Culgoa NP.

- Chemical control of Mexican Poppy at Nocoleche NR.

The list of weeds in this strategy (Table 1) is not an exhaustive list of species occurring within Upper Darling Region. A number of other weeds occur on NPWS managed lands but are of less importance in natural areas and, therefore, have not been included in this pest strategy. Many are "weeds of opportunity" which are addressed as required in response to changing seasons and conditions.

Noxious Weeds recorded in Upper Darling Region, as identified by the RLPB, are listed in Appendix 2.

4.2 Threatened Species

The conservation of threatened species is of the upmost importance when considering pest management programs. Every effort is made to minimise any disturbance to species, populations and communities when planning pest management programs within the Upper Darling Region, on and off park.

Threatened species found within Upper Darling Region are listed in Appendix 3 (fauna) and Appendix 4 (flora). Pest control programs are undertaken in the Upper Darling Region by NPWS to protect those threatened species listed in Table 2.

In NSW, the threat abatement planning process is an excellent mechanism for delivering strategic statewide initiatives to protect threatened species. To date, a threat abatement plan has been finalised for foxes, with others in preparation, e.g. feral cats, bitou bush and plague minnow.

Table 1: Distribution of pest animals and weeds on NPWS estate in the Upper Darling Region.

Species	Location
PEST ANIMALS	
Feral pig	Yathong NR, Nocoleche NR, Gundabooka NP, Mt Grenfell HS, Culgoa NP, Ledknapper NR, Paroo-Darling National Park (Thilta Karra section) and Quanda NR. UDR currently have trapping and baiting programs for all reserves.
Fox	All reserves listed above. Major work carried out at Yathong NR with ground and aerial baiting programs as part of the Malleefowl Conservation program. All other reserves have ground baiting programs.
Rabbit	All reserves listed above. Programs include seasonal baiting, fumigating and warren ripping. Extensive work carried out at Yathong NR.
Hare	Culgoa NP.
Feral goat	All reserves listed above. UDR has entered into contracts for the removal of feral goats from Service Estate. The contracts have a royalty paid to the Service for each animal removed.
Feral cat	Scattered populations in all areas.
Wild cattle	Nocoleche NR. Neighbour muster occurs every couple of years followed by helicopter shooting.
Wild sheep	Gundabooka NP, Nocoleche NR, Yathong NR.
WEEDS	
Parthenium Weed *Parthenium hysterophorus* W1	Gundabooka NP.
Spiny Burr Grass *Cenchrus incertus* W2	Culgoa NP.
St John's Wort *Hypericum perforatum* W2	Yathong NR.
African Boxthorn *Lycium ferocissimum* W2	Gundabooka NP, Yathong NR, Culgoa NP, Ledknapper NR.

WEEDS	
Bathurst Burr *Xanthium spinosum* W3	Yathong NR, Nocoleche NR, Gundabooka NP, Culgoa NP, Ledknapper NR, Paroo-Darling National Park (Thilta Karra section), Quanda NR, Mt Grenfell HS.
Noogoora Burr *Xanthium occidentale* W3	Nocoleche NR, Yathong NR, Gundabooka NP, Culgoa NP, Ledknapper NR, Paroo-Darling National Park (Thilta Karra section), Quanda NR, Mt Grenfell HS
Paterson's Curse *Echium plantagineum*	Yathong NR, Paroo-Darling National Park (Thilta Karra section)
Saffron Thistle *Carthamus lanatus*	Yathong NR, Nocoleche NR, Gundabooka NP, Culgoa NP, Ledknapper NR, Paroo-Darling National Park (Thilta Karra section), Quanda NR, Mt Grenfell HS.
Variegated Thistle *Silybum marianum*	Yathong NR, Gundabooka NP, Mt Grenfell HS.
Prickly Pear *Opuntia aurantiaca*	Nocoleche NR, Gundabooka NP, Culgoa NP, Quanda NR.
Devil's Claw *Ibicella lutea*	Yathong NR.
Mexican Poppy *Argemone ochroleuca*	Culgoa NP, Nocoleche NR, Gundabooka NP, Ledknapper NR, Paroo-Darling National Park (Thilta Karra section), Mt Grenfell HS.
Three-cornered Jack *Emex australis*	Nocoleche NR.
Onion Weed *Asphodelus fistulosus*	Yathong NR, Gundabooka NP.
Crown Beard *Verbesina encelioides*	Gundabooka NP, Culgoa NP.
Mother-of-Millions *Bryophyllum Tubiflora*	Culgoa NP, Gundabooka NP.
Buffel Grass *Cenchrus ciliaris*	Culgoa NP, Gundabooka NP, Nocoleche NR.

Threatened species	**Pest**	**Program**	**Reserve**
Malleefowl	Foxes/Cats	Y	Yathong NR
Brush-tailed Bettong	Foxes/Cats	Y	Yathong NR

Table 2: Threatened species protection programs.

5 Regional Priorities

5.1 Criteria for Prioritising Pests

The following criteria reflect the key responsibilities and impacts that are considered by the NPWS when setting regional priorities for pest management. The availability of suitable technology and resources (financial, human and physical) also influences which programs are implemented.

A. A pest for which a national or state emergency control program has been developed (eg. feral animals implicated in any exotic disease outbreak).

B. Any relevant action specified in a threat abatement plan developed for a pest species which has been listed as a key threatening process under the *Threatened Species Conservation Act 1995*.

C. Actions identified in recovery plans for threatened species.

D. A pest that the community has identified as a high priority for action (this includes, but is not restricted to, pests declared under the *Noxious Weeds Act 1993* or the *Rural Lands Protection Act 1998*). Priority will generally be given to those pests for which state or regional management strategies have been developed, or where there is support for a collaborative program.

E. A pest which threatens the conservation, cultural heritage or recreational values of an area.

F. A pest population of limited distribution but known to be an important problem in other parks, or in other states or overseas.

G. A pest for which continued management is necessary to maintain benefits gained from previous control programs.

H. A pest for which a window of opportunity occurs to undertake control activities (eg. where an effective biocontrol agent is available, or feral pig control during floods or droughts).

I. A pest which must be controlled/contained to allow another high priority management program to be effective.

J. Other factors: For weeds, location of the infestation (i.e. within a water catchment or ease of access) and the potential of an area to regenerate naturally, will influence the priority given to a program (natural regeneration is more cost effective, reduces maintenance and maintains the genetic integrity of plant communities).

The pest species in Upper Darling Region are prioritised for control based on the extent to which they satisfy the above criteria, and on the probability of practical success of a control operation. The latter is determined by:

- the existence of an effective means of controlling the pest species;
- the availability of resources to undertake effective control;
- the likely availability of resources in the medium to long-term to maintain control efforts.

5.2 Regional Assessment

Table 3 illustrates how the criteria and probability of success are cross-referenced in order to group pest species into three priority classes.

Probability of success	Extent to which criteria satisfied		
	High	Med	Low
High	**1**	**1**	2
Med	**1**	2	3
Low	2	3	3

Table 3: Priority classes for pest species.

Table 4 shows the application of the criteria to reserves and pest species in Upper Darling Region, and the resultant priority classes.

The appropriate timing for application of chemical controls is given in Appendix 1.

Although the focus of NPWS pest management is the priority pest species, monitoring for emerging pest problems is undertaken on an ongoing basis. NPWS will continue to work with the Pest Animal Council, NSW Agriculture, RLPBs and local councils to address problems as they arise (e.g. outbreaks of Category W1 weeds).

Table 4: Pest species priority classes for Upper Darling Region.

Pest Species	Criteria										Reserve	Prob. of success	Priority
Pest Animals	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**			
Feral pig	✔			✔	✔		✔	✔			Yathong NR Nocoleche NR Gundabooka NP Mt Grenfell HS Culgoa NP Ledknapper NR Paroo-Darling NP (Thilta Karra) Quanda NR	L H H L H H H M	2 1 1 3 1 2 2 1
Fox		✔	✔	✔	✔		✔		✔		Yathong NR Nocoleche NR Gundabooka NP Mt Grenfell HS Culgoa NP Ledknapper NR Paroo-Darling NP (Thilta Karra) Quanda NR	H L M L L L M M	1 2 2 3 3 3 2 2
Rabbit		✔		✔	✔		✔				Yathong NR Nocoleche NR Gundabooka NP Mt Grenfell HS Culgoa NP Ledknapper NR Paroo-Darling NP (Thilta Karra) Quanda NR	M L L M L L L M	2 3 3 1 3 3 2 2
Hare						✔					Culgoa NP	L	3
Feral goat				✔	✔		✔				Yathong NR Nocoleche NR Gundabooka NP Mt Grenfell HS Culgoa NP Ledknapper NR Paroo-Darling NP (Thilta Karra) Quanda NR	M M M H L L M L	2 1 2 2 3 2 2 3
Feral cat			✔	✔	✔		✔		✔		Yathong NR Nocoleche NR Gundabooka NP Mt Grenfell HS Culgoa NP Ledknapper NR Paroo-Darling NP (Thilta Karra) Quanda NR	M M M M M M M M	3 3 3 3 3 3 3 3
Feral cattle					✔	✔	✔				Nocoleche NR	M L	1 2
Wild/stray sheep					✔	✔	✔				Gundabooka NP Nocoleche NR Yathong NR	L L L	2 2 2

Weed Species	A	B	C	D	E	F	G	H	I	J			
Parthenium Weed	✔			✔	✔	✔	✔				Gundabooka NP	H	1
Spiny Burr Grass				✔	✔	✔	✔	✔			Culgoa NP	H	2
St John's Wort											Yathong NR	L	3

Pest Species Weed Species	Criteria A	B	C	D	E	F	G	H	I	J	Reserve	Prob. of success	Priority
African Boxthorn				✔	✔	✔				✔	Gundabooka NP Yathong NR Culgoa NP Ledknapper NR	H H H H	2 2 2 2
Bathurst Burr				✔	✔		✔				Yathong NR Nocoleche NR Gundabooka NP Mt Grenfell HS Culgoa NP Ledknapper NR Paroo-Darling NP (Thilta Karra) Quanda NR	M M M M M M M M	2 2 2 2 2 2 2 2
Noogoora Burr				✔	✔		✔			✔	Yathong NR Nocoleche NR Gundabooka NP Mt Grenfell HS Culgoa NP Ledknapper NR Paroo-Darling NP (Thilta Karra) Quanda NR	M M M M M M M M	3 3 3 3 3 3 3 3
Paterson's Curse					✔						Yathong NR Nocoleche NR Gundabooka NP Mt Grenfell HS Culgoa NP Ledknapper NR Paroo-Darling NP (Thilta Karra) Quanda NR	L L L L L L L L	3 3 3 3 3 3 3 3
Saffron Thistle					✔						All Reserves	L	3
Variegated Thistle					✔						Yathong NR, Gundabooka NP Mt, Grenfell HS	L L L	3 3 3
Prickly Pear				✔	✔	✔	✔				Nocoleche NR Gundabooka NP Culgoa NP Quanda NR	L L L L	2 2 2 3
Mexican Poppy				✔							Culgoa NP Nocoleche NR Gundabooka NP Ledknapper NR Paroo-Darling NP (Thilta Karra) Mt. Grenfell HS	M	3
Three-cornered Jack					✔	✔					Nocolehce NR	L	3
Onion Weed					✔	✔					Yathong NR, Gundabooka NP	L L	3 3
Crown Beard					✔	✔					Gundabooka NP Culgoa NP	L L	3 3
Mother-of-Millions					✔	✔					Culgoa NP Gundabooka NP	L L	3 3
Buffel Grass					✔	✔					Culgoa NP Gundabooka NP	L L	3 3

6 Programs

The following sections summarise the control programs to be undertaken in Upper Darling Region, based on the priorities established in Section 5.

6.1 Pest Animal Species

6.1.1 Feral Pig - *Sus scrofa*

Distribution

Present in all reserves, but with higher densities in reserves with rivers, creeks, and floodplains, notably Nocoleche NR and Culgoa NP.

Impacts

Feral pigs can cause severe environmental degradation by:

- selective feeding on plant communities;
- creation of drainage channels in swamps;
- soil erosion and fouling of watering points by their habit of wallowing and rooting;
- direct predation on frogs, reptiles, ground-nesting birds and small mammals;
- as an agent for the spread of weeds, particularly Noogoora and Bathurst Burrs.

Feral pigs can kill and eat lambs under two weeks of age, and as such can have an adverse impact on sheep breeding enterprises. They also compete with domestic livestock for pasture forbs, and damage cereal crops and introduced pastures.

Pigs are a major potential host of a number of exotic diseases such as Foot and Mouth, African Swine Fever and Rinderpest, as well as viruses to which humans are susceptible, such as Murray Valley Encephalitis and Ross River Fever. Of these, only Foot and Mouth would be unlikely to persist in the hot, dry and dusty climates of western NSW.

Control Methods

Trapping, shooting (both ground shooting and aerial control programs), exclusion fencing and 1080 baiting are currently the preferred methods of control.

Management Strategy

1. Continue to monitor pig distributions and populations using monthly ground inspections and comments from neighbours.

2. Continue with existing programs. Priority reserves for pig control are Nocoleche NR, and Gundabooka and Culgoa NPs.

3. Maintain and improve cooperation with neighbours undertaking feral pig control work.

4. Undertake ongoing monitoring to evaluate effectiveness of current control techniques, and review as necessary.

Performance Measures

Reduced feral pig numbers as indicated by evidence of pig activity in all reserves.

Comments from neighbours.

6.1.2 European Red Fox – *Vulpes vulpes*

Distribution

Widespread throughout all reserves in the Region.

Impacts

Fox predation is a major threat to native animal populations including threatened species such as Malleefowl and Brush-tailed Bettongs. Foxes also contribute to the dispersal of weeds such as Bathurst and Noogoora Burr, and are a potential carrier of disease. Predation by foxes on farm livestock can be serious.

Control Methods

Fox control is undertaken in the peak dispersal periods (Autumn) and mating periods but more frequently in relation to predation on threatened species (NSW NPWS 2001).

Fox control is undertaken in accordance with the Fox TAP best practice guidelines. Methods include:

- 1080 ground baiting;
- 1080 aerial baiting under licence to the NRA according to Off Label Permits;
- shooting in conjunction with rabbit spotlight counting programs;

Management Strategy

Fox management will occur in accordance with management models within the Fox Threat Abatement Plan (NSW NPWS 2001). Management activities include:

1. Continue monitoring fox populations region-wide.
2. Undertake coordinated programs in cooperation with other agencies and immediate neighbours and stakeholders to protect threatened and other native species (as per Threat Abatement Plan). Strategic 1080 baiting programs are carried out on all estate along with ground shooting. Fox control if a high priority on all estate where they occur.
3. Undertake monitoring in all areas where foxes are likely to have a high impact on threatened species.

Performance Measures

Increased recovery of threatened species as per high priority programs identified in the Fox Threat Abatement Plan (e.g. Malleefowl in Yathong NR, Brolga in Nocoleche NR).

Short-term reduction in fox numbers as indicated by bait uptake and spotlight surveys.

Comments from neighbours.

6.1.3 European Wild Rabbit – *Oryctolagus cuniculus*

Distribution

Rabbits occur in varying densities throughout the Region and are more common in areas of disturbance or on areas adjacent to agricultural lands.

Impacts

Rabbits cause the following environmental damage:

- soil erosion;
- grazing on native vegetation and reducing regeneration;
- competition with native animals for suitable habitat;
- impacts on historic sites through foundation disturbance.

Control Methods

Rabbit control uses a combination of control techniques, including baiting, fencing, fumigation, shooting, warren destruction and biological control.

Programs also make use of natural outbreaks of myxomatosis and calicivirus to further suppress populations.

Management Strategy

Continue to monitor rabbit activity and evaluate their impact in NPWS reserves, using spotlight surveys, ground inspections to identify active warrens.

Control rabbit populations using coordinated programs in all reserves. Yathong NR is a priority reserve for rabbit control given their role in maintaining fox populations at high levels.

Evaluate the impact of rabbits on all new reserves and establish control strategies where required.

Performance Measures

A reduction in rabbit activity as indicated by presence/absence monitoring and reduction in warren activity.

6.1.4 Feral Goat – *Capra hircus*

Distribution

Within the Region feral goats are widespread and have adapted to the dry conditions. Parks containing ranges or hills have greater goat numbers because they prefer those habitats and control is difficult in such terrain.

Impacts

Impacts include competition for water, food and shelter, soil erosion and compaction, modification of vegetation structure through overgrazing. They have the potential to spread disease, especially Footrot and Ovine Johnes Disease (OJD), and also damage Aboriginal heritage sites and art work.

Control Methods

Control methods include shooting (aerial control programs), contract mustering and trapping. Man-made watering points are closed down or controlled at certain times of the year to assist with mustering and trapping programs.

Management Strategy

Continue monitoring of feral goat populations and their impacts:

- monthly monitoring of the extent of feral goat distribution and populations on NPWS managed lands.
- vegetation monitoring indicating regeneration of species susceptible to grazing by feral goats.
- annual endangered species surveys.

Continue current methods of control.

Evaluate the current control programs in all areas and make any changes as required.

Performance Measures

Reduced goat numbers as indicated by monitoring programs.

Comments from visitors regarding feral goat sightings.

6.1.5 Feral Cat – *Felis catus*

Distribution

Known to occur throughout the region in abundance but numbers are unknown. Areas with high rabbit numbers have higher cat populations because rabbits are a main food source for cats and warrens provide shelter.

Impacts

Feral cats predate on native reptiles, frogs, small mammals and bird species. They compete for food and act as a reservoir for diseases and parasites, which can be transferred to native fauna, domestic stock and humans.

Control Methods

No poison is currently registered for use on cats. Other control methods include trapping and opportunistic shooting,

however they are largely ineffective on cat numbers. Feral cats are a difficult pest to control, and major advances in their control will depend on further progress with the cat-specific toxin and baiting system currently being developed.

Management Strategy

1. Continue to record cat sightings on Yathong NR.

2. Increase community awareness of responsible cat ownership in conjunction with local government and NPWS newsletters etc.

3. Undertake trapping where required for problem cats.

Performance Measures

Increased community awareness of responsible cat ownership.

Removal of identified problem cats from areas using available techniques.

6.1.6 Wild Cattle and Sheep

Distribution

Not widespread but they do present a difficult problem on Nocoleche NR where terrain makes it difficult to judge numbers. Other reserves occasionally have small numbers but removal is usually less difficult.

Impacts

Soil erosion and compaction, damage to wetland habitats and Aboriginal heritage areas, and disturbance to native fauna habitats.

Control Methods

Include mustering, controlled shooting programs and appropriate fencing to restrict migration from neighbouring land.

Management Strategy

Continue monitoring numbers and maintain fencing agreements with neighbours. Continue communication with neighbours to effect removal and prevent future problems.

Performance Measures

Comments form neighbours and reduced stock numbers as indicated by presence/absence monitoring programs.

6.2 Weed Species

6.2.1 Parthenium Weed - *Parthenium hysterophorus*

Distribution

Infestations of Parthenium Weed have occurred on Gundabooka NP where the Kidman Way passes through the Park. Localised infestations have been found on major roads in NSW.

Impacts

Once established, Parthenium Weed is difficult to control as it seeds prolifically. Each plant can produce 15 000 seeds in a growing season. Seeds germinate readily and the species tolerates a wide variety of conditions. It can germinate, flower and set seed within four weeks.

The weed affects animal and human health.

Control Methods

These could include strategic herbicide application, physical removal of the plants or quarantine of the affected area.

Management Strategy

Continual vigilance by all land managers to prevent spread of new outbreaks.

Any infestation of Parthenium Weed on NPWS estate will require immediate

commitment of resources and implementation of control measures. Its presence must be notified to the Local Control Authority immediately. The LCA will then advise the necessary actions that are to be taken to control the infestation.

Performance Measures

All outbreaks of Parthenium Weed are reported immediately to the LCA and all infestations are eradicated as advised by the LCA.

6.2.2 Spiny Burr Grass - *Cenchrus incertus*

Distribution

The only infestation to date is at Culgoa National Park. It is found in light sandy, well-drained soils. It is common along roadsides, creeks and river banks where soil has been disturbed.

Impacts

It is an objectionable burr and has the ability to spread rapidly into dense widespread infestations. It competes with other native pastures and does extremely well in drought times due to lack of pasture competition. Stock will graze on early growth but mature plants cause health problems in stock, dogs and humans. The sharp rigid barbed spines means that the burrs are a major wool contaminant and their presence can degrade visitor areas.

If moisture is present it will germinate at any time of the year and seeds will lay dormant for as long as three years. Each plant can yield up to 1000 seeds. It can be easily transferred by animals and on vehicle tyres.

Control Methods

At this stage infestations can be controlled with herbicide and physical removal of isolated patches. Several herbicides are effective on this species, and are applied to actively growing plants, usually during summer.

To reduce spread of this weed, vehicle movements are restricted to roads and limited to service access only.

Management Strategy

Apply registered herbicides at recommended rates.

Monitor and control spread from other infestations.

Continue presence/absence monitoring and compare mapping to existing data**.**

Performance Measures

Reduction in the degree of infestation, as demonstrated by ongoing presence/ absence monitoring.

Comments from neighbours.

6.2.3 African Boxthorn - *Lycium ferocissimum*

Distribution

Present in varying densities in four reserves: Yathong NR, Culgoa NP, Gundabooka NP and Ledknapper New Estate. It was used as a hedge plant in the 1800s and is therefore usually found around old homestead sites that have long been vacated. Spreads through the transfer of seeds by birds.

Impacts

Can be an aggressive invader in areas where soil disturbance occurs. High soil reserves of dormant seed can germinate under ideal conditions.

Troublesome insects such as fruit fly and the common house fly breed on plants and rotting fruit. The plant provides perfect cover for pest animals such as rabbits and cats that live in warrens under it, and it has spiky branches that cause damage to native animals and humans. Because it is

hardy it does well in the drier country, and is capable of competing and eliminating considerable pasture areas.

Occurs mostly in watercourses. Smothers and outcompetes native vegetation and threatens the conservation and recreational values of service estate.

Control Methods

Physical removal by chainsaw and tractor, and treatment of stumps with appropriate herbicide. In areas of smaller plants and where manpower is restricted, herbicide or fire can be effective control measures.

Six months after treatment, stumps and regrowth are treated with an appropriate herbicide.

Management Strategy

Continue mapping program of African Boxthorn infestations on NPWS managed lands.

Continue an integrated approach using chemical and mechanical control measures.

Reduce plant numbers in all areas. Priority areas are Yathong NR and areas of new estate soon after purchase by NPWS.

Monitor plants treated for regrowth, and for newly germinated seed and plants.

Encourage neighbour participation in similar control programs, especially Culgoa NP.

Performance Measures

Ground inspections indicating a reduction in abundance and requirements for follow up treatments.

6.2.4 Bathurst Burr - *Xanthium spinosum*

Distribution

Minor infestations occur on all reserves across the region.

Impacts

A summer-growing invasive weed of disturbed areas, such as along roadside drains, man-made water points and on floodout areas.

A troublesome weed which has a spoiling effect on wool.

Each burr contains two seeds, one of which may not germinate for several seasons after the first seed has germinated. Mature burrs are readily dispersed by animals and flowing water.

Control Methods

Integrated approach using spot spraying of herbicides and pulling or chipping of isolated patches, such as along drainage lines.

Management Strategy

Treat all outbreaks as they occur and before they set seed. Priority areas are around ground tanks where frequent animal visitation promotes spread of infestations.

Contain current areas of infestation and monitor areas for new outbreaks.

Performance Measures

Ground inspections indicating a reduction in the degree of infestation, both in area and plant density.

6.2.5 Noogoora Burr - *Xanthium occidentale*

Distribution

Minor infestations occur on all reserves across the region.

Impacts

A summer-growing invasive weed of disturbed areas, such as along roadside drains, man-made water points and on floodout areas.

Highly invasive weed of floodout areas on a range of soils from sandy clay loams to heavy self-mulching grey clays. A vigorous competitor against all native pasture species.

A troublesome weed which has a spoiling effect on wool.

Each burr contains two seeds, one of which may not germinate for several seasons after the first seed has germinated. Mature burrs are readily dispersed by animals and flowing water.

Control Methods

Spot spraying of registered herbicides at recommended rates wherever possible. Some pulling or chipping of isolated patches.

Management Strategy

Treat all outbreaks as they occur and before they set seed.

Continue to implement current control methods. Nocoleche NR is a priority area for treatment of Noogoora Burr. Other infestations are treated on a needs-be basis

Contain current areas of infestation and monitor areas for new outbreaks.

Performance Measures

Ground inspections indicating a reduction in the degree of infestation, both in area and plant density.

7 Conclusion

Pest management programs have been undertaken throughout Upper Darling Region based on priorities and recommendations in the previous regional plan. This review of the 1996/1997 Cobar District Pest Strategy will assist in the continuation of works programs for 2003-2006 and highlight planning needs.

Setting priorities is only the beginning of pest management. Once regional priorities are established, the planning, implementation of programs, monitoring and evaluation begins.

Successful pest management takes time. Programs are successful if they are well planned ensuring the appropriate control techniques are used and follow-up is undertaken. Programs are also more effective if neighbours are encouraged to become actively involved in the overall implementation of the programs across the landscape.

This management strategy is only a tool to establish pest priorities and establish broad management guidelines. More detailed plans for individual pests or reserves have been prepared or require preparation as companions to this strategy.

The Upper Darling Region Pest Species Management Plan will be reviewed annually.

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Report Prepared by:

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Upper Darling Region

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Appendix 1: Timing of Pest Control Programs

The NPWS tries to adopt a strategic approach to pest animal control, whilst also allowing sufficient flexibility to capitalise on windows of opportunity which arise (e.g. floods, droughts, fire). Similarly, some opportunistic weed control is undertaken in response to local events (e.g. control of mass germinations following flooding or rainfall events). Timing of control activities vary with the method used. For pest animal control activities, the timings indicated are general in nature and are influenced by factors such as varying seasonal conditions. Factors that determine timing of herbicide application include growth stage of the plant, time of year, herbicide used, mode of application and weather conditions. The following table outlines the best time for control or key pest species in the Upper Darling Region. Timing for weed species refer to herbicide treatment only.

Species	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Feral Pig	x	x	x	x	x	x	x	x	x	x	x	x
Fox	x	x	x					x	x	x	x	x
Rabbit						x	x	x				
Feral Goat	x	x	x	x	x	x	x	x	x	x	x	x
Feral Cat	x	x	x	x	x	x	x	x	x	x	x	x
Wild Cattle	x	x	x	x	x	x	x	x	x	x	x	x
Wild Sheep	x	x	x	x	x	x	x	x	x	x	x	x
Parthenium Weed	x	x	x	x	x	x	x	x	x	x	x	x
Spiny Burr Grass								x	x	x		
St John's Wort			x	x	x	x	x	x	x			
African Boxthorn	x	x	x	x						x	x	x
Bathurst Burr				x	x	x	x	x				
Noogoora Burr								x	x	x		
Paterson's Curse	x	x	x									x
Saffron Thistle			x	x								
Variegated Thistle			x	x	x							
Scotch Thistle			x	x	x							
Horehound	x	x	x	x							x	x
Prickly Pear			x	x	x							
Drooping Tree Pear			x	x	x							
Devil's Claw						x	x	x				
Mexican Poppy			x	x	x							
Three-cornered Jack			x	x	x							
Onion Weed			x	x	x							
Crown Beard			x	x	x							
Mother-of-Millions	x	x	x	x	x	x	x	x	x	x	x	x
Buffel Grass	x	x	x	x	x	x	x	x	x	x	x	x

Appendix 2: Noxious weeds of the Upper Darling Region

Common Name	Scientific Name	Bourke	Cobar	Bogan	Central Darling
African Boxthorn	*Lycium ferocissimum*	W2	W2	W2	W2
Alligator Weed	*Alternanthera philoxeroides*	W1	W1	W1	W1
Bathurst/Noogoora/ Californian/Cockle Burrs	*Xanthium* spp.	W3	W3		
Black Knapweed	*Centaurea nigra*	W1	W1	W1	W1
Blue Heliotrope	*Heliotropium amplexicaule*		W2	W2	
Broomrape (except *O. minor* and *O. cernua* var *Australiana*)	*Orobanche* spp.	W1	W1		W1
Cabomba (Pink Cabomba *C. furcata* is exempt)	*Cabomba* spp.	W4g	W4g	W4g	W4g
Columbus Grass	*Sorghum x almum*	W2	W2		W2
Golden Dodder	*Cuscuta campestris*	W2	W2	W2	W2
Galvanized Burr	*Sclerolaena birchii*		W3		
Green Cestrum	*Cestrum parqui*	W2	W2	W2	W2
Harrisia Cactus	*Harrisia* spp.	W4f	W4f	W4f	W4f
Hawkweed	*Hieracium* spp.	W1	W1	W1	W1
Horsetail	*Equisetum* spp.	W1	W1	W1	W1
Jerusalem Thorn	*Parkinsonia aculeata*	W1	W1		W1
Johnson Grass	*Sorghum halepense*	W2	W2		W2
Karroo thorn	*Acacia karroo*	W1	W1	W1	W1
Kochia (Summer or Mock Cypress *K. scoparia* subsp. *Tricophylla* is exempt)	*Kochia scoparia*	W1	W1	W1	W1
Lagarosiphon	*Lagarosiphon major*	W1	W1	W1	W1
Mesquite	*Prosopis* spp.	W1	W1		W1
Mexican Feather Grass	*Nassella tenuissima* syn *Stipa tenuissima*	W1	W1		W1
Miconia	*Miconia* spp.	W1	W1		W1
Parthenium Weed	*Parthenium hysterophorus*	W1	W1		W1
Prickly Acacia	*Acacia nilotica*	W1	W1	W1	W1
Prickly Pears (Indian Fig *O. ficus indic*a is exempt	*Opuntia* spp.	W4f	W4f		W4f
Rhus Tree	*Toxicodendron succedaneum*	W2	W2		W2
Salvinia	*Salvinia molesta*	W1	W1		W1
Senegal Tea Plant	*Gymnocoronis spilanthoides*	W1	W1	W1	W1
Siam Weed	*Chromolaena odorata*	W1	W1	W1	W1
Spiny Burr Grass	*Cenchrus incertus*	W2	W2	W2	
Spiny Burr Grass	*Cenchrus longispinus*	W2	W2	W2	
Spotted Knapweed	*Centaurea maculosa*	W1	W1	W1	W1
Water Hyacinth	*Eichhornia crassipes*	W1	W1	W1	W1
Water Lettuce	*Pistia stratiotes*	W1	W1		W1
Willows (*S. babylonic*a, *S. reichardtii* and *S. calodendron* are exempt)	*Salix* spp.	W4g	W4g		W4g

Table of Explanation:
W1 The presence of the weed on land must be notified to the local control authority, and the weed must be fully and continually suppressed and destroyed.
W2 The weed must be fully & continually suppressed and destroyed.
W3 The weed must be prevented from spreading & its numbers and distribution reduced.
W4 Various actions according to the following categories:
(f) The weed must not be sold, propagated or knowingly distributed. Any biological control or other control program directed by a local control authority must be implemented.
(g) The weed must not be sold, propagated or knowingly distributed.

Appendix 3: Threatened Fauna Species within the Upper Darling Region

Common Name	Scientific Name	Legal Status
Australasian Bittern	*Botaurus poiciloptilus*	V
Australian Bustard	*Ardeotis australis*	E1
Barking Owl	*Ninox connivens*	V
Black-breasted Buzzard	*Hamirostra melanosternon*	V
Blue-billed Duck	*Oxyura australis*	V
Brolga	*Grus rubicunda*	V
Brush-tailed Phascogale	*Phascogale tapoatafa*	V
Brush-tailed Rock-wallaby	*Petrogale penicillata*	V
Bush Stone-curlew	*Burhinus grallarius*	E1
Chestnut Quail-thrush	*Cinclosoma castanotus*	V
Diamond Firetail	*Stagonopleura guttata*	V
Flock Bronzewing	*Phaps histrionica*	E1
Freckled Duck	*Stictonetta naevosa*	V
Gilbert's Whistler	*Pachycephala inornata*	V
Eastern Grass Owl	*Tyto capensis*	V
Greater Long-eared Bat	*Nyctophilus timoriensis*	V
Grey Falcon	*Falco hypoleucos*	V
Hall's Babbler	*Pomatostomus halli*	V
Inland Forest Bat	*Vespadelus baverstocki*	V
Koala	*Phascolarctos cinereus*	V
Kultarr	*Antechinomys laniger*	E1
Lesser Sand Plover	*Charadrius mongolus*	V
Little Pied Bat	*Chalinolobus picatus*	V
Long-haired Rat	*Rattus villosissimus*	V
Magpie Goose	*Anseranas semipalmata*	V
Major Mitchell's Cockatoo	*Cacatua leadbeateri*	V
Malleefowl	*Leipoa ocellata*	E1
Masked Owl	*Tyto novaehollandiae*	V
Narrow-banded Snake	*Simoselaps fasciolatus*	V
Painted Honeyeater	*Grantiella picta*	V
Painted Snipe	*Rostratula benghalensis*	V
Pied Honeyeater	*Certhionyx variegatus*	V
Plains-wanderer	*Pedionomus torquatus*	E1
Red-lored Whistler	*Pachycephala rufogularis*	E1
Red-tailed Black-Cockatoo	*Calyptorhynchus banksii*	V
Sanderling	*Calidris alba*	V
Sandy Inland Mouse	*Pseudomys hermannsburgensis*	V
Shy Heathwren	*Hylacola cauta*	V
Southern Ningaui	*Ningaui yvonneae*	V
Southern Scrub-robin	*Drymodes brunneopygia*	V
Square-tailed Kite	*Lophoictinia isura*	V
Stimson's Python	*Liasis stimsoni*	V
Striated Grasswren	*Amytornis striatus*	V
Stripe-faced Dunnart	*Sminthopsis macroura*	V
Superb Parrot	*Polytelis swainsonii*	V
Turquoise Parrot	*Neophema pulchella*	V

Common Name	Scientific Name	Legal Status
Western Blue-tongued Lizard	*Tiliqua occipitalis*	V
Woma	*Aspidites ramsayi*	V
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	V

E1 = Endangered
V = Vulnerable

Appendix 4 Threatened Flora Species within the Upper Darling Region

Family Name	Scientific Name	Legal Status
Fabaceae (Mimosoideae)	*Acacia carneorum*	V
Fabaceae (Mimosoideae)	*Acacia curranii*	V
Chenopodiaceae	*Atriplex infrequens*	V
Poaceae	*Bothriochloa biloba*	V
Asteraceae	*Brachyscome papillosa*	V
Rubiaceae	*Dentella minutissima*	E1
Chenopodiaceae	*Dysphania plantaginella*	E1
Eriocaulaceae	*Eriocaulon carsonii*	E1
Goodeniaceae	*Goodenia occidentalis*	E1
Haloragaceae	*Haloragis exalata*	V
Fabaceae (Faboideae)	*Indigofera helmsii*	E1
Asteraceae	*Kippistia suaedifolia*	E1
Brassicaceae	*Lepidium monoplocoides*	E1
Chenopodiaceae	*Maireana cheelii*	V
Euphorbiaceae	*Monotaxis macrophylla*	E1
Chenopodiaceae	*Osteocarpum scleropterum*	E1
Euphorbiaceae	*Phyllanthus maderaspatensis*	E1
Thymelaeaceae	*Pimelea elongata*	E1
Orchidaceae	*Pterostylis cobarensis*	V
Sterculiaceae	*Rulingia procumbens*	V
Malvaceae	*Sida rohlenae*	E1
Solanaceae	*Solanum karsense*	V
Fabaceae (Faboideae)	*Swainsona murrayana*	V
Fabaceae (Faboideae)	*Swainsona pyrophila*	V
Fabaceae (Faboideae)	*Swainsona sericea*	V

E1 = Endangered
V = Vulnerable

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