

**MALLEE CLIFFS NATIONAL PARK
PLAN OF MANAGEMENT**

NSW NATIONAL PARKS AND WILDLIFE SERVICE

1998

This plan of management was adopted by the Minister for the Environment on 4 October 1998.

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Photo of malleefowl by Dave Priddel.

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FOREWORD

Mallee Cliffs National Park is 57 969 ha in size and located in south-west NSW, 25 km north east of the Victorian city of Mildura.

The park is one of seven large protected areas in the south-west corner of NSW and west of the Darling River in the Western Division of NSW. The other six are Mootwingee, Sturt, Mungo and Kinchega national parks and Nocolleche and Tarawi nature reserves. These national parks and nature reserves in NSW are complemented by national parks and equivalent areas in both Victoria and South Australia. Important conservation areas in these two states include Danggali Conservation Park in South Australia and Hattah-Kulkyne, Murray-Sunset and Wyperfeld national parks in Victoria.

The park comprises extensive areas of flat to undulating red sandy plains and sand dunes and contains large areas of two plant communities typical of the south-west of NSW. These are the mallee association (*Eucalyptus gracilis* - *E. dumosa* - *E. socialis*) and belah-rosewood woodland (*Casuarina pauper* - *Alectryon oleifolius ssp. canescens*).

Thirteen species of native animals which are listed on Schedules 1 and 2 of the Threatened Species Conservation Act as being endangered or vulnerable have been recorded on Mallee Cliffs National Park. A further five species of threatened fauna may occur on the park. Of particular importance is the population of malleefowl. Research and monitoring of the malleefowl population on the national park has been undertaken for many years and will continue.

Removal of artificial watering points and the control or eradication of non-native herbivores will be undertaken to assist in the re-establishment of native vegetation. Progressive decommissioning of water tanks is proposed and is expected to lead in the moderate to long term to a reduction in kangaroo numbers on the park which will allow regeneration of native plant communities which are now subject to overgrazing.

The Service will continue to liaise with neighbours and wherever possible, pest control programs will be carried out with them

Recreational opportunities in the park are limited. This is consistent with the high priority given to the protection of the natural resources of the park. Of consideration in the provision of limited recreational opportunities in the park is the restricted public access to the park and that similar communities are interpreted and recreational opportunities are offered in other national parks within the region.

This plan of management establishes the scheme of operations for Mallee Cliffs National Park. In accordance with the provisions of Section 75 of the National Parks and Wildlife Act, 1974, this plan of management is hereby adopted.

PAM ALLAN

Minister for
the Environment

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1. INTRODUCTION

The National Parks and Wildlife Act, 1974, requires that a plan of management be prepared for each national park. A plan of management is a legal document that outlines how the area will be managed in the years ahead.

The procedures for the adoption of a plan of management are specified in the Act and involve five stages:

- * The Director-General gives notice that a plan of management has been prepared.
- * The plan is placed on public exhibition for at least one month and any person may comment on it.
- * The plan and copies of all representations are referred to the National Parks and Wildlife Advisory Council for consideration.
- * The Director-General submits the plan, together with the recommendations of the Advisory Council, to the Minister.
- * The Minister may adopt the plan, with or without amendment, after considering the recommendations of the Advisory Council or may refer the plan back to the Director-General and Council for further consideration.

A draft plan of management for Mallee Cliffs National Park was placed on public exhibition for a period of three months ending 12th May 1997. During the period of public exhibition, nine representations were received which raised seven issues. These representations were referred to the National Parks and Wildlife Advisory Council for review and report to the Minister. The comments and suggestions of the Advisory Council were in turn considered by the Minister when adopting this plan.

Once a plan of management has been adopted by the Minister, no operations may be undertaken within the national park except in accordance with the plan.

For additional information or enquiries on any aspect of the management of Mallee Cliffs National Park, please contact:

Lower Darling District,
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Shop 1, Buronga Shopping Centre,
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or telephone (03) 5023 1054 during business hours.

2. MANAGEMENT CONTEXT

2.1 NATIONAL PARKS IN NEW SOUTH WALES

The national park concept was introduced into Australia through the establishment of Royal National Park near Sydney in 1879.

The International Union for the Conservation of Nature and Natural Resources (IUCN) in 1994 defined a national park as:

“A natural area of land and/or sea, designated to (a) protect the ecological integrity of one or more ecosystems for present and future generations, (b) exclude exploitation or occupation inimical to the purposes of designation of the area, and (c) provide a foundation for spiritual, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible.”

National parks are part of the regional pattern of land use. The management of a national park aims at minimising disturbance to natural and cultural resources; other land uses, e.g., agriculture, forestry and mining, are distinguished by an acceptance or encouragement of environmental modification. National parks, therefore, provide for only a limited part of the range of land uses in a region.

2.2 MALLEE CLIFFS NATIONAL PARK

2.2.1 Location and Regional Setting

This plan relates to all lands reserved as Mallee Cliffs National Park which currently comprises a total area of 57 969 hectares (December 1997). The park is bounded by grazing leases, with the exception of the Mallee Cliffs Salt Interception Scheme administered by the Department of Land and Water Conservation.

The park lies in south-western NSW north-east of Buronga on the Murray River. Other NSW towns in the region include Dareton, Wentworth, Balranald, Euston and Broken Hill. Mildura in Victoria's Sunraysia District lies across the river from Buronga.

Mallee Cliffs National Park is one of seven large protected areas in the south-west corner of NSW and west of the Darling River in the Western Division of NSW. The other six are Mootwingee, Sturt, Mungo, Kinchega national parks and Nocoleche and Tarawi nature reserves. The Yathong-Nombinnie-Round Hill complex of nature reserves is also a major protected area in western NSW which is important for the conservation of mallee communities and which therefore complements Mallee Cliffs National Park. Together these eight areas are an important system of conservation reserves, each protecting different landscapes typical of inland Australia.

These national parks and nature reserves in NSW are complemented by national parks and equivalent areas in both Victoria and South Australia. Important conservation areas in these two states include Danggali Conservation Park in South Australia and Hattah-Kulkyne, Murray-Sunset and Wyperfeld national parks in Victoria.

2.2.2 Importance of Mallee Cliffs National Park

- Mallee Cliffs National Park is the only major conservation area in NSW that protects extensive areas of flat to undulating red sandy plains and sand dunes. The surface deposits in Mallee Cliffs National Park are largely aeolian in origin and this contrasts with the lake beds and ancient streams of nearby Mungo National Park.
- Mallee Cliffs National Park accounts for 6% of the mallee land systems conserved in the Western Division of NSW prior to 1989. (Pressey *et al.*, 1990).
- The park contains a number of isolated, relict plant communities which demonstrate shifts in the pattern of vegetation arising from long term environmental change.
- The park also contains extensive areas of disclimax herbland and open herbland as a consequence of one hundred years of grazing.
- Thirteen species of native animals which are listed on Schedules 1 and 2 of the Threatened Species Conservation Act as being endangered have been recorded on Mallee Cliffs National Park. A further five species of endangered fauna may occur on the park.
- The national park protects a regionally significant population of malleefowl.

3. OBJECTIVES OF MANAGEMENT

3.1 GENERAL OBJECTIVES FOR NATIONAL PARKS

The following general objectives relate to the management of national parks in New South Wales:

- * the protection and preservation of scenic and natural features;
- * the conservation of wildlife;
- * the maintenance of natural processes as far as is possible;
- * the preservation of Aboriginal sites and historic features;
- * the provision of appropriate recreation opportunities; and
- * the encouragement of scientific and educational enquiry into environmental features and processes, prehistoric and historic features and park use patterns.

In addition to the above general objectives, the following specific objectives relate to the management of Mallee Cliffs National Park:

- * the protection and where necessary restoration of the area as a representative sample of the sand plain and sand dune land system of south-western NSW and its associated plant and animal communities;
- * the protection of rare, endangered and/or isolated plant and animal species and communities by preparing and implementing, where appropriate, specific management programs;
- * the emphasis within the local community, particularly neighbours of the park, of the importance and purpose of management programs relating to the protection of natural features and the control of fire, weeds and feral animals; and
- * the enhancement of the value of Mallee Cliffs National Park as a wildlife conservation area by promoting the importance of its conservation values through liaison with local councils and appropriate government organisations.

MANAGEMENT STRATEGY

The emphasis of management for Mallee Cliffs National Park for the lifetime of this plan will be on the protection of the area and on programs necessary for the restoration of disturbed lands to a more natural condition.

4. POLICIES AND MANAGEMENT FRAMEWORK

This chapter contains the policies and framework for the management of Mallee Cliffs National Park together with relevant background information. Policies are summarised under the following section headings:

Mallee Cliffs National Park: Its Natural and Cultural Landscapes; and
Use of the Area.

The policies established in this plan of management will provide the framework for management consistent with the anticipated resources available to the Service and with anticipated community trends for the next five to ten years.

The actions identified are those to which priority will be given in the foreseeable future. Other management actions may be developed over the life of this plan consistent with the National Parks and Wildlife Act, Service management policies and the objectives and policies set out in this plan.

4.1 MALLEE CLIFFS NATIONAL PARK: ITS NATURAL AND CULTURAL LANDSCAPES

4.1.1 Landforms and Soils

Mallee Cliffs National Park overlies an interesting geological structure of south-western NSW. The Murray Basin was originally formed as an extensive area of early Permian marine sediments laid down in a shallow arm of the sea more than 250 million years ago. More recently, in the early Tertiary, the land sank beneath the sea again. At both times the sea flooded in from the south-west along the present alignment of the Murray River. The sea again retreated about two million years ago leaving a mantle of shallow water sediments.

Following the withdrawal of the sea in the early Pleistocene a succession of cool-dry and warm-moist climatic cycles developed the present cover of deep red sands in the lower Murray-Darling Basin. From about 350 000 to 50 000 years ago there were at least three periods of arid conditions suitable for dune building. These periods of desiccation produced a pattern of extensive linear sand dunes which seem to be aligned along the anti-clockwise pattern of winds circulating around high pressure systems.

The national park lies in the south-west corner of the Murray-Darling Basin and consists of Quaternary deposits of low aeolian sand dunes and sand plains. There are no permanent streams or natural water bodies within the national park.

The soils of the park are typically calcareous plains of loam or brown solonised sandy loams; some with limestone nodules at the surface. These alternate with an irregular system of low east-west dunes of red earthy sands and sandy solonised brown soils overlying sandy clays. Some accelerated sheet soil erosion arising from past grazing and other uses is evident on the park.

Policies

- * Areas subject to accelerated soil erosion arising from past land use will be revegetated.
- * All works carried out in the park will be designed to minimise soil erosion.

4.1.2 Native and Introduced Plants

Mallee Cliffs National Park contains extensive areas of two important plant communities typical of the south-west of NSW. These are the mallee association (*Eucalyptus gracilis*-*E. dumosa*-*E. socialis*) and belah-rosewood woodland (*Casuarina pauper*-*Alectryon oleifolius* ssp. *canescens*). The park is also noted for variations of these two dominant associations; particularly the mallee association with triodia understorey (*Triodia scariosa*) [previously *irritans*] and monospecific *Dodonea* shrub communities. *Dodonea* normally occurs within the understorey of mallee communities.

The vegetation of Mallee Cliffs National Park has been mapped and analysed by the Department of Applied Biology of the (then) Ballarat College of Advanced Education in three seasons during 1983, 1985 and 1987 (Morcom & Westbrooke, 1990). It has subsequently been mapped by the Royal Botanic Gardens (Fox, 1991; Scott, 1992) and is shown on the Ana Branch-Mildura and the Balranald-Swan Hill 1:250,000 map sheets. Morcom and Westbrooke (1990) recorded 191 species of plants, including 33 non-native species on the national park. The distribution of the plant communities within Mallee Cliffs National Park is largely determined by minor changes in topography and associated soil type.

Ten plant associations were identified; four of which cover almost 99% of the area of the park. These major vegetation communities are:

***Eucalyptus gracilis*-*E. dumosa*-*E. socialis* open scrub:** This mallee open scrub community is the most extensive plant community in the park. In addition to the dominant eucalypts, *E. foecunda* and *E. oleosa* occur but less frequently. The community is characterised by a diverse understorey which includes *Dodonea viscosa* ssp. *angustissima*, *Senna artemesiodes*, *Zygophyllum* spp., *Eremophilla glabra*, *Westringia rigida*, *Grevillea huegelli* and *Chenopodium curvispicatum*. This community is found on the sandy loams and solonised brown soils of the calcareous sandplains.

This community is comparatively weed free. It is, however, very fire prone.

***Eucalyptus gracilis*/*E. dumosa*/*E. socialis* open scrub with *Triodia scariosa* open scrub with triodia understorey:** This mallee/open scrub community occurs on low dune ridges where shallow sands overlie sandy clays. The association is recognised as a separate community because of the dominance of the triodia understorey although, as is the case with the mallee on deep red sands, this community also has a rich shrub understorey other than triodia. The understorey species include *Dodonea viscosa* ssp. *angustissima*, *Eremophilla glabra*, *Myoporum platycarpum*, *Senna artemesiodes*, *Baeckea crassifolia*, *Acacia wilhelmiana*, *A. microcarpa* and *Pittosporum phyllyreoides*. Several species are restricted to this community and two, *Baeckea crassifolia* and *Exocarpos sparteus* are recorded at only a few localities in NSW.

Because of its dense structure this community was rarely used for grazing and is therefore comparatively unmodified. Like the other mallee community described above, this community is comparatively weed free, but is also, however, very fire prone.

Mallee with triodia seems to be a preferred habitat for the endangered malleefowl. In particular, the extensive area of mallee east of Chalky Tank

was not used for grazing and supports the greatest concentration of malleefowl found to date in the park.

Casuarina pauper low woodland/low open woodland: The belah woodland community occurs on calcareous plains of loamy solonised brown soils of interdune areas. It typically occurs with rosewood (*Alectryon oleifolius* ssp. *canescens*) although monospecific stands of either belah or rosewood may occur. This community is also often characterised by an understorey of tall and low shrubs including *Olearia muelleri*, *Zygophyllum apiculatum*, *Atriplex vesicaria* and *Exocarpus aphyllus*. *Dodonaea viscosa* ssp. *angustissima*, *Senna artemesioides*, *Myoporum platycarpum*, *Acacia colletioides* and *Maireana pyramidata* often dominate the understorey.

In the north of the park, there is an unusual occurrence of wilga (*Geijera parviflora*); a species which is regarded as uncommon in the area. *Parietaria debilis*, a plant not previously recorded in the south-west of NSW was found in association with these wilga stands by the Ballarat College of Advanced Education survey team.

This community was utilised for grazing and has been moderately invaded by non-native species. Belah woodland does not readily carry fire and these communities were not severely burnt during the fires in 1975 and 1977.

Herbland and open herbland: This vegetation type covers 10% of the area of the park and is thought to be a degraded community which has resulted from grazing over the past one hundred years. The community typically occurs around the major watering points which were provided on the former property. Because the watering points were sited in areas of occluded drainage where the soils tended to be heavier grey clays, the original vegetation may have been black box, mulga, cypress-pine or chenopod shrub steppe associations.

The relative dominance of species in this community may vary dramatically with the extent and season of rainfall.

This community is the most heavily invaded by non-native plant species. The removal of grazing by domestic stock may result in regeneration of the original vegetation.

It is inferred by the widespread occurrence of the disclimax herbfield and open herbfield community in the park that a number of other plant species and associations were more common in the area of the park before grazing. These species and associations were generally found in the heavier texture contrast soils of occluded drainage basins which were the preferred sites for tanks and hence carried the heaviest concentrations of stock.

Plant communities which may have been modified and reduced in distribution as a result of grazing in these areas include:

Callitris glaucophylla low open woodland: White cypress-pine occurs as scattered individual plants within the belah community and is the dominant species in a few small areas. The individual plants tend to be senescent which suggests that the species were a preferred forage plant for sheep when the property was grazed. The species has also suffered from fire and harvesting for timber. The community is

characterised by an understorey largely made up of non-native herbs and grasses.

***Eucalyptus largiflorens* open woodland:** A small patch of black box occurs in the north-western section of the park on heavy soils. The understorey consists mainly of non-native grasses and herbs.

***Acacia aneura* open woodland:** One small patch of mulga occurs in the north of the park within an extensive area of belah woodland. The understorey of this community is dominated by species associated with the herbland community.

Cheilanthes austrotenuifolia has been recorded in the mulga stand as has the non-native species *Papaver hybridum*. These two species have not been recorded elsewhere in the far west of NSW.

***Dodonea viscosa* ssp. *angustissima* shrubland:** In Mallee Cliffs National Park, narrow-leafed hophush is generally associated with mallee open scrub communities. In a number of sites in the park, however, it occurs as a monospecific tall shrub community. The species is recognised as being favoured by grazing and is an early coloniser following clearing or disturbance of vegetation. The incidence of this community, therefore, probably reflects past grazing and clearing. Hophush is considered by landholders as a major “woody weed” in the south-west corner of the state.

***Maireana sedifolia* low open shrubland:** Two small areas of pearl bluebush occur in the park on soils with a high clay content and where pools of water accumulate following rain. This species was preferred by stock and was probably once more common on the park.

***Maireana pyramidata* low open shrubland:** Small areas of black bluebush also occur. Like pearl bluebush this community was preferred by stock and was probably once more common on the park.

The occurrence of small, isolated and relict native plant communities within the park possibly demonstrates relatively long term ecological change in the south-west of NSW. It is inferred that bluebush shrubland, mulga, and cypress-pine woodland were once more widespread.

The park also demonstrates short term vegetation changes resulting from grazing; 10% of the park is now disclimax herbland and open herbland and the present pattern of vegetation has been strongly influenced by one hundred years of grazing. The condition of the vegetation generally is also recognised as being post fire succession following extensive wildfires in 1974 and 1976.

Pressey (1990) has established that there has been a ten fold increase in dryland cropping in the Western Division since the mid 1960's. Clearing and cropping in the malleelands has partly isolated Mallee Cliffs National Park as a remnant 'island' of native vegetation. Parsons (1993) identified clearing and cropping as the single most important contributor to the depletion of genetic diversity of native vegetation in the area. Of the vegetation types represented on the park, sandplain mallee and belah-rosewood have been the most favoured for clearing, Scott (1992) and Fox (1991).

Invasion by weeds accompanied grazing and settlement. This impact has been unevenly spread between the native plant communities. Generally the eucalypt associations are relatively weed free (3-5%) whilst those communities which

suffered the greatest grazing pressure are most "weedy". Measures of "weediness" are high for the *Dodonea* community (25%), mulga (25%), white cypress-pine (32%), black box (33%), pearl bluebush (35%), black bluebush (50%) and herbland/open herbland (56%) communities. The percentage represents the proportion of non-native species to native species in each community.

Elimination of grazing by domestic stock and implementation of a more scientifically based fire management regime should assist in the regeneration of native vegetation communities. In particular the removal of stock is expected to reduce the overall impact of weeds on native vegetation and the control of wildfire will result in a decline in the incidence of fire-promoted species.

The Noxious Weeds Act 1993 took effect from 1 July 1993. The Act places an obligation upon public authorities to control noxious weeds on land that it occupies to the extent necessary to prevent such weeds spreading to adjoining lands.

Despite the removal of stock the open woodland and shrub steppe areas of the park remain subject to artificially high pressure from grazing from goats, rabbits and kangaroos since the construction and continued existence of ground tanks in the national park has modified the ecological condition of the park.

Removal of artificial watering points and the culling and possible moderate to long term eradication of non-native herbivores will be undertaken to assist in the re-establishment of native vegetation. Decommissioning of water tanks as outlined in sub-section 4.1.3 of this plan of management will also lead in the moderate to long term to a reduction in kangaroo numbers on the park which will allow regeneration of native plant communities which are now subject to overgrazing (q.v. sub-section 4.1.3).

Policies

- * The existing diversity of native plant and animal communities will be conserved and where necessary restored.
- * Scientific understanding of the diversity, distribution, ecology and management needs of native plants in the park will be encouraged. Research (including inventory) into the ecology and distribution of rare and endangered plant species will be encouraged as a priority.
- * Management operations will be designed to cause minimal disturbance to native plant communities.
- * Weeds will be controlled on the national park with priority given to those which:
 - are declared noxious
 - have an unacceptable impact on native plant and animal communities;
 - have a high capacity for dispersal;
 - are new isolated occurrences;
 - are or may affect neighbouring lands; and/or
 - have the potential to be spread through internal access systems.
- * The control of weeds will be by techniques which have minimum impact on native plant and animal communities.

- * Environments currently free of introduced species that may be susceptible to invasion by weeds will be monitored and control/ eradication measures will be implemented in these areas if invasion by weeds occurs.
- * Weed control programs will be carried out in conjunction with adjoining landholders and the Rural Lands Protection Board.

4.1.3 Native and Introduced Animals.

In order to provide for the complete range of native animals in the reserves it is an aim of the management of Mallee Cliffs National Park to provide habitat diversity, including some areas of grassy woodland as well as shrubby areas and a variety of post fire stages in both the mallee and woodland communities.

It is likely that protection of the national park from too frequent fire, the regeneration of cleared areas, control of introduced animals and maintenance of populations of kangaroos at a naturally sustainable level will also greatly benefit most native animals in the reserve.

The fauna record for south-western New South Wales is limited. Accordingly, several surveys have been recently undertaken (mid 1990's); in particular the Biodiversity Project undertaken by the NSW National Parks and Wildlife Service has completed the first and second stages of a program of fauna surveys in mallee and associated communities in south-western NSW. Sites surveyed include Mallee Cliffs National Park and the adjoining property "Gulthul".

The Biodiversity Project has added several records of endangered species for Mallee Cliffs National Park. It is expected that this and other surveys plus opportunistic sightings, will add to the existing record and increase the information available on the ecology of endangered fauna in the area. Of particular interest is the confirmation of the mallee worm lizard (*Aprasia inaurita*) in the park, for which few records exist in the area.

Other threatened fauna listed on Schedules 1 and 2 of the Threatened Species Conservation Act (see below) which have been recorded on Mallee Cliffs National Park include:

- shy hylacola (*Sericornis cautus*);
- purple-gaped honeyeater (*Lichenostomus cratitius*);
- Gilbert's whistler (*Pachycephala inornata*);
- chestnut quail thrush (*Cinclosoma castanotum*);
- pink cockatoo (*Cacatua leadbeateri*);
- malleefowl (*Leipoa ocellata*);
- western pygmy possum (*Cercartetus concinnus*);
- greater-long eared bat (*Nictophilus timorensis*);
- little pied bat (*Chalinolobus picatus*);
- plains wanderer (*Pediomus torquatus*);
- red-tailed black cockatoo (*Calyptorhynchus magnificus*);
- black-breasted buzzard (*Hamirostra melanosternon*); and
- pied honeyeater (*Certhionyx variegatus*).

The red-tailed black cockatoo is an unusual sighting for this area, the birds are likely to have been in transit.

Present information on threatened fauna and their habitat preferences, points to the possibility of a number of other Schedule 1 and 2 species being present at Mallee Cliffs National Park including:

- Bolams mouse (*Pseudomys bolami*);
- inland epitesicus (*Vespadelus baverstocki*);
- striated grasswren (*Amytornis striatus*);
- grey falcon (*Falco hypoleucos*); and
- southern scrub robin (*Drymodes brunneopygia*)

The following species have not been recently recorded in NSW, or are considered extinct in this area, but are found in similar habitat in Victoria. It is possible that they could occur in Mallee Cliffs National Park.

- Mitchell's hopping mouse (*Notomys mitchelli*);
- little pygmy possum (*Cercartetus lepidus*);
- mallee emu wren (*Stipiturus ruficeps*);
- red-lored whistler (*Pacheycephala rufogularis*); and
- slender billed thornbill (*Acanthiza iredalei*)

An extensive survey for the black-eared miner (*Manorina melanotis*), a bird restricted to mallee regions in the vicinity of the NSW/Victorian/South Australian borders and which is recognised as extremely rare and possibly extinct, was recently undertaken in south western NSW, including within Mallee Cliffs National Park. The conclusion of the researcher was that the park did not contain suitable habitat for the bird because the mallee communities were not of a suitable age class or density. (Franklin, pers.com.)

Habitat preference of many of the Schedule 1 and 2 mammals and reptiles is mallee with triodia understorey. Sadler and Pressey (1994) in their report on reptiles and amphibians consider it one of the two broad habitat types of particular importance in the Western Division.

The criteria adopted for ascribing threatened status to an animal under Schedule 1 and 2 of the Threatened Species Conservation Act include:

- whether the population of a species has been reduced to a critical level;
- whether the habitat of a species has been drastically reduced or modified;
- whether a species may be in danger of extinction;
- whether a species may now be considered extinct but has been seen in the wild in the past 50 years.

The decline and possible extinction of species of native fauna is generally the result of a combination of many factors which include:

- clearing of native vegetation;
- competition and habitat degradation from rabbits, stock and other introduced herbivores (and sometimes artificially high populations of native herbivores, particularly kangaroos);
- predation by cats, foxes and dogs; and
- changes in fire regimes.

While not eliminating all these factors reservation of an area as a national park protects the native plant and animal communities from grazing by domestic stock and clearing of vegetation. It is an aim of national park management to reduce

or eliminate predation and competition from feral animals and to establish a scientifically and socially responsible regime of fire management.

Under the Threatened Species Conservation Act a recovery plan must be prepared for endangered and vulnerable flora and fauna. The purpose of a recovery plan is to promote the recovery of a threatened species, population or ecological community with the aim of returning the species, population or ecological community to a position of viability in nature.

The Act provides that a recovery plan for a plant or animal listed on Schedule 1 must be prepared within five years from December 1995. The Act also provides that a recovery plan for a plant or animal listed on Schedule 2 must be prepared within ten years from December 1995.

A threat abatement plan outlines the management of key threatening processes with a view to their abatement, amelioration or elimination.

Recovery plans and threat abatement plans are prepared as part of a Service wide program and are not the responsibility of any one park or district.

In particular, the past one hundred to one hundred and fifty years has seen a dramatic reduction and modification to the habitat of the endangered malleefowl in western NSW. Malleefowl populations are threatened by all of the factors described above as primary causes for the decline and possible extinction of native animals. Malleefowl are also subject to roadkills and predation by native animals such as hawks.

Mallee Cliffs National Park is important to the conservation of malleefowl as one of a number of large but isolated conservation areas where the bird survives. Each of these parks and reserves protects a small population of malleefowl and the loss of any one community will result in a substantial reduction in the total population. Little information is available on genetic differences between the separate populations.

Other national parks and reserves known to have malleefowl include:

In NSW

Yathong and Nombinnie Nature Reserves (177 241 hectares)
Round Hill Nature Reserve (13 630 hectares)
Pulletop Nature Reserve (145 hectares)
Tarawi Nature Reserve (33 573 hectares)

In Victoria

Wyperfeld National Park and Wilderness Area (333 700 hectares)
 Hattah-Kulkyne National Park (48 000 hectares)
 Little Desert National Park (132 000 hectares)
 Big Desert Wilderness Park (132 000 hectares)
 Murray-Sunset National Park (633 000 hectares)
 Brozewing Flora Reserve (12 400 hectares)

In South Australia

Danggali Conservation Park (253 230 hectares)
 Billiat Conservation Park (38 742 hectares)
 Martin Washpool Conservation Park (563 hectares)
 Messent Conservation Park (12 246 hectares)
 Ngarkat Conservation Park (262 700 hectares)
 Peebinga Conservation Park (3 371 hectares)
 Pooginook Conservation Park (2 851 hectares)
 Innes National Park (9 141 hectares)
 Ferries McDonald Conservation Park (845 hectares)

A Recovery Plan involving NSW, Victorian, South Australian and Commonwealth conservation agencies is currently being prepared for the management of malleefowl in Australia. The NSW National Parks and Wildlife Service, in association with the Western Plains Zoo at Dubbo is also developing more specific programs for the remaining populations of malleefowl in Mallee Cliffs National Park and Yathong Nature Reserve. These two programs recognise that malleefowl even in protected areas are particularly susceptible to:

- reduction in food resources and loss of cover as a result of too frequent fire;
- heavy predation by foxes and cats;
- competition by goats and rabbits; and
- competition from high numbers of native birds such as the common bronzewing (*Phaps chalcoptera*) which are attracted by water held in tanks.

Surveys have been undertaken over the past seven years into the population of malleefowl in Mallee Cliffs National Park to monitor the population in the park and to add to the ecological information on the species. This project has established that mallee with *Triodia scariosa* understorey is the most significant nesting site preference for the birds on the park.

Population fluctuations of the species will continue to be monitored. Fox baiting specifically aimed at reducing the fox population to increase the chance of survival of the malleefowl on the park, has also been undertaken since 1989.

European settlement of the Darling River commenced in the late 1840's and resulted in the taking up of huge pastoral holdings in the second half of the nineteenth century. As a result, the area of Mallee Cliffs National Park had been grazed for over one hundred years prior to its reservation as a national park in 1977. During that period eleven species of introduced animals reached the region; one of the most significant contributors to the loss of native animals and the serious decline in their habitats.

Introduced fauna of particular concern are foxes (*Vulpes vulpes*), rabbits (*Oryctolagus cuniculus*), feral goats (*Capra hircus*) and cats (*Felis catus*).

Foxes are considered a major pest species in Mallee Cliffs National Park because of the significant impact they have on native fauna, particularly malleefowl. As opportunistic feeders, baiting using 1080 poison impregnated meat baits is an effective and environmentally safe control technique if done in conjunction with other co-operative control programs on all neighbouring lands. A 1080 baiting program has been undertaken in the national park since 1989; the program is ongoing due to the highly mobile nature of foxes which results in rapid re-population of treated areas.

The control of foxes is co-ordinated with the control of rabbits on the park. Fox baiting is increased in areas where rabbit control has been undertaken, as it is believed that in the absence of effective fox control, removal of rabbit prey can result in higher predation by foxes upon native species in these areas.

Rabbits accelerate erosion by removing plant cover and are also suspected as being an important cause in the decline of and limited regeneration of many native species particularly Murray cypress-pine *Callitris columellaris*. Rabbits are a major food source of the large predators, notably foxes and eagles, although predation by those animals alone does not significantly reduce rabbit numbers. The most effective control measure is ripping and fumigation of warrens. Baiting using 1080 is also undertaken as a supplementary measure.

Rabbit calici virus first appeared in Mallee Cliffs National Park in 1996 but to date has had no noticeable effect in reducing rabbit populations. The Service will monitor the effect of the calici virus.

Goats are a significant problem in western NSW since they can breed rapidly and are highly nomadic. Many landholders consider goats both as a major pest and a source of income and carry out control programs. Accordingly, trapping for goats in western NSW is most active when the market price for goats is high and conversely, control effort is reduced when the market price is low.

Past management of goats on the park has included mustering and shooting programs carried out by Service staff. Current control is by licenced contractor and the terms of the licence are reviewed on an annual basis in the light of climatic and market conditions. Goat traps are established at ground tanks within the park and are effective in reducing the number of goats.

As with other pest control programs neighbours are encouraged to carry out goat control in co-operation with the Service. In addition to on-park goat control, therefore the Service has established, in conjunction with the owner, a goat trap on a ground tank in a neighbouring property. The tank is within 2km of the park boundary and it is probable that the goats and kangaroos within this section of the park depend on the water available in this tank.

Cats are an introduced species of concern, although the effective control of feral cats in large areas such as Mallee Cliffs National Park is currently impractical. Trapping and shooting have limited effect and are labour intensive. Shooting at night with spotlights has been the primary method

of control on the park and has been undertaken in association with the fox control program. Spotlighting figures are also a means of recording fluctuations in the fox and cat populations.

Cats are not on the list of species approved for control by 1080 poisoning. Although 1080 poisoning is effective in reducing cat numbers special permission is required from the Department of Agriculture for such programs. Some preliminary work has been undertaken to develop specially designed baiting stations for cats and, subject to the necessary approvals from the Department of Agriculture, are to be trialled on the park in conjunction with the fox baiting program. Effective biological control of feral cats has not yet been developed but current research may provide techniques for such control in the moderate to longer term.

Pigs have not been recorded on the park probably because of distance from a major watering source. If they appear at any time on the park priority will be given to their control and eradication.

Scientific investigations have established that European honeybees compete with and displace native animals, particularly native bees, nectar feeding birds and small mammals and have damaging effects on native plants. There are no licenced apiary sites in Mallee Cliffs National Park and in accordance with Service policy no licences will be issued.

There are currently seventeen ground tanks on Mallee Cliffs National Park, many of which no longer hold permanent water. Those tanks that do hold water, however, have an impact on both native and introduced animal species:

- some native species which should occur in the arid environment of the park are disadvantaged and displaced by competition from non-endemic native species which take advantage of the water retained in the ground tanks;
- the tanks support other species of native animals at artificially high levels. In particular ground tanks maintain high levels of kangaroos which move onto neighbouring properties; and
- they support all species of introduced animals, including high populations of feral honeybees.

The closure of ground tanks is an important means of controlling all feral animals in the park. In particular, Bracken and Gorman (1987) state that each ground tank has a local population of rabbits and that it is the warrens around the tank which act as "refuge warrens" from which invasion into the surrounding country commonly occurs after a drought. Closure of tanks and subsequent ripping of the refuge warrens will be effective measures to control the rabbit population of the park.

Feral goats will also be more effectively controlled by the closure of tanks as goats rely on tanks for water in the summer months. A goat trap has been established at Pine Tank, the only tank considered essential for management purposes (q.v. sub-section 4.3.3).

The removal of artificial watering points on the park should also reduce the populations of red, western grey and eastern grey kangaroos (*Macropus rufus*, *M. fuliginosus*, *M. giganteus*) in the moderate to long term although high populations of these species may still be sustained near park boundaries where water is available on neighbouring properties.

Monitoring kangaroo populations on the park and on neighbouring properties together with research into the impact of artificially high numbers of kangaroos on the park's ecology will be undertaken to establish effective kangaroo management programs.

Policies

- * Where required, management of endangered fauna will be in accordance with relevant Species Recovery Plans.
- * Populations of red kangaroos, western grey kangaroos and eastern grey kangaroos on Mallee Cliffs National Park will be monitored to establish their management requirements.
- * Introduced animals will be controlled and where possible eradicated. Preference will be given to control techniques which have minimal environmental impact.
- * Control programs will be undertaken in conjunction with neighbours where appropriate.
- * Priority for control of introduced animal species will be given to those which:
 - are declared noxious;
 - conflict with native plant and animal communities;
 - may be a threat because of disease;
 - have a high capacity for dispersal;
 - are new isolated occurrences; and
 - are or may affect neighbouring lands;
- * Priority for research into the control of feral animals will be encouraged in the following areas:
 - biological control methods;
 - assessment of their distribution and abundance;
 - assessment of their impact of on native plants and animals.
- * The occurrence, distribution and density of introduced animal species causing significant environmental damage will be mapped.
- * Control of foxes will be undertaken as a matter of priority and with the co-operation of adjoining landholders with the aim of reducing numbers to levels which do not threaten the survival of malleefowl and other endangered species.
- * A feral goat control program will be undertaken by trapping, mustering and removal by a contractor with supplementary programs of aerial and ground shooting.
- * The control of rabbits will be undertaken by ripping warrens, baiting and fumigating.
- * The program of control of feral cats will be extended. Subject to approval being granted by the Department of Agriculture, 1080 bait stations for cats will be trialled.

- * Environments currently free of introduced species will be monitored.
- * Grazing of domestic stock will not be permitted in the park.
- * No apiary licences will be issued on the park.
- * All tanks on the park not required for management purposes specified in sub-section 4.3.3 will be progressively decommissioned and rendered in-operative.
- * Tanks not required for management purposes will be recorded, decommissioned but not destroyed.
- * Decommissioning of tanks will be progressive and in accordance with a program which will include monitoring of the impact of the program.

4.1.4 Fire Management

Fire is an integral part of the Australian environment. It is a major factor in determining the structure and species composition of the vegetation and has long term effects on animal populations.

The Aboriginal and pre-Aboriginal fire regimes for semi-arid mallee communities are not known. The effect of fire on the current vegetation pattern can clearly be seen, however, in the young, even-aged stands of mallee and the absence from many areas of fire sensitive species such as *Callitris spp.*

Fire frequency, intensity, season of occurrence along with the source of fire and the subsequent path, are major factors influencing the distribution and composition of plant and animal communities. Through the use of prescribed fire and other fire management techniques, the Service has considerable potential to influence these factors. However the development of an appropriate fire regime requires understanding of the fire requirements of the native plant and animal communities. An inappropriate regime could compromise the conservation of the natural resources of the park.

Many species of plants and animals are adapted to specific stages of the regeneration cycle and different frequencies of fires will favour different species, depending on life cycles and patterns of seed setting. Mallee pine, for example takes 15 years to form cones but will survive for up to 500 hundred years if it escapes being burnt for the first 50 years of its life. A number of reptiles, on the other hand are most favoured by the 6-25 year post fire stages because of the promotion of growth of *Triodia scariosa* by fire (Caughley 1985).

The majority of fires in south-western NSW are started by lightning strikes and occur both within and near Mallee Cliffs National Park. Fires are generally carried in the woodlands by heavy growth of *Stipa spp.* and ephemeral herbs after a wet winter and spring. Fire risk is highest in the mallee when strong winds and high temperatures allow fire to bridge the gaps between trees and inflammable understorey.

The south-west of NSW including the area of the park was extensively burnt during major fires in 1974-75. Virtually all the area of the present park was burnt in these fires. A large section of what is now the western part of Mallee Cliffs

National Park also burned in February 1977. Very few areas have remained unburnt for longer than 30 years.

Longer periods between fires than presently occur will result in greater vegetation variety and it appears desirable that communities in the reserve should generally not be burnt more often than at least every 20-40 years. Some areas should remain unburnt for as long as possible to provide old age stands of vegetation. The most desirable result would be for all post fire stages to be present in some part of the reserve to provide habitat diversity.

The following features of fire ecology in Mallee Cliffs National Park are important:

- when the area burnt is small the pressures of grazing and predation on seeds and seedlings may be high, particularly if dry conditions persist. Repeated patchy low intensity fires could therefore result in low shrub densities;
- intense fires usually kill *Callitris spp.*, *Acacia spp.* and most other plants, but intense fires also result in greater germination and establishment of seedlings; and
- in the absence of fire, seedling establishment occurs at low rates for some plants, including many eucalyptus species.

Patchy low intensity burns therefore result in the short term in lower loss of animal numbers, increased habitat diversity and rapid recolonisation from adjacent unburnt areas. In the longer term, in the absence of more intense fire, loss of food and cover as a result of senescence of vegetation and poor seedling establishment would disadvantage the fauna. The best compromise would appear to be for areas burnt to be quite large but not continuous over the whole available habitat.

A boundary firebreak is maintained around the reserve and internal management tracks divide the area into blocks. Fire suppression will aim to restrict wildfire to within a block or minimum number of blocks.

The Service is a member of the South West Mallee Bushfire Prevention Scheme. Under the *Rural Fires Act 1997* the Service is a fire authority and is responsible for containing fires on reserved areas and to ensure they do not cause loss of life or damage to other land or property. This responsibility includes the implementation of fuel management programs. The Service may also assist with the control and suppression of fires adjacent to the reserves.

The Service regards co-operative fire management as essential for both the protection of property and of the natural resources of the national park. An important part of the Service's fire management is participation as a member of District Bushfire Management Committees in the preparation of a plan of operations and a bush fire risk management plan under Section 52 of the Rural Fires Act.

These plans contain an introduction and address operational arrangements, fuel management planning and include a resources directory. The commitments each organisation makes in these plans are legally binding. The plans recognise the need to systematically map or otherwise identify all environmental resources, including vegetation, topography, and Aboriginal or historic heritage sites.

A fire management plan for Mallee Cliffs National Park will be developed by June 1999. The plan will address in greater detail the policies and actions relating to fire management within Mallee Cliffs National Park.

Policies

- * Fire will be managed in Mallee Cliffs to ensure:
 - the protection of human life and property;
 - the conservation of plant communities and plant or animal species which require a particular fire frequency;
 - the maintenance of species and habitat diversity; and
 - the protection of Aboriginal sites, historic places and management facilities.
- * Fire management in the park will aim to create a range of fire age classes with some areas maintained in as old an age class as possible.
- * Most areas will be protected from being burnt more often than at least every 20-40 years.
- * All wildfires will be suppressed and restricted in extent as much as possible within established firelines within the park.
- * Prescribed burning may be used to establish the desired fire regime and will generally be timed to approximate the desirable natural fire cycle.
- * Preference will be given to fire suppression methods which least damage the landscape. Use of heavy equipment off existing roads and tracks will be avoided where possible.
- * Liaison will be maintained with fire brigades, shire councils, the Mallee Bushfire Prevention Scheme and local land owners to ensure co-ordination in the suppression of wildfires in the reserves and adjoining lands.
- * The Service will participate in the preparation of the plan of operations and a bush fire risk management plan under Section 52 of the Rural Fires Act by the District Fire Management Committees.
- * The Service will continue to develop co-operative strategies with other authorities and landholders as a basis for fire management on the national park.

- * Research will be encouraged into:
 - fire behaviour in mallee;
 - effects of fire on mallee vegetation and fauna, particularly threatened species; and
 - fire effects in woodland communities.
- * A fire management plan will be prepared for the Mallee Cliffs National Park by June 1999 and will be reviewed every five years. The fire management plan will be placed on public exhibition.
- * Records of fire occurrence, patterns and effects will be maintained and post fire regeneration will be monitored.
- * The co-operation of all relevant authorities will be sought in reducing the number and extent of unplanned fires in the area of the park and surrounding properties.
- * Fire breaks will be maintained along all external boundaries and internal roads.

4.1.5. Cultural Heritage

The area of Mallee Cliffs National Park has no documented Aboriginal sites although a great number of sites have been recorded along the Murray River, demonstrating that the river supported a large population of Aborigines. In areas which are located a considerable distance from the river, such as Mallee Cliffs National Park, Aboriginal sites are generally restricted to sand dunes, particularly near a water source such as a soak or clay pan. These sites are likely to contain only terrestrial fauna and stone artifacts (Lance, 1988). It is postulated that the poor mallee sandridge country and lack of water compared to the rich riverlands offered few advantages for Aboriginal use of areas such as the park.

South-western NSW was settled by Europeans in the late 1840's from both the Riverina to the east and from South Australia to the west and by the early 1850's squatting licences were being issued for the occupation of river frontage lands near the confluence of the Murray and Darling Rivers. A map published in 1890 (Bowyer-Smith 'Map of the Land Board District of Hay') shows that the western two thirds of what is now Mallee Cliffs National Park was part of a much larger Mallee Cliffs property which extended to the Murray River. The eastern block of Mallee Cliffs National Park was part of Tapalin property which also had extensive frontage on the Murray River. Substantial evidence of pastoral occupation remains on the park. A meat house is the only building remaining from the original station complex. The foundations of other buildings are still extant.

Policies

- * All cultural sites located on the park will be recorded and protected from disturbance.
- * The provisions of the ICOMOS charter for the conservation of places of cultural significance (the Burra Charter) will be used as guidelines for the management of cultural sites in the park.
- * The Service will liaise with relevant Local Aboriginal Land Councils and communities on all aspects of Aboriginal site management in the park.

4.2 USE OF THE PARK

Mallee Cliffs National Park will be managed to ensure that its use, whether by the general public, special interest groups, Service managers or other authorities, is appropriate and conforms with the National Parks and Wildlife Act and with the conservation objectives and policies of this plan.

The major categories of use that may be appropriate within Service areas are:

- promotion of natural and cultural resource conservation and environmental education;
- recreation in a natural setting;
- research; and
- management operations by the Service and other authorities.

The extent to which these categories of use are appropriate to Mallee Cliffs National Park are indicated below.

4.2.1 Public Use

Recreation opportunities in Mallee Cliffs National Park are limited by a number of factors including lack of necessary infrastructure and services, particularly water and road access within and to the park.

Other national parks in the region, both in NSW and Victoria cater for outdoor recreation. These include Mungo National Park in NSW and Hattah-Kulkyne, Murray-Sunset and Wyperfeld National Parks in Victoria. These national parks offer ready access to landscapes and environments typical of the lower Murray-Darling region and are comparable to those in Mallee Cliffs National Park.

Mallee Cliffs National Park currently receives a limited amount of use by community groups and educational institutions, primarily from Mildura. District scouting groups including Venturers and Rovers and the Sunraysia Malleefowl Preservation Society have been involved in malleefowl surveys for several years.

A policy of limited public access for recreation purposes is consistent with the high priority given in the management of Mallee Cliffs National Park to the protection of malleefowl and other endangered animals. No increase in the level of public use is proposed for Mallee Cliffs National park.

Policies

- * Facilities will be not be provided on the park for public use.
- * A permit system will be introduced enabling controlled visitor access.
- * Any road or track on the park may be closed temporarily or permanently or have its use restricted if such use results in environmental damage or effects essential management programs.

4.2.2 Research

The purpose of scientific study in the national park is to improve the Service's understanding of its natural systems and the processes which affect them. Research will also establish the requirements for the management of particular species. Data and findings from research studies and surveys will be utilised in park management.

Service policy is to encourage research by recognised authorities and individuals and the Service may provide assistance with access and information. However, where a research topic is directly applicable to particular management problems, the Service may also provide financial and logistic support.

The Service does not presently have the resources to undertake much of the long term research needed for the management of Mallee Cliffs National Park. To encourage the use of the area for *bona fide* research a prospectus will be prepared as the basis for the involvement of research organisations.

Policies

- * Mallee Cliffs National Park will be available for appropriate research.
- * Research topics which improve knowledge of the resources of the area and assist management will be encouraged. In particular, research will be encouraged into:
 - the conservation of malleefowl;
 - the conservation requirements of any other endangered plants or animals;
 - the impact of kangaroos on the vegetation of the park;
 - the control of weeds;
 - the control of feral animals; and
 - the management of fire for conservation purposes.
- * Only research which causes minimal disturbance to the values of the area will be permitted unless alternative opportunities are not available outside the area and the results of the research can be demonstrated to offer significant benefits for improvement of management programs or knowledge of natural resources.
- * Liaison will be maintained with researchers to obtain as much mutual information and assistance as possible. The results of research will be required to be provided to the managers of the area.
- * A prospectus will be prepared as a guide to priority research objectives.

4.2.3 Management Operations

A network of tracks remains from pastoral days. Most are used for management purposes which includes both Service and non Service use. Service use is for access for fire management, feral animal and weed control, monitoring and research.

The following management tracks outlined on the map (centre pages) will be maintained:

Centre Track;
 Belah Track;
 Dead Horse North Track;
 Bulbuc Road;
 Butchers Track;
 Homestead Track; and
 Pine Tank Track.

Mallee Cliffs National Park has no permanent surface water. There are currently a number of ground tanks in the park which were constructed for the watering of stock. As outlined above (q.v. sub-section 4.1.3) ground tanks often have unacceptable ecological consequences in an arid environment by providing permanent water in areas that would not otherwise be watered. Accordingly the following ground tanks will be progressively de-commissioned and closed in accordance with a program which will include monitoring of the the impact of the program:

Central Bulbuc Tank; North Bulbuc Tank; Chalky Tank; Butchers Tank;
 Lubra Tank; Eureka Tank; Myall Tank; Cote Tank; Homestead Tank;
 Dead Horse Tank; Belah Tank; Todd's Tank; Box Tank; Milkay Tank; Tail Tank; Mulga Tank; Twin Tank.

Many of these tanks have not held water for many years.

Pine Tank will be maintained for fire management and goat control purposes. The tank will be fenced to restrict feral and native animal access.

Mallee Cliffs National Park is bounded by Western Lands Leases with the exception of the Mallee Cliffs Salt Interception Scheme (see map). The neighbouring properties are primarily used for grazing and dryland cropping.

The entire boundary of the national park has been fenced to keep out stock since establishment of the park and the fence is in good condition and only requires periodic maintenance. The fence will be maintained in accordance with a fencing agreement to be drawn up with neighbours. This generally involves the Service supplying the material and the neighbour erecting the fence.

The Mallee Cliffs Salt Interception Scheme has been constructed by the former Department of Water Resources on the south western boundary of the park in the vicinity of Todds Tank to control salinisation of the lower Murray River. A stock and rabbit proof fence has been erected along the boundary shared by the national park and the scheme and a wind break of vegetation is being established. Water is also available for park management purposes such as fire control from a pipeline from the scheme which runs along the park boundary. The environmental impacts of the scheme on the natural condition of the national park are to be independently monitored.

Policies

- * No new roads or vehicle tracks will be constructed in the park.
- * The management tracks outlined on the map, centre pages, will be maintained.
- * Pine Tank within the park will be maintained for management purposes.
- * All other ground tanks within the park will be progressively de-commissioned.

5. PLAN IMPLEMENTATION

This plan of management is part of a system of management developed by the National Parks and Wildlife Service. The system includes the National Parks and Wildlife Act, management policies, established conservation and recreation philosophies and strategic planning at corporate, regional and district levels.

The orderly implementation of this plan will be undertaken within the annual program of the Service's Lower Darling District. Priorities, determined in the context of district and regional strategic planning, will be subject to the availability of necessary staff and funds and to any special requirements of the Director-General or Minister.

District programs are subject to ongoing review within which works and other activities carried out at Mallee Cliffs National Park are evaluated in relation to the objectives laid out in this plan.

The environmental impact of all development proposals will continue to be assessed at all stages of the development and any necessary investigations undertaken in accordance with established environmental assessment procedures.

Section 81 of the Act requires that this plan shall be carried out and given effect to and that no operations shall be undertaken in relation to the national park unless they are in accordance with the plan. However, if after adequate investigation, operations not included in the plan are found to be justified, this plan may be amended in accordance with section 76(6) of the Act.

Activity	Priority
Weed Control Program	High/ongoing
Feral Animal Control Program	High/ongoing
Maintenance of fire breaks	High/seasonal
Research/monitor malleefowl population	High/ongoing
Progressively decommission ground tanks in accordance with a program which will include monitoring of the the impact of the tanks closure.	High
Develop Fire Plan	Medium
Research/monitor kangaroo populations and impact	Medium

6. SELECTED REFERENCES

- Bowyer-Smith, C W (1890) **Map of the Land Board District of Hay, NSW**
Original held in the State Library of NSW.
- Bracken and Gorman (1987) **The Management of Ground Tanks at Mungo National Park: Management options and their consequences.**
S.A.C.A.E. Salisbury (Unpublished)
- Dickman et al.(1993) **Mammals of Particular Conservation Concern in the Western Division of New South Wales.** *Biological Conservation*, 65, 219-248
- Franklin, D. (1993) pers.com. **Researcher Black-eared Miner Survey South-Western New South Wales**, 1993 RAOU.
- Fox, M.D. (1991) **The Natural Vegetation of the Ana Branch - Mildura 1:250 000 map sheet (New South Wales).** *Cunninghamia* 2(3):
- Morcom, L. and Westbrooke, M. (1990) **The Vegetation of Mallee Cliffs National Park.** *Cunninghamia* 2(2)
- Parsons, A.E.B. (1993) **Survey of the Floodplain and Mallee ecosystems of the Mallee Cliffs State Forest and adjacent areas** (Draft) New South Wales National Parks and Wildlife Service.
- Pressey, R.L. Bedward, M. & Nichols. A.O. (1990) **Reserve Selection in Mallee Lands.** In J.C. Noble, P.J.Joss & G.K. Jones(eds) *The mallee lands: a conservation perspective* CSIRO: Melbourne
- Sadler R.A. and Pressey R.L. (1994) **Reptiles of particular conservation concern in the Western Division of New South Wales : A Preliminary Preview.** *Biological Conservation* 69, 41-54
- Scott, J.A. (1992) **The Natural Vegetation of the Balranald-Swan Hill area.** *Cunninghamia* 2(4) 503-662.
- Stephens, S. (1992) **Endangered Species and Communities and Threatening Processes in the Murray Mallee:** Draft status report. Murray Darling Basin Commission.