NSW NATIONAL PARKS & WILDLIFE SERVICE

Kemendok National Park

Plan of Management

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Cover photo: Backwater in Kemendok National Park in flood, 2011. E Foster/DPIE

This plan of management was adopted by the Minister for Energy and Environment on 12 May 2020.

Kemendok National Park is in the traditional Country of the Kureinji People.

This plan of management was prepared by staff of NSW National Parks and Wildlife Service (NPWS). Valuable information on the history of the area was provided by: Kureinji Elder, Ronnie O'Donnell; Jeannette Hope, historian; Jim Maynard, local land manager; and Joseph Vann, retired Forestry Corporation of NSW employee.

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Published by:

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ISBN 978-1-922493-60-6
EES 2020/0513
November 2020

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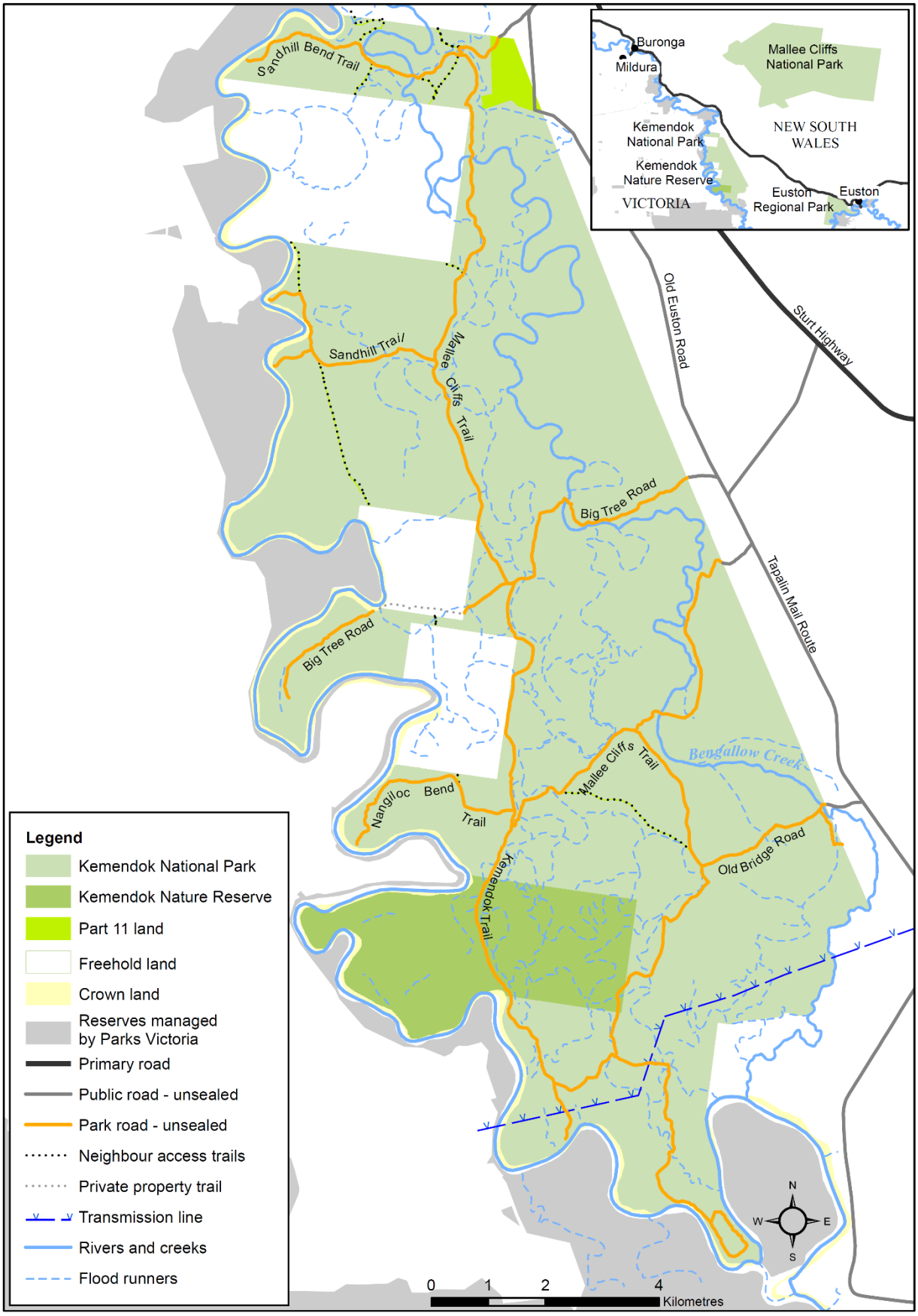

Figure 1 Kemendok National Park

1. Introduction

1.1 Location, reservation and regional setting

Features	Description
Location	Kemendok National Park (also referred to as 'the park' in this plan) is located in the far west of New South Wales, approximately 40 kilometres south-east of Buronga and 36 kilometres north-west of Euston. The western boundary of the park is defined by the Murray River, which is the state border between New South Wales and Victoria.
Area	The park covers 9874 hectares. It includes several roads that are vested in the Minister administering the *National Parks and Wildlife Act 1974* for the purposes of Part 11 of that Act. These roads ensure continued access to neighbouring landholdings. As Part 11 land they do not form part of the reserved area of the park, but their management is subject to this plan and the National Park and Wildlife Regulation 2009 (see Section 5.2).
Reservation date	The park was reserved on 1 July 2010 under the *National Park Estate (Riverina Red Gum Reservations) Act 2010*.
Previous tenure	Before reservation Kemendok National Park was Mallee Cliffs State Forest, dedicated in 1922 for the purposes of timber production and other permitted uses including apiary and grazing. The *Riverina Bioregion Regional Forest Assessment for River Red Gums and Woodland Forest*, conducted by the Natural Resources Commission in 2009 (NRC 2009), recommended the area be managed for conservation and recreation.
Regional context	
Biogeographic region	The park lies in the Murray Channels and Floodplains subregion of the Riverina Biogeographic Region (Thackway & Cresswell 1995). This bioregion is considered to be under-represented in reserves (ERIN 2014).
Surrounding land use	Within New South Wales, land adjoining the park's eastern, northern and southern boundaries is used primarily for cropping and grazing under Western Lands leases. Along its western edge, the park surrounds three freehold blocks that together form Culpra Station which is used for grazing (see Figure 1). Kemendok National Park surrounds Kemendok Nature Reserve, which was reserved in 1988 and is guided by a separate plan of management (NPWS 2009). There is also an 8190-hectare privately managed conservation reserve adjacent to the eastern boundary of the park. Across the river in Victoria are Hattah-Kulkyne National Park, Murray-Kulkyne Park, River Murray Reserve and Karadoc Nature Conservation Reserve. These reserves are managed by Parks Victoria. See Figure 1.
Other authorities	The park is located in the areas of the Dareton Local Aboriginal Land Council, Western Local Land Services and Wentworth Shire Council.

1.2 Statement of significance

Kemendok National Park is of significance due to its biological, Aboriginal and recreation values.

Biological

- Kemendok National Park includes significant vegetation associations that are poorly represented in Australia. These include River Red Gum – Black Box Woodlands and Chenopod – Mallee Shrublands.
- The park provides habitat for a range of native animal species including those dependent on mature river red gum trees and associated hollows. This includes populations of the eastern subspecies of the regent parrot which is threatened at both state and national levels.

Aboriginal heritage

- Kemendok National Park forms part of the Country of the Kureinji People and contains a diverse range of evidence of Aboriginal occupation and use, including modified trees, fire hearths, flaked stone artefacts, burial sites and middens.

Recreation and tourism

- Kemendok National Park is adjacent to the Murray River and supports opportunities for low-impact, nature-based recreation such as camping, fishing, horse riding, walking and birdwatching.

2. Management context

2.1 Legislative and policy framework

The management of national parks in New South Wales is in the context of the legislative and policy framework of the NSW National Parks and Wildlife Service (NPWS), primarily the National Parks and Wildlife Act and Regulation, the *Biodiversity Conservation Act 2016* and NPWS policies.

Other legislation, strategies and international agreements may also apply to management of the area. In particular, the *Environmental Planning and Assessment Act 1979* may require assessment of the environmental impact of works or actions proposed in this plan. The NSW *Heritage Act 1977* may apply to the excavation of known archaeological sites or sites with potential to contain historical archaeological relics. The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* may apply in relation to actions that impact matters of national environmental significance, such as migratory and threatened species listed under that Act.

A plan of management is a statutory document under the National Parks and Wildlife Act. Once the Minister has adopted a plan of management, the plan must be carried out and no operations may be undertaken in relation to the lands to which the plan relates unless the operations are in accordance with the plan. This plan will also apply to any future additions to Kemendok National Park. Should management strategies or works be proposed in future that are not consistent with this plan, an amendment to the plan will be required.

2.2 Management purposes and principles

National parks

National parks are reserved under the National Parks and Wildlife Act to protect and conserve areas containing outstanding or representative ecosystems, natural or cultural features or landscapes or phenomena that provide opportunities for public appreciation, inspiration and sustainable visitor or tourist use and enjoyment.

Under section 30E of the Act, national parks are managed to:

- conserve biodiversity, maintain ecosystem functions, protect geological and geomorphological features and natural phenomena and maintain natural landscapes
- conserve places, objects, features and landscapes of cultural value
- protect the ecological integrity of one or more ecosystems for present and future generations
- promote public appreciation and understanding of the park's natural and cultural values
- provide for sustainable visitor or tourist use and enjoyment that is compatible with conservation of natural and cultural values
- provide for sustainable use (including adaptive re-use) of any buildings or structures or modified natural areas having regard to conservation of natural and cultural values
- provide for appropriate research and monitoring.

The primary purpose of national parks is to conserve nature and cultural heritage. Opportunities are provided for appropriate visitor use in a manner that does not damage conservation values.

Part 11 lands

Part 11 lands (i.e. unreserved lands) are lands vested in the Minister and are either land that is intended to be reserved (e.g. newly acquired additions to the park estate that have not yet been formally reserved), or land that is unlikely to ever be reserved (e.g. severely modified areas, quarries, telecommunication towers, some access roads). Part 11 lands are managed in accordance with the objectives of the National Parks and Wildlife Act, including to:

- conserve nature, including habitats, ecosystems, biodiversity, landforms, landscapes, wilderness and wild rivers
- conserve objects, places or features of cultural value
- foster public appreciation, understanding and enjoyment of natural and cultural heritage and conservation
- apply the principles of ecologically sustainable development.

2.3 Specific management directions

In addition to the general principles for the management of national parks (see Section 2.2), the following specific management directions apply to the management of Kemendok National Park:

- encourage low-impact, self-reliant, nature-based visitation
- encourage and promote appropriate sustainable use to conserve the natural features of the park
- manage fire in the park to minimise the threat of wildfire to life and property
- protect habitat and Aboriginal and non-Aboriginal cultural heritage by controlling priority pest plants and animals, particularly declared weeds, rabbits and foxes.

3. Values

This plan aims to conserve the natural and cultural values of the park. The location, landforms and plant and animal communities of an area have determined how it has been used and valued by both Aboriginal and non-Aboriginal people. These values may be attached to the landscape as a whole or to individual components, for example to plant and animal species used by Aboriginal people. To make this plan clear and easy to use, various aspects of natural heritage, cultural heritage, threats and ongoing use are dealt with individually, although these features are interrelated.

3.1 Geology, landscape and hydrology

Kemendok National Park is located on the Murray River floodplain, and is characterised primarily by heavy grey soils on relatively flat plains dissected with numerous channels and billabongs that are inundated during peak floods.

The Riverland and Murrumbidgee land systems comprise the majority of Kemendok National Park. The Ki Downs and Guthul land systems are also represented in the park (Walker 1991).

Riverland Land System covers approximately 50% of the park. It occurs in a central band extending the length of the park. There is also a narrow band along the edge of the Murray River. This land system is a defined floodplain of grey, fine-textured Quaternary alluvium with sinuous river channels, back channels and billabongs. There are elevated levees of browner alluvium up to three metres high, and riverside lunettes up to 10 metres high.

Murrumbidgee Land System covers approximately 35% and is found along a central band extending the length of the park. A narrower band extends along the edge of the river. It is a complex mix of geomorphologic features of riverine origin including floodplains of grey, fine-textured Quaternary alluvium with small rises up to three metres; back plains, scalded levees and swamps; and riverside lunettes of deep sands up to 10 metres high. The area is irregularly inundated by flooding.

Ki Downs Land System covers approximately 10% and is located along the eastern boundary of the park. This land system comprises a sandplain of loamy to sandy solonised brown soils.

Guthul Land System covers approximately 5% and occurs in the north-east corner of the park. Features of this land system include calcareous Quaternary sandplains of level to slightly undulating loamy to clay-loam solonised brown soils.

The Riverland and Murrumbidgee land systems are susceptible to severe scalding of levees and gullying of riverbanks. Soil erosion occurs in several places in the park, due to either surface water or wind erosion on heavily grazed soils.

Regulation of the Murray River and alteration of its natural flooding regime commenced in 1936 with the completion of the Hume Weir. As a result of extensive river regulation and water extraction, the hydrological regime of the Lower Murray River where the park is located has been significantly changed, with less than half the natural median annual discharge now reaching the NSW border with South Australia (Gippel & Blackham 2002, cited in NRC 2009). Periods of prolonged low flow have become more frequent. The frequency, duration and magnitude of all but the largest floods have been reduced. This in turn has reduced the extent and frequency of inundation of the adjacent floodplain and associated vegetation. The impact of changed watering regimes is compounded during extended periods of dry weather. The Natural Resources Commission has identified the river red gum (*Eucalyptus camaldulensis*) forests of the Lower Murray River as possibly the least frequently flooded and most stressed forests in the Riverina Bioregion (NRC 2009). Rising

saline groundwater has also been known to occur and this may impact forest and wetland health.

The Bengallow Creek anabranch floodplain wetland system is almost entirely contained in Kemendok National Park (see Figure 1). The system consists of a braided network of flood runners, together with a variety of smaller creeks, wetlands, billabongs and broad open floodplains (Sharpe, D'Santos & Healy 2013), that were once sustained by a natural watering regime of intermittent inundation and drying. Under regulated river operation, Bengallow Creek has been reduced to a series of isolated waterholes that are near-permanent.

The Bengallow system was fully or partially inundated by floods seven times between 1990 and 2000. It received environmental water by pumping in 2006 (during the millennium drought), which inundated about 25% of the creek channel. During the summers of 2010–11 and 2011–12 it eventually flooded, which inundated the creek channel as well as wetlands, billabongs and open floodplain areas. No water management infrastructure is provided in the park, however, before overbank flooding occurs Bengallow Creek can receive water at three main points along the park boundary. Although the artificial watering of Bengallow Creek in 2006 was only partly completed, it was recognised as a significant ecological asset that would benefit from a strategic watering program (Val et al. 2007). All seven sites included in the watering event in the Lower Murray at that time recorded positive ecological responses and made a contribution to restoring ecological functions in the wetland environments. NPWS is therefore working with water management agencies to introduce more water to the Bengallow Creek system in an effort to restore connectivity to the river and improve biodiversity values in the park.

Issues

- Murrumbidgee and Riverland land systems are susceptible to erosion.
- Wetland areas are disconnected from the river, and their ecosystems are impaired and highly stressed by lack of water and, potentially, by rising saline groundwater.
- Floodwaters have the potential to interrupt access to some parts of the park.

Desired outcomes

- Negative impacts of soil erosion are minimised.
- Landscape values are restored in degraded areas.
- The extent of stressed vegetation is reduced.

Management response

3.1.1 Continue to work with Commonwealth and NSW water management agencies and other relevant stakeholders to secure and deliver environmental water for improving the health and condition of biodiversity values in the park.

3.1.2 Investigate the installation of causeways or other similar structures where vehicle access is hampered by gully erosion or water flow.

3.2 Native plants and animals

Kemendok National Park contains a variety of habitat types that support a range of native plant and animal species.

Five broad plant communities have been described in the park (Val 1997; Benson et al. 2010). These communities are discussed below, from the most widespread to least widespread in the park.

River Red Gum – Lignum Very Tall Open Forest or Woodland Wetland on Floodplains

This community occurs primarily on river banks and associated tributaries and extends over 58% of the park. It is dominated by river red gum up to 20 metres high with patches of river cooba (*Acacia stenophylla*). The understorey is generally sparse but often contains nitre goosefoot (*Chenopodium nitrariaceum*), ruby saltbush (*Enchylaena tomentosa*) and lignum (*Duma florulenta*).

Black Box – Lignum Woodland Wetland of the Inner Floodplains and Black Box Open Woodland Wetland with Chenopod Understorey

Black Box – Lignum Woodland (27% of the park) occurs on alluvial plains that may be subject to periodic inundation. A dense shrub layer often comprising old man saltbush (*Atriplex nummularia*), nitre goosefoot, lignum and dillon bush (*Nitraria billardierei*) is evident in some areas. In other areas of the park the shrub layer is discontinuous. Ground cover species include cannonball burr (*Dissocarpus paradoxus*), creeping boobialla (*Myoporum parvifolium*), and various copperburrs (*Sclerolaena* spp.). Large open areas of mainly herbaceous or various saltbush cover are likely to be degraded black box (*Eucalyptus largiflorens*) woodland.

Black Box Grassy Open Woodland/Wetland

This community occurs as small scattered areas (7% of the park) primarily associated with Bengallow Creek and backwaters of the Murray River. The predominant species is black box with a low shrubby understory of ruby saltbush and other saltbush (*Atriplex* spp.). Grassy weed species are common.

Chenopod Sandplain Mallee Woodland/Shrubland

The area of higher elevation on the eastern side of the park is covered by chenopod mallee (5% of the park). The dominant species on the undulating sandplain are yorrell (*Eucalyptus gracilis*), acorn mallee (*E. oleosa*), and white mallee (*E. dumosa*) with sugarwood (*Myoporum platycarpum*) over bluebush (*Maireana* spp.), saltbush (*Atriplex* spp.) and copperburr. Chenopod and saltbush vegetation in the park has been heavily impacted by sheep (*Ovis aries*) grazing.

Spinifex Linear Dune Mallee

This community covers 2% of the park and occurs in small areas abutting chenopod mallee. The linear east–west running sand dunes of this community are dominated by white mallee, red mallee (*E. socialis*) and narrow-leaved red mallee (*E. leptophylla*) with sugarwood. The shrub layer consists of wattles (*Acacia* spp.), *Senna* spp., narrow-leaved hopbush (*Dodonaea viscosa* subsp. *angustissima)* and porcupine grass (*Triodia scariosa*). Rabbits (*Oryctolagus cuniculus*) are present in this community as well as the Chenopod Sandplain Mallee Woodland/Shrubland community (see Section 4.1).

The park has been infrequently watered over many years and the overall condition of vegetation in the park is poor. The park is characterised by large areas of dieback (dead standing trees). Dramatic changes in the number and size of natural floods reaching the

Lower Murray River have led to widespread decline of riverine native vegetation including lignum, river cooba, black box and particularly river red gum. An assessment of river red gum health in the Bengallow Creek system in 2007 found 39% of the trees sampled were stressed, 31% severely stressed, 7% near death, 22% in moderate condition and only 1% were in good condition (Val et al. 2007). High rainfall during the summers of 2010–11 and 2011–12 may have contributed to a minor improvement in the condition of river red gum in the park.

When the park was managed as Mallee Cliffs State Forest, river red gum was the focus of timber harvesting and silvicultural operations by the Forestry Corporation of NSW. These practices, in combination with changed water regimes, drought, occupational permits for domestic stock grazing and firewood collection, have degraded the health and structure of the community. Escaped campfires have also threatened the survival of individual river red gum trees. Occurring on higher ground that would naturally receive flooding less frequently, the condition of black box woodland in the park is even poorer than the river red gum areas. It is also suspected that rising saline groundwater has contributed to tree decline and death, especially around swamps (see Section 3.1).

Table 1 Significant plant and animal species recorded in or near Kemendok National Park

Common name	Scientific name	BC Act status	EPBC Act status
Plants			
Bitter quandong	*Santalum murrayanum*	E	
Thyme rice-flower	*Pimelea serpyllifolia* subsp. *serpyllifolia*	E	
Yellow Swainson-pea	*Swainsona pyrophila*	V	V
Birds			
Black-breasted buzzard [A]	*Hamirostra melanosternon*	V	
Black-eared miner [A]	*Manorina melanotis*	CE	E
Caspian tern	*Hydroprogne caspia*		M
Chestnut quail-thrush [A]	*Cinclosoma castanotum*	V	
Eastern great egret	*Ardea modesta*		M
Gilbert's whistler	*Pachycephala inornata*	V	
Hooded robin (south-eastern form)	*Melanodryas cucullata cucullata*	V	
Little eagle [A]	*Hieraaetus morphnoides*	V	
Major Mitchell's cockatoo [A]	*Lophochroa leadbeateri*	V	
Malleefowl [A]	*Leipoa ocellata*	E	V
Pied honeyeater [A]	*Certhionyx variegatus*	V	
Purple-gaped honeyeater [A]	*Lichenostomus cratitius*	V	
Rainbow bee-eater	*Merops ornatus*		M
Regent parrot (eastern subspecies)	*Polytelis anthopeplus monarchoides*	E	V
Rufous fieldwren [A]	*Calamanthus campestris*	V	
Shy heathwren [A]	*Hylacola cautus*	V	

Common name	Scientific name	BC Act status	EPBC Act status
Varied sittella	*Daphoenositta chrysoptera*	V	
White-bellied sea-eagle	*Haliaeetus leucogaster*	V	
Yellow-tailed plain slider [A]	*Lerista xanthura*	V	
Mammals			
Inland forest bat	*Vespadelus baverstocki*	V	
Koala	*Phascolarctos cinereus*	V	V
Southern myotis	*Myotis macropus*	V	

BC Act = Biodiversity Conservation Act; EPBC Act = Environment Protection and Biodiversity Conservation Act;

V = vulnerable; E = endangered; CE = critically endangered; M = migratory species.

[A] Recorded in New South Wales within 10 kilometres of the park and, as the park includes suitable habitat, may occur in the park.

A native animal survey was conducted by NPWS in the early 1990s and a fish survey in 2013 (Sharpe, D'Santos & Healy 2013). The 2013 survey found the Bengallow Creek system to be relatively diverse and abundant, with six native fish species recorded. The high value fish habitat and the persistence of a diversity of native fish species in Bengallow Creek's chain of pools also provides an important opportunity for studying fish cues and movements between natural and managed flows (i.e. the creek and the Murray River) (Sharpe, D'Santos & Healy 2013). The Murray River below Hume Weir is part of an endangered ecological community listed under the *Fisheries Management Act 1994*; namely the Aquatic Ecological Community in the Natural Drainage System of the Lower Murray River Catchment (Fisheries SC 2001).

While no threatened native plant species have been recorded in Kemendok National Park, there are several that have potential to occur as they have been recorded in nearby privately managed conservation reserves, and there is suitable habitat in the park. Table 1 lists the significant plant and animal species known or likely to occur in the park (OEH 2015).

The single record of a koala in 2008 is of particular interest, as it is far to the west of the species' usual distribution. However, follow-up surveys, including in Kemendok Nature Reserve, failed to locate any koalas, and no recent observations have been made. It has been speculated that if koalas do exist in the area they may be the descendants of a population that was introduced onto Lock 11 Island at Mildura in the 1970s.

Significant populations of the state and nationally listed threatened regent parrot are known to nest in the park and in the adjoining Kemendok Nature Reserve. Typical nest trees are large, mature, healthy red gums with many spouts (i.e. broken branch ends with hollows or capable of developing hollows). Regent parrots forage extensively in mallee vegetation communities as well as in riverine communities. The major threat to this species is the loss of mallee woodlands within 20 kilometres of the Murray River. This habitat can be lost through rising groundwater and tree clearing. Grazing pressure, including in riverine communities, can reduce the quality and availability of foraging habitat for regent parrots (Martin & Possingham 2005) and competition for nest hollows with feral honeybees (*Apis mellifera*) can result in the abandonment of nest sites.

Strategies for the recovery of threatened species, populations and ecological communities have been set out in a statewide *Biodiversity Conservation Program* (OEH 2017). These actions are currently prioritised and implemented through the *Saving our Species* program, which aims to maximise the number of threatened species that can be secured in the wild in New South Wales for 100 years (OEH 2013b). Individual recovery plans may also be prepared for threatened species to consider management needs in more detail. Recovery

plans are in place for the koala (DECC 2008) and the regent parrot (Baker-Gabb & Hurley 2011). These plans identify river red gum and black box trees as important habitat for both species.

Issues

- Vegetation is in poor condition as the result of changed water regimes, lack of water, overall grazing pressure and past land-use practices (particularly timber harvesting).
- Little is known of the plants and animals of the park, but a range of threatened species is likely to occur.

Desired outcomes

- The condition of vegetation communities is enhanced.
- Knowledge of native plant and animal species in the park is improved and is used to inform park management.
- Populations of significant plant and animal species are conserved.
- Negative impacts on threatened species are minimised.
- Structural diversity and habitat values are restored in degraded areas.

Management response

3.2.1 Encourage and support the undertaking of biological surveys, research and monitoring to better understand plant and animal populations in the park.

3.2.2 Conduct vegetation monitoring, including tree health, in relation to water management, grazing pressure and other processes that may be affecting vegetation.

3.2.3 Implement relevant strategies in the *Biodiversity Conservation Program* and recovery plans for threatened species, including undertaking an annual monitoring program for regent parrots.

3.3 Aboriginal connections to Country

The land, water, plants and animals in a landscape are central to Aboriginal spirituality and contribute to Aboriginal identity. Aboriginal communities associate natural resources with the use and enjoyment of foods and medicines, caring for the land, passing on cultural knowledge, kinship systems and strengthening social bonds. Aboriginal heritage and connection to nature are inseparable and need to be managed in an integrated manner across the landscape.

Kemendok National Park lies in the traditional Country of the Kureinji People (Tindale 1940) and of the Keramin language group (Hercus 1998). Keramin can be further subdivided into Kemendok (around Mallee Cliffs Station) and Yerre-yerre (from Mildura) (Hercus 1998). Neighbouring tribal groups in the vicinity of the park include the Yari Yari and Letji Letji peoples (Hercus 1998). Some of the known totems for the Kureinji include eel-tailed catfish (*Tandanus tandanus*) (water), tree dtella (*Gehyra variegata*) (land) and whistling kite (*Haliastur sphenurus*) (sky).

Today, Aboriginal people in the area are represented by the Barkandji native title holders, the Dareton Local Aboriginal Land Council and local Elders. A native title claim (NSD6084/1998) that included the land in the park was determined in favour of the Barkandji Traditional Owners on 16 June 2015. Although Kemendok National Park was excluded from

the determination, NPWS is committed to negotiating an Indigenous land use agreement (ILUA) with the Barkandji native title holders. The ILUA will address how the Barkandji People will be involved in management of the park.

The Murray River and its resources supported large numbers of Aboriginal people in the past and today there is abundant evidence that provides insights into Aboriginal culture. The river acted as a route for traversing Country. People were known to follow the river from Nyah (approximately 151 kilometres to the south-east in Victoria) to Lake Victoria (approximately 139 kilometres to the north-west), possibly to attend ceremonies.

The park's many river bends have been places for camping and gathering through to recent times. This is demonstrated by the many modified trees, middens and camp sites along the river banks as well as modified trees in the black box woodland. Aboriginal people also worked on local pastoral properties and at The Mulberries Guesthouse in the southern part of the park (see Section 3.4).

Survey of Aboriginal cultural heritage in the park has been limited and it is likely there are many more unrecorded sites. Sites are important as evidence of Aboriginal history and remain an important part of the culture of local Aboriginal people.

All Aboriginal sites are vulnerable to disturbance, for example through accidental discovery, wind erosion, or the actions of pest animals such as rabbits. Particularly susceptible are the deep sand lunettes of the Murrumbidgee Land System that were preferred sites for burials, and were important to Aboriginal people as sites for refuge during floods.

While the NSW Government has legal responsibility for the protection of Aboriginal sites and places, NPWS acknowledges the right of Aboriginal people to make decisions about their own heritage. Aboriginal communities will be consulted and involved in the managing Aboriginal sites, places and related issues, and promoting and presenting Aboriginal culture and history. It is also recognised that all parts of Country are part of the cultural landscape of Aboriginal people, which includes custodial responsibilities for and connections to nature.

Issues

- Aboriginal connections to Country are ongoing, but access and rights have been diminished.
- Aboriginal sites are vulnerable to disturbance.
- Consultation with Aboriginal communities must incorporate understanding of the broader cultural landscape.
- Further survey and research effort may reveal more about the Aboriginal cultural values of the park.

Desired outcomes

- Aboriginal places and values are identified and protected.
- Aboriginal people are involved in managing the values of Kemendok National Park.
- Aboriginal engagement in landscape management is not restricted to Aboriginal cultural heritage.
- Impacts on Aboriginal heritage values are minimised.
- Understanding of the cultural values of the park is improved.

Management response

3.3.1 Continue to consult and involve the Barkandji Native Title Claimant Group, Dareton Local Aboriginal Land Council, Aboriginal community organisations and custodial

families in the management of Country, including the management of Aboriginal cultural heritage and natural values. This will include implementation of any negotiated ILUA or other joint management arrangements.

3.3.2 Encourage further research into the Aboriginal heritage values of the park in consultation with relevant Aboriginal community organisations.

3.3.3 Work cooperatively with the local Aboriginal community to rehabilitate, protect, interpret and promote sites to the broader community as appropriate.

3.4 Historic heritage

Heritage places and landscapes are made up of living stories as well as connections to the past that individuals and communities have inherited and wish to conserve for current and future generations, and can include natural resources, objects, customs and traditions. Cultural heritage comprises places and items that may have historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance. NPWS conserves the significant heritage features of the parks it manages.

Knowledge of the early pastoral history of the area is scant. The earliest known reference to the area that is now Kemendok National Park is from 1851 when the area was in the Bengallow Run (Craig 2012). The run covered 12,432 hectares with a carrying capacity of 4000 sheep and was leased to John McKinlay. Two years later he transferred the lease to J McNichol and T McPherson. By 1865 Donald McKenzie was the lessee of the Bengallow Run.

An 1879 pastoral holding map (Macdonald 1879) illustrates the Bengallow Run as part of the Tapalin Pastoral Holding, a holding that comprised 13 runs and extended north-east from the Murray River (Hanson 1889).

The Tapalin Homestead was located in the southern portion of the park, close to the river. Today the area is referred to as The Mulberries. Nothing remains of the buildings, but three mulberry trees survive. A grave, presumed to be of a farm labourer, is located in nearby sand dunes.

By 1884, two homestead leases were located on the river: Bengallow Station (owned by John Grace and his family) and Culpra Station (owned by John's brother, James Grace, and his family). James Grace left Culpra Station for the goldfields in West Australia and his lease was later taken up by JK Buxton. Bengallow remained with the Grace family, even after 1901 when John Grace died. D Wickett later became lessee of Bengallow. However, no evidence of these homesteads is currently known in the park.

In 1922 Mallee Cliffs State Forest was gazetted and any active Western Lands leases were extinguished. No heritage items or sites from the days of forestry operations have been identified in the park.

Issues

- Knowledge of the history of the park before its reservation is incomplete.
- The significance of historic heritage sites has not been assessed.

Desired outcomes

- Understanding of the historic heritage values of the park is improved.
- Historic heritage is appropriately recorded, conserved, managed and interpreted.

Management response

3.4.1 Record historic sites and assess their significance. Manage and interpret historic heritage values according to their significance.

3.4.2 Undertake necessary stabilisation works, if required, until heritage value is assessed.

3.5 Visitor use

Camping and day use

NPWS parks provide a range of visitor opportunities. NPWS aims to ensure that visitors enjoy, experience and appreciate parks, at the same time as conserving and protecting park values.

Kemendok National Park generally experiences low levels of visitation. There are no visitor facilities provided in the park and visitation is centred on low-impact, self-reliant, nature-based recreation such as bushwalking, camping, fishing and birdwatching. The park also provides opportunities for cycling and horse riding along park roads. Most visitors are thought to be locals who visit for relatively short durations. The Big Tree is one of the largest river red gum trees in the park and a well-known destination.

Access to the park is via the Sturt Highway and along one of two well-formed gravel public roads: The Old Euston Road or Tapalin Mail Route. Public vehicles are allowed on all public roads and park roads shown on Figure 1. These roads may be impassable during extended wet weather.

Peak visitation occurs during holiday periods such as Easter, long weekends and school holidays. The river is also popular during mid-summer when houseboats moor along the boundary of the park. The most popular areas for visitors are along the riverbanks. This has resulted in littering, soil compaction and escaped campfires from time to time. There are risks to visitor safety along the river edge and under trees. Areas along the banks are also prone to periodic flooding.

When managed as Mallee Cliffs State Forest visitation to the park was informal. NPWS has maintained the low-key nature of visitor opportunities. This means that access on park roads will remain unrestricted and no visitor facilities will be provided. Firewood for campfires in the park may be collected by people camping in the park outside the fire season, that is, from April to October. To reduce fire risk of escaped campfires, only fuel stoves are allowed during the fire season from November to March.

Some recreational activities that were permitted under state forest management, such as recreational hunting and walking with dogs, are not permitted in the park.

Cycling

In accordance with NPWS policy and the *Sustainable Mountain Biking Strategy* (OEH 2011b), cycling is allowed on all park roads (see Figure 1). Off-road cycling is not allowed due to its potential to damage native vegetation, soils and cultural heritage values. No cycling-specific trails are provided in the park.

Horse riding

Horse riding is allowed in Kemendok National Park on all park roads (see Figure 1) and is limited to day riding visits only. Overnight camping with horses is not allowed. If riders wish to use the section of Kemendok Trail that traverses the nature reserve, they will need to seek consent from NPWS.

Horse riding in the park shall be conducted in accordance with the NPWS *Code of Practice for Horse Riding in Parks* (OEH 2014a). Horse riding can have unacceptable impacts and conflict with other park users if undertaken in unsuitable locations and not managed appropriately.

Recreational fishing

Members of the local community fish along the riverbank in the park. Native fish species sought include golden perch (*Macquaria ambigua*), Murray cod (*Maccullochella peelii*) and yabbies (*Cherax destructor*).

All fishing activities in NSW waters are regulated under the Fisheries Management Act. Both commercial and recreational fishing must be in accordance with licence conditions specified by the relevant regulatory authority.

Group activities

Group activities can provide opportunities for people who would otherwise not be able to experience the park, and can promote environmental understanding and support for conservation. However, large groups can have an environmental impact and can restrict opportunities for independent visitors.

Activities that are part of a competition or large-scale organised activity (including non-commercial activity) will require written consent from NPWS. All commercial activities require a licence under the National Parks and Wildlife Act. All group activities must be consistent with the management principles for the park and be compatible with its natural and cultural heritage values.

Visitor use issues

- Visitor awareness of recreational opportunities and constraints may be limited, particularly among people who visited the park when it was a state forest.
- There is potential for unsafe interactions between park users including cyclists, walkers and horse riders.

Desired outcomes

- Visitor use of the park is ecologically sustainable and consistent with nature-based recreation.
- Negative impacts of visitors and recreational activities on park values are minimised.
- Visitor opportunities encourage appreciation and awareness of the park's values and conservation.

Management response

3.5.1 Promote nature-based recreational activities in the park that do not conflict with the park's natural and cultural values.

3.5.2 Encourage visitors to be responsible for the removal of their rubbish from the park.

3.5.3 Allow the collection of fallen timber for campfires outside the fire season. Use of non-wood fuel stoves will be encouraged as the preferred alternative to wood fires.

3.5.4 Provide interpretive, safety and minimal-impact use information at park road entrances and points of interest.

3.5.5 Allow cycling on park roads that are open to public vehicles. Off-road cycling will not be permitted.

3.5.6 Allow horse riding on park roads that are open to public vehicles. Off-road horse riding will not be permitted. Overnight camping with horses will not be permitted.

3.5.7 Monitor the environmental and social impacts of cycling and horse riding, including erosion, weed dispersal and interactions with other park users. Routes may be closed to these activities where impacts are identified.

3.5.8 Continue to provide access for recreational fishing, and to work cooperatively with the relevant regulatory agency to ensure fishing in the park has minimal impact on park values.

3.6 Information and education

Interpretation, signage and information are key components of the visitor experience. Meeting the needs of visitors requires a range of communication and interpretation strategies because different visitors desire different levels and types of interpretation and information. Provision of appropriate information helps protect natural and cultural heritage, promotes support for conservation, and increases the enjoyment and satisfaction of visitors.

The park offers outdoor teaching and learning opportunities for primary and secondary students, higher education providers, community organisations, park visitors and the general public.

Issues

- There is minimal public information available regarding the values of the park and the appropriate behaviours to support visitor safety and the protection of natural and cultural values.

Desired outcomes

- There is enhanced community understanding and appreciation of the park's natural and cultural values.
- Visitors are aware of the park's recreational opportunities.
- Educational opportunities are made available to schools and community organisations.

Management response

3.6.1 Develop and implement an interpretation plan following consultation with the Aboriginal community and other appropriate stakeholders.

3.6.2 Identify opportunities for sharing information and communicating with the broader community.

3.6.3 Support and encourage use of the park by education providers, community groups and individuals.

4. Threats

4.1 Pests

Pest species are plants, animals and pathogens that have negative environmental, economic and social impacts and are most commonly introduced species. Pests can have impacts across the range of park values, including impacts on biodiversity, cultural heritage, catchment and scenic values.

The *Biosecurity Act 2015* and its regulations provide specific legal requirements for the response, management and control of biosecurity risks, including weeds and pest animals. These requirements apply equally to public and privately-owned land. Under this framework, Local Land Services has prepared regional strategic weed management plans and regional strategic pest animal management plans for each of its 11 regions, including the Western Region (Western LLS 2017) and (Western LLS 2018).

The LLS plans identify priority weeds and pest animals in each of the regions, plus the appropriate management response for the region (i.e. prevention/alert, eradication, containment or asset protection).

NPWS prepares regional pest management strategies which identify the operations and control actions undertaken by NPWS to meet the priorities from regional strategic pest and weed management plans. This also includes other important programs such as the *Biodiversity Conservation Program* (see Section 3.2).

The overriding objective of the NPWS regional pest management strategies is to minimise adverse impacts of introduced species on biodiversity and other park and community values while complying with legislative responsibilities. These strategies are regularly updated. Reactive programs may also be undertaken in cooperation with neighbouring land managers, in response to emerging issues. Significant pest species recorded in the park are listed in Table 2 and discussed below.

Table 2 Pest plant and animals recorded in Kemendok National Park

Common name	Scientific name	Comment
Pest plants		
Bathurst burr	*Xanthium spinosum*	Isolated along river or flood edges.
Bridal creeper	*Asparagus asparagoides* ABCD	Bridal creeper is found mainly along the banks of the Murray, with some patches elsewhere. It forms a thick mat of underground tubers that impedes the root growth of other plants and prevents seedling establishment. It smothers native plants.
Horehound	*Marrubium vulgare* CD	Scattered along roadsides and disturbed areas. Able to invade poor soil and waste places and disturbed native vegetation forming thick stands.
Maltese cockspur	*Centaurea melitensis*	Established throughout the park on sandier soils, creating a dense, monospecific ground cover restricting growth of native species.
Noogoora burr	*Xanthium occidentale*	Isolated along river or flood edges.
Onion weed	*Asphodelus fistulosus*	Established throughout the park on sandier soils, creating a dense, monospecific ground cover restricting growth of native species.

Common name	Scientific name	Comment
Paterson's curse	*Echium plantagineum* [CD]	Scattered along roadsides and disturbed areas. Able to invade poor soil and waste places and disturbed native vegetation forming thick stands.
Prickly pear	*Opuntia stricta* [ABC]	Scattered throughout the park usually as isolated specimens.
Saffron thistle	*Carthamus lanatus*	Scattered throughout the park along the river or disturbed sandier locations. Can form thick clumps competing with native species.
Thornapple	*Datura inoxia*	Scattered in the park, along roadsides or disturbed areas. Prolific seeder and forms dense patches suppressing growth of native species.
Tobacco bush	*Nicotiana glauca*	Scattered along roadsides and disturbed areas.
Pest animals		
European red fox	*Vulpes vulpes* [CEF]	Scattered throughout the park. Prey on native animals, especially small to medium-sized ground-dwelling and semi-arboreal mammals, ground-nesting birds and freshwater turtles.
Feral cat	*Felis catus* [CEG]	Scattered throughout the park. Implicated as one of the causes of the decline of native species. Act as a reservoir for infectious diseases.
Feral goat	*Capra hircus* [CF]	Feral goats have been observed in the park and compete with native animals for food, water and shelter. Feral goats browse on native plants, damage Aboriginal sites and may transmit animal diseases.
Feral honeybee	*Apis mellifera* [C]	Scattered throughout the park. Competes with regent parrots for river red gum tree hollows.
Feral pig	*Sus scrofa* [CEF]	Scattered resident populations in the vicinity of the river and temporary wetlands. Numbers are suspected to be low but variable.
Rabbit	*Oryctolagus cuniculus* [CEF]	Scattered throughout the park on sandier soils. Grazing and burrowing can cause extensive erosion problems, reduce plant recruitment and survival.

Notes:

[A] Declared Weed of National Significance.

[B] Western LLS (2017) regional priority weed, asset protection management category.

[C] Declared key threatening process under the Biodiversity Conservation Act.

[D] An escaped garden plant under the key threatening process of loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants (NSW SC 2011).

[E] Declared key threatening process under the Environment Protection and Biodiversity Conservation Act.

[F] Western LLS (2018) asset protection pest animal management category.

[G] Western LLS (2018) limited action pest animal management category.

Pest species that are also key threatening processes may be managed under the Biodiversity Conservation Program where it includes key threatening processes strategies. The *Saving our Species* program has developed targeted strategies for managing key threatening processes using the best available information to minimise current and future impacts of key threatening processes on priority biodiversity values, including threatened

species and ecological integrity. Several of the weed species in the park are examples of escaped exotic garden plants. The movement of vehicles, people and equipment through the park increases the potential for the spread and introduction of weed species. In this riverine environment, weed propagules are also readily transported during inundation by flooding.

Opuntioid cacti

Opuntioid cacti (*Opuntia* spp.), including prickly pear, are Weeds of National Significance. These species are a significant hazard to native wildlife, in some instances causing painful death, reducing habitat opportunities and impeding wildlife movement. Native vegetation is also adversely affected through competition for resources.

Rabbits

Grazing and burrowing by rabbits can exacerbate or cause extensive erosion problems. This is of particular concern in the park where rabbits have been observed on the sandier dunes where Aboriginal cultural heritage sites may occur, including burials. Rabbit activity can also reduce plant recruitment and survival. Competition and land degradation by feral rabbits is listed as a key threatening process under the Biodiversity Conservation Act (NSW SC 2002a) and the Environment Protection and Biodiversity Conservation Act (DoE 2009).

Rabbit numbers declined post-1998 with the introduction of the rabbit calicivirus disease, but more recently rabbit numbers are increasing across the region. This is likely due to increased resistance to the virus and widespread rainfall. Within riverine areas such as those in the park, rabbits reside above-ground and therefore conventional warren destruction techniques (such as ripping) are not feasible. In the dune country where Aboriginal cultural heritage may be present, ground disturbance of any type is to be avoided where possible. In these areas, gassing and poisoning may be more suitable. Continued monitoring of the rabbit population will be necessary.

European red foxes

Foxes suppress native animal populations, particularly medium-sized ground-dwelling and semi-arboreal mammals, ground-nesting birds and freshwater turtles. Foxes have also been implicated in the spread of a number of weed species such as bridal creeper.

Predation by the European red fox is a listed key threatening process under the Biodiversity Conservation Act (NSW SC 1998) and the Environment Protection and Biodiversity Conservation Act (DoE 2009). The NSW *Threat Abatement Plan for Predation by the Red Fox* (OEH 2011a) establishes long-term control programs to protect priority threatened native animal species and populations. Foxes are being controlled at priority sites across New South Wales to protect biodiversity, however, Kemendok National Park has not been identified as a priority site.

Foxes occur in the park and surrounding area but numbers are unknown. Native species most likely to be impacted in the park include the freshwater turtles and other reptiles.

Goats

Goats are a significant management problem in many parts of western NSW. Feral goats have significant impacts on native vegetation, including threatened species, and can introduce weeds. Goats can be highly nomadic and have a rapid breeding cycle. Competition and habitat degradation by feral goats is listed as a key threatening process under the Biodiversity Conservation Act (NSW SC 2004a) and the Environment Protection and Biodiversity Conservation Act (DoE 2009). Current goat numbers are low with small

groups observed at a few locations in the park, reflecting the widespread and scattered nature of goats in the general area.

Feral pigs

The impact of feral pigs on habitat and other conservation values can be substantial and long-lasting. Pigs forage, wallow and dig in wetland areas, cause major disturbance and damage to soils, roots, ground plants and wetland environments. Feral pigs are active predators of native birds, reptiles (including their eggs), frogs, soil invertebrates, the underground storage organs of plants and the fruiting bodies of fungi. Areas disturbed by feral pigs are at risk from subsequent weed invasion and soil erosion. Feral pigs may also pose a physical threat to park visitors.

Predation, habitat degradation, competition and disease transmission by feral pigs is listed as a key threatening process under both the Biodiversity Conservation Act (NSW SC 2004b) and the Environment Protection and Biodiversity Conservation Act (TSSC 2001a). A threat abatement plan has been prepared under the Environment Protection and Biodiversity Conservation Act to address this process.

No formal estimate of the density and distribution of feral pigs in the park has been made, however, they appear to be resident, widespread but low in number. Populations will be controlled as required.

Feral honeybees

Competition from feral honeybees is a listed key threatening process under the Biodiversity Conservation Act (NSW SC 2002b). The impact of European honeybees on regent parrots and other hollow-dependent native species in the park has not been quantified. However, honeybees use significant numbers of tree hollows in the river red gum woodlands and may, as a consequence, be a limiting factor in the nesting success of some bird species including the regent parrot.

Feral cats

Feral cats impact heavily on native animals and predation by feral cats is listed as a key threatening process under both the Biodiversity Conservation Act (NSW SC 2000a) and the Environment Protection and Biodiversity Conservation Act (DoE 2009). In addition to predation, cats act as a reservoir for infectious diseases such as toxoplasmosis and sarcosporidiosis, which can be transmitted to native animals, domestic stock and humans. Effective methods of cat control are currently unavailable. Preliminary work has been undertaken to develop specifically designed cat baiting stations and, subject to further research and approvals, this technique may be suitable for use in the park.

Desired outcomes

- Pest plants and animals are controlled and where possible eradicated.
- Negative impacts of introduced and pest species on park values are minimised.

Management response

4.1.1 Monitor the distribution and impact of pest species on the park and park values, including disturbance to Aboriginal cultural heritage, threatened species and their habitats.

4.1.2 Manage pest species in accordance with pest management strategies relevant to the park. Priority will be given to priority weeds, rabbits and foxes.

4.1.3 Monitor the park for new outbreaks of priority weeds or pests. Destroy any new outbreaks where possible.

4.1.4 Clean heavy plant and equipment before it is used in the park to mitigate against the introduction and spread of weed species.

4.1.5 Implement weed and pest control programs in cooperation with Wentworth Shire Council, Western Local Land Services and park neighbours as required.

4.2 Fire

The primary objectives of NPWS fire management are to protect life, property, community assets and cultural heritage from the adverse impacts of fire, while also managing fire regimes in parks to maintain and enhance biodiversity. NPWS also assists in developing fire management practices that contribute to conserving biodiversity and cultural heritage across the landscape, and implements cooperative and coordinated fire management arrangements with other fire authorities, neighbours and the community (OEH 2013a).

Fire is a natural feature of many environments and is essential for the survival of some plant communities. However, inappropriate fire regimes can lead to the loss of particular plant and animal species and communities and high frequency fire has been listed as a key threatening process under the Biodiversity Conservation Act (NSW SC 2000b).

The fire history in what is now the park is only partially known. Fires have been small-scale and the majority of past outbreaks were the result of lightning strikes or inadequately extinguished or unattended campfires.

Intense and even moderate fires in riparian environments can have serious environmental impacts. River red gum is highly susceptible to fire, and older trees may be killed by fire. Black box is more resilient to repeated fire events due to its ability to sprout from a basal lignotuber. Loss of nesting hollows in riverine environments from too-intense or too-frequent fire can severely affect species dependent on hollows for breeding and refuge. Mallee eucalypts show adaptations to fire but inappropriate fire regimes are detrimental. This applies not only to individual trees but more particularly to the provision of habitat associated with older vegetation structure and age classes, and the presence of leaf litter and coarse woody debris.

NPWS aims to eliminate the occurrence of accidental fire in the park by providing information, including signage, to educate the public on park fire bans. Wildfires will be suppressed in order to minimise the loss of life, property, habitat and cultural heritage sites.

A fire management strategy that defines the fire management approach for Kemendok National Park has been prepared (OEH 2012). The fire management strategy outlines the recent fire history of the park, key assets in and adjoining the park (including sites of natural and cultural heritage value), fire management zones and fire control advantages such as management trails and water supply points. It also contains fire regime guidelines for conservation of the park's vegetation communities.

NPWS maintains cooperative arrangements with surrounding landowners and the Rural Fire Service and is actively involved with the Lower Western Zone Bush Fire Management Committee. Cooperative arrangements include fire planning, fuel management and information sharing. Hazard reduction programs, ecological burning proposals and management trail works are submitted annually to the bush fire management committee.

Desired outcomes

- Negative impacts of fire on life, property and the environment are minimised.
- The potential for spread of bushfires on, from, or into the park is minimised.
- Fire regimes are appropriate for the conservation of native plant and animal communities.

Management response

4.2.1 Implement the park's fire management strategy and update it as necessary. Prescribed burning will take into account ecological thresholds, fuel loads and maintenance of key habitat components.

4.2.2 Continue to be involved in the Lower Western Zone Bush Fire Management Committee and maintain cooperative arrangements with local Rural Fire Service brigades and neighbours in regard to fuel management and fire suppression.

4.3 Firewood collection

Many people enjoy the experience of a campfire when camping or picnicking in the bush. However, collecting firewood can result in the loss of woody debris and fallen logs, reducing or eliminating the availability of this material as habitat. The removal of timber, woody debris, dead wood and dead trees has been identified as having a significant negative impact on habitat availability and ecosystem functioning and is listed as a key threatening process under the Biodiversity Conservation Act (NSW SC 2003). The collection of wood from riverbanks and at sites of cultural significance may also result in the disturbance, damage or destruction of artefacts.

NPWS therefore encourages the use of alternative fuel stoves to avoid over-collection of woody debris and avoid escaped campfires.

Firewood for campfires in the park may be collected by people camping in the park between April and October, as this is outside the fire season and the risk of campfires escaping is low. To reduce the risk of escaped campfires during the fire season, only fuel stoves may be used from November to March. Firewood collected in the park is only to be used in the vicinity from which it is collected.

NPWS administers a domestic firewood collection program in some river red gum parks where the level of coarse woody debris is sufficiently high to avoid adverse impacts on biodiversity values. Kemendok National Park has a coarse woody debris level well below the minimum threshold, and the level is not expected to be exceeded during the life of this plan. Nevertheless, coarse woody debris levels may be reviewed periodically for the domestic firewood collection program.

Desired outcomes

- Levels of coarse woody debris are maintained.

Management response

4.3.1 Encourage the use of alternative fuel sources such as gas stoves.

4.3.2 Prohibit the collection of firewood for domestic use unless coarse woody debris thresholds are exceeded.

4.4 Climate change

Human-induced climate change has been listed as a key threatening process under the Biodiversity Conservation Act (NSW SC 2000c) and the associated loss of habitat is listed under the Environment Protection and Biodiversity Conservation Act (TSSC 2001b).

The latest information on projected changes to climate are from the NSW and ACT Regional Climate Modelling (NARClim) project (OEH 2014b). The climate projections for 2020–39 are described as 'near future', and projections for 2060–79 are described as 'far future'. The snapshot shown in Table 3 is for the Far West Region, which includes Kemendok National Park (OEH 2014b).

Table 3 Far West Region climate change snapshot

Projected temperature changes	
Maximum temperatures are projected to **increase** in the near future by 0.3–1.0°C	Maximum temperatures are projected to **increase** in the far future by 1.8–2.7°C
Minimum temperatures are projected to **increase** in the near future by 0.4–0.8°C	Minimum temperatures are projected to **increase** in the far future by 1.4–2.7°C
The number of hot days (i.e. > 35°C) will **increase**	The number of cold nights (i.e. < 2°C) will **decrease**
Projected rainfall changes	
Rainfall is projected to **decrease** in spring	Rainfall is projected to **increase** in summer and autumn
Projected Forest Fire Danger Index changes	
Average fire weather is projected to **increase** in summer and spring	Number of days with severe fire weather is projected to **increase** in summer and spring

Source: OEH 2014b.

Projections of future changes in climate for the Far West Region include higher average, maximum and minimum temperatures; increased summer and autumn rainfall, and drier winter and spring seasons (OEH 2014b). For the region as a whole, these changes are likely to lead to more intense summer rainfall events, decreased river flows in spring and higher evaporative demand. The southern fringe of the region adjacent to the Victorian border currently experiences milder conditions than the remainder of this very extensive region. The effects of climate change may therefore be less extreme for Kemendok National Park than in other parts of the region.

Climate change may significantly affect biodiversity by changing the size of populations and distribution of species, modifying species composition, and altering the geographical extent of habitats and ecosystems. Species most at risk are those unable to migrate or adapt, particularly those with small population sizes or with slow growth rates.

The combined effects are likely to cause changes in natural systems and many species and ecosystems that cannot adapt to the reduced water availability and changed rainfall seasonality are likely to decline, contract or become extinct. Effects are likely to be most intense where existing pressures are exacerbated, and for wetlands and riverine ecological communities, many of which may be lost or greatly reduced. An increase in weeds, particularly summer-growing opportunists, is likely. However, some winter weeds are likely to become less problematic (DECCW 2010).

The potential impact of climate change on the park is difficult to assess since it depends on the compounding effects of other pressures, particularly barriers to migration and pressure from feral animals. The river red gum forests and woodlands have already been heavily

impacted by reduced water availability and extensive changes to natural flooding regimes throughout the Murray–Darling Basin. Considerable effort is being applied to restoring environmental flows to the Murray, Murrumbidgee and Lachlan rivers and their tributaries through legislation, water sharing rules, buy-back programs, use of water infrastructure for manipulating flows and other measures. These measures are aimed at helping to restore the health of these communities and address future water availability under a drying climate. NPWS and relevant NSW Government agencies will continue to participate in catchment-scale and cross-border initiatives for improving the resilience of these riverine ecosystems.

At the park scale, NPWS will continue to manage threats to the natural and cultural values of Kemendok National Park in an effort to build resilience to the effects of climate change. Ongoing programs to reduce the impacts of habitat fragmentation, invasive species and bushfires will help reduce the severity of the effects of climate change.

Desired outcomes

- The effects of climate change on natural systems are mitigated.

Management response

4.4.1 Continue existing fire, pest and weed management programs to increase the park's ability to cope with future disturbances, including climate change.

4.4.2 Work with adjoining land managers, government stakeholders and the community to improve habitat resilience to the effects of climate change, including cross-tenure conservation initiatives.

5. Management operations and other uses

5.1 NPWS management facilities and operations

Park roads and management trails

A network of formal and informal roads and trails exists in the park, a legacy of former logging activities and unrestricted public access. The number, condition and extent of roads and trails has negatively impacted the natural and cultural values of the park by reducing and fragmenting available habitat and increasing opportunities for weed and pest activity. The number of trails in the park exceeds NPWS management requirements.

Public vehicle access in the park is allowed via the park roads shown on Figure 1. Unless otherwise indicated by signs, all other roads and trails are for park management purposes (such as fire and pest management) and are closed to public vehicle access. These management trails are also available for low-impact recreational opportunities such as bushwalking. Some trails will be permanently closed and actively rehabilitated or allowed to revegetate naturally. In some instances, closed roads may be maintained for NPWS use in the event of fire. During wet weather or flooding, park roads may be closed temporarily.

Boundary fencing

Stock are allowed to graze in Kemendok National Park under permit (see Section 5.2) but stock-proof boundary fencing is needed to keep unpermitted stock out of the park. The condition of existing park boundary fencing varies from good to poor. Complete fencing of the boundary is difficult to achieve due to steep creeks, flood water damage and difficult topography, however, there are sections of the boundary where fencing is feasible. Significant sections of fencing may need replacing and all boundaries require clearing of encroaching vegetation. NPWS will liaise with neighbouring landowners regarding boundary fencing and may enter into fencing agreements where necessary to improve the effectiveness of boundary fencing.

Signage

Since July 2010, NPWS has progressively installed entrance, hazard, directional and regulatory signs to inform members of the public about NPWS management of the park. Interpretive signage will also be provided.

Desired outcomes

- Impacts of informal roads and tracks decrease over time, with areas rehabilitated or allowed to regenerate naturally.
- Park roads and management trails provide for the effective management of recreational activities and management requirements.
- Unauthorised stock access to the park is minimised.
- Signage reinforces NPWS management and promotes a safe and enjoyable visitor experience.

Management response

5.1.1 Maintain the park roads shown on Figure 1 and maintain management trails required for park management purposes. Other roads and trails excess to NPWS management and visitor needs will be closed and allowed to revegetate. As necessary, some closed roads may be maintained in a modified condition for use in the event of fire.

5.1.2 Assess the condition of boundary fencing, prioritise replacement where necessary and enter into fencing agreements with neighbouring landowners.

5.1.3 Assess internal fencing for heritage value and conserve it as required. Internal fences without significant heritage value will be removed.

5.1.4 Provide regulatory and interpretive signage to enhance visitor use of the park as required.

5.2 Non-NPWS access and operations

Apiary sites

There are two current permits for a total of 20 authorised apiary sites in Kemendok National Park. Access to the apiary sites is via park roads and short access tracks. These permits existed before the reservation of the park and will continue to be permitted as existing interests. NPWS policy on beekeeping allows existing sites to continue but does not allow any new or additional sites.

European honeybees can have adverse impacts on some native plants and animals (Paton 1996), including poor flower pollination and competition with native nectar feeders. Regent parrots can also be affected by competition from honeybees for hollows (NSW SC 2002b). Competition from feral honeybees is listed as a key threatening process under the Biodiversity Conservation Act (NSW SC 2000b), but managed honeybees are not the subject of this determination.

While no problems are currently known in the park, hive sites may cause unacceptable environmental impacts or user conflicts at times. Where needed, NPWS will negotiate the relocation of hives to other sites in the park to minimise the impact of apiary activities.

Grazing

Grazing is currently permitted under licence in Kemendok National Park subject to conditions. Under the National Parks and Wildlife Act, grazing licences are recognised as an existing interest. Existing grazing licences on areas reserved under the National Parks Estate (Riverina Red Gum Reservations) Act have been allowed to continue while a comprehensive grazing study is undertaken on NPWS-managed lands in south-west New South Wales. The outcomes will inform future decisions about grazing on certain NPWS-managed lands in south-west NSW.

Powerline

Powercor Australia Limited has a nine-hectare occupancy permit that covers the corridor of a high-voltage power transmission line. The line traverses the southern portion of the park, across the Murray River into Victoria (see Figure 1). Powercor Australia Limited is responsible for controlling vegetation under the transmission line in accordance with relevant regulations and permit conditions.

Private property access

There are three separate parcels of freehold land, currently held in one ownership, along the western edge of the park (see Figure 1). The only practical means of access to these holdings is along roads that traverse the park. These roads and trails (shown as 'Neighbour access trails' in Figure 1) have been excluded from the reserved area of the park and remain as Crown land that is vested in the Minister responsible for the administration of the National Parks and Wildlife Act under Part 11 to ensure the continuation of access arrangements that existed immediately before the park's reservation. While these roads do not form part of the area reserved as park, they are subject to the provisions of this plan and the National Parks and Wildlife Regulation.

In addition to formally retaining these roads as Crown land, the National Park Estate (Riverina Red Gum Reservations) Act also provides for the general protection of private property access rights. Any roads that provide the only practical means of access to private property cannot be closed while that property remains in private ownership. However, any modification or upgrade of the road would only be permitted under the terms of a formal access agreement such as a licence. NPWS will therefore consult with the property owners on maintenance and other matters as needed.

Some sections of neighbour access trails used for private property access have no other reason for public access and will not be promoted for use by park visitors.

In accordance with the National Parks and Wildlife Regulation and the NPWS pets in parks policy (OEH 2018), pets and livestock may be transported by vehicle along these roads and trails provided they are on the way to the private property and remain in the vehicle.

Desired outcomes

- Third-party uses of the park are managed appropriately to minimise any potential negative impacts on park values.

Management response

5.2.1 Continue to license and manage the authorised apiary sites in the park in accordance with NPWS policy and consent conditions. If a site compromises the environmental values of the area or leads to user conflicts it will be relocated in consultation with the licensee.

5.2.2 Grazing under licence will be monitored and managed in accordance with licence conditions.

5.2.3 Continue to license and manage the transmission line route in the park in accordance with permit conditions.

5.2.4 Continue to maintain and allow existing private property access on Part 11 roads through the park. Enter into agreements for future maintenance where required.

6. Implementation

This plan of management establishes a scheme of operations for Kemendok National Park. Activities identified in the plan are listed in Table 4. Relative priorities are allocated against each activity as follows:

High priority activities are imperative to achieve the plan's objectives and desired outcomes and must be undertaken in the near future to avoid significant deterioration in natural, cultural or management resources.

Medium priority activities are necessary to achieve the objectives and desired outcomes but are not urgent.

Low priority activities are desirable to achieve the objectives and desired outcomes but can wait until resources become available.

Ongoing activities are undertaken on an annual basis or in response to an issue that arises.

This plan of management does not have a specific term and will stay in force until amended or replaced in accordance with the National Parks and Wildlife Act.

Table 4 List of management responses

Management response		Priority
3.1 Geology, landscape and hydrology		
3.1 1	Continue to work with Commonwealth and NSW water management agencies and other relevant stakeholders to secure and deliver environmental water for improving the health and condition of biodiversity values in the park.	Medium/Ongoing
3.1.2	Investigate the installation of causeways or other similar structures where vehicle access is hampered by gully erosion or water flow.	Medium
3.2 Native plants and animals		
3.2.1	Encourage and support the undertaking of biological surveys, research and monitoring to better understand plant and animal populations in the park.	Medium
3.2.2	Conduct vegetation monitoring, including tree health, in relation to water management, grazing pressure and other processes that may be affecting vegetation.	Medium/Ongoing
3.2.3	Implement relevant strategies in the *Biodiversity Conservation Program* and recovery plans for threatened species, including undertaking an annual monitoring program for regent parrots.	Medium/ Ongoing
3.3 Aboriginal connections to Country		
3.3.1	Continue to consult and involve the Barkandji Native Title Claimant Group, Dareton Local Aboriginal Land Council, Aboriginal community organisations and custodial families in the management of Country, including the management of Aboriginal cultural heritage and natural values. This will include implementation of any negotiated ILUA or other joint management arrangements.	Ongoing
3.3.2	Encourage further research into the Aboriginal heritage values of the park in consultation with relevant Aboriginal community organisations.	Medium
3.3.3	Work cooperatively with the local Aboriginal community to rehabilitate, protect, interpret and promote sites to the broader community as appropriate.	Ongoing

Management response		Priority
3.4 Historic heritage		
3.4.1	Record historic sites and assess their significance. Manage and interpret historic heritage values according to their significance.	High
3.4.2	Undertake necessary stabilisation works, if required, until heritage value is assessed.	Ongoing
3.5 Visitor use		
3.5.1	Promote nature-based recreational activities in the park that do not conflict with the park's natural and cultural values.	Ongoing
3.5.2	Encourage visitors to be responsible for the removal of their rubbish from the park.	Ongoing
3.5.3	Allow the collection of fallen timber for campfires outside the fire season. Use of non-wood fuel stoves will be encouraged as the preferred alternative to wood fires.	Ongoing
3.5.4	Provide interpretive, safety and minimal-impact use information at park road entrances and points of interest.	Ongoing
3.5.5	Allow cycling on park roads that are open to public vehicles. Off-road cycling will not be permitted.	Ongoing
3.5.6	Allow horse riding on park roads that are open to public vehicles. Off-road horse riding will not be permitted. Overnight camping with horses will not be permitted.	Ongoing
3.5.7	Monitor the environmental and social impacts of cycling and horse riding, including erosion, weed dispersal and interactions with other park users. Routes may be closed to these activities where impacts are identified.	Ongoing
3.5.8	Continue to provide access for recreational fishing, and to work cooperatively with the relevant regulatory agency to ensure fishing in the park has minimal impact on park values.	Ongoing
3.6 Information and education		
3.6.1	Develop and implement an interpretation plan following consultation with the Aboriginal community and other appropriate stakeholders.	Medium
3.6.2	Identify opportunities for sharing information and communicating with the broader community.	Ongoing
3.6.3	Support and encourage use of the park by education providers, community groups and individuals.	Ongoing
4.1 Pests		
4.1.1	Monitor the distribution and impact of pest species on the park and park values, including disturbance to Aboriginal cultural heritage, threatened species and their habitats.	High
4.1.2	Manage pest species in accordance with pest management strategies relevant to the park. Priority will be given to priority weeds, rabbits and foxes.	High
4.1.3	Monitor the park for new outbreaks of priority weeds or pests. Destroy any new outbreaks where possible.	Medium/Ongoing
4.1.4	Clean heavy plant and equipment before it is used in the park to mitigate against the introduction and spread of weed species.	Ongoing

Management response		Priority
4.1.5	Implement weed and pest control programs in cooperation with Wentworth Shire Council, Western Local Land Services and park neighbours as required.	Medium/Ongoing
4.2 Fire		
4.2.1	Implement the park's fire management strategy and update it as necessary. Prescribed burning will take into account ecological thresholds, fuel loads and maintenance of key habitat components.	High
4.2.2	Continue to be involved in the Lower Western Zone Bush Fire Management Committee and maintain cooperative arrangements with local Rural Fire Service brigades and neighbours in regard to fuel management and fire suppression.	High/ Ongoing
4.3 Firewood collection		
4.3.1	Encourage the use of alternative fuel sources such as gas stoves.	High/ Ongoing
4.3.2	Prohibit the collection of firewood for domestic use unless coarse woody debris thresholds are exceeded.	High/ Ongoing
4.4 Climate change		
4.4.1	Continue existing fire, pest and weed management programs to increase the park's ability to cope with future disturbances, including climate change.	High/ Ongoing
4.4.2	Work with adjoining land managers, government stakeholders and the community to improve habitat resilience to the effects of climate change, including cross-tenure conservation initiatives.	High/ Ongoing
5.1 NPWS management facilities and operations		
5.1.1	Maintain the roads shown on Figure 1 and maintain management trails required for park management purposes. Other roads and trails excess to NPWS management and visitor needs will be closed and allowed to revegetate. As necessary, some closed roads may be maintained in a modified condition for use in the event of fire.	High/ Ongoing
5.1.2	Assess the condition of boundary fencing, prioritise replacement where necessary and enter into fencing agreements with neighbouring landowners.	High
5.1.3	Assess internal fencing for heritage value and conserve it as required. Internal fences without significant heritage value will be removed.	Low
5.1.4	Provide regulatory and interpretive signage to enhance visitor use of the park as required.	High
5.2 Non-NPWS access and operations		
5.2.1	Continue to license and manage the authorised apiary sites in the park in accordance with NPWS policy and consent conditions. If a site compromises the environmental values of the area or leads to user conflicts it will be relocated in consultation with the licensee.	Medium/Ongoing
5.2.2	Grazing under licence will be monitored and managed in accordance with licence conditions.	Medium/Ongoing
5.2.3	Continue to license and manage the transmission line route in the park in accordance with permit conditions.	Ongoing
5.2.4	Continue to maintain and allow existing private property access on Part 11 roads through the park. Enter into agreements for future maintenance where required.	High

References

Baker-Gabb D & Hurley VG 2011, *National Recovery Plan for the Regent Parrot (eastern subspecies)* Polytelis anthopeplus monarchoides, Department of Sustainability and Environment, Melbourne, www.environment.gov.au/resource/national-recovery-plan-regent-parrot-eastern-subspecies-polytelis-anthopeplus-monarchoides.

Benson JS, Richards PG, Waller S & Allen CB 2010, New South Wales Vegetation Classification and Assessment: Part 3 Plant communities of the NSW Brigalow Belt South, Nandewar and west New England bioregions and update of NSW Western Plains and South-western Slopes plant communities, version 3 of the NSWVCA database, *Cunninghamia*, vol.11, pp.457–579.

Craig R 2012, *Information on Early Western NSW and some of Central NSW*, www.dcstechnical.com.au/rusheen.html.

DECC 2008, *Recovery Plan for the Koala (*Phascolarctos cinereus*)*, Department of Environment and Climate Change NSW, Sydney.

DECCW 2010*, NSW Climate Impact Profile: The impacts of climate change on the biophysical environment of New South Wales*, Department of Environment, Climate Change and Water NSW, Sydney, www.climatechange.environment.nsw.gov.au/Impacts-of-climate-change/2010-NSW-climate-impact-reporting.

DoE 2009, *Listed Key Threatening Processes*, Australian Government Department of the Environment, www.environment.gov.au/cgi-bin/sprat/public/publicgetkeythreats.pl.

DPI 2013, *NSW Biosecurity Strategy 2013–2021*, Department of Primary Industries, a division of NSW Department of Trade and Investment, Regional Infrastructure and Services, Orange, www.dpi.nsw.gov.au/__data/assets/pdf_file/0005/467699/NSW-biosecurity-strategy-2013-2021.pdf.

DPI & OEH 2011, *Biodiversity Priorities for Widespread Weeds*, report prepared for the 13 Catchment Management Authorities (CMAs) by NSW Department of Primary Industries and Office of Environment & Heritage, Orange.

ERIN 2014, *National Reserve System: IBRA regions with less than 10% protection,* map produced by Environmental Resources Information Network, Department of the Environment*, Canberra,* www.environment.gov.au/system/files/pages/3a086119-5ec2-4bf1-9889-136376c5bd25/files/underrepresented-capad-2014.pdf.

Fisheries SC 2001, *Determination to List the Aquatic Ecological Community in the Natural Drainage System of the Lower Murray River Catchment as an Endangered Ecological Community in Part 3 of Schedule 4 of the* Fisheries Management Act 1994, Fisheries Scientific Committee, www.dpi.nsw.gov.au/__data/assets/pdf_file/0008/208295/FR16-Murray-River-EEC.pdf.

Hanson W 1889, *The Pastoral Possessions of New South Wales*, Gibbs Shallard and Co, Sydney, www26.us.archive.org/details/pastoralpossessi00hans.

Hercus L 1998, Three Linguistic Studies from Far South-west NSW, *Aboriginal History,* vol.13, pp.45–62.

Martin TG & Possingham HP 2005, Predicting the impact of livestock grazing on birds using foraging height data, *Journal of Applied Ecology*, vol.42, pp.400–8.

Macdonald AC 1879, *Map of Riverina and the Northern and Northwestern Pastoral Districts New South Wales*, National Library of Australia Digital Collections Maps, http://pandora.nla.gov.au/pan/153994/20150925-1015/www.visitmungo.com.au/downloads/mungo-book-1788-1901.pdf.

NPWS 2009, *Kemendok Nature Reserve Plan of Management*, National Parks and Wildlife Service, Sydney, www.environment.nsw.gov.au/parkmanagement/KemendokNRMgmtplan.htm.

NRC 2009, *Riverina Bioregion Regional Forest Assessment for River Red Gums and Woodland Forest*, Natural Resources Commission.

NSW SC 1998, *Final Determination to List Predation by the European Red Fox* Vulpes vulpes (Linnaeus 1758) as a Key Threatening Process on Schedule 3 of the Threatened Species Conservation Act, NSW Scientific Committee, www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=20015.

NSW SC 2000a, *Final Determination to List Predation by the Feral Cat* Felis catus *(Linnaeus, 1758) as a Key Threatening Process on Schedule 3 of the TSC Act*, NSW Scientific Committee, www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=20008.

NSW SC 2000b, *Final Determination to List High Frequency Fire Resulting in the Disruption of Life Cycle Processes in Plants and Animals and Loss of Vegetation Structure and Composition as a Key Threatening Process on Schedule 3 of the Threatened Species Conservation Act*, NSW Scientific Committee, www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=20014.

NSW SC 2000c, *Final Determination to List Anthropogenic Climate Change as a Key Threatening Process on Schedule 3 of the Threatened Species Conservation Act*, NSW Scientific Committee, www.environment.nsw.gov.au/threatenedspecies/HumanClimateChangeKTPListing.htm.

NSW SC 2002a, *Final Determination to List Competition and Grazing by the Feral European Rabbit Oryctolagus cuniculus (L.) as a Key Threatening Process on Schedule 3 of the Threatened Species Conservation Act*, NSW Scientific Committee, www.environment.nsw.gov.au/determinations/FeralEuropeanRabbitKTPListing.htm.

NSW SC 2002b, *Final Determination to List Competition from Feral Honeybees as a Key Threatening Process on Schedule 3 of the Threatened Species Conservation Act*, NSW Scientific Committee, www.environment.nsw.gov.au/committee/finaldeterminations.htm.

NSW SC 2003, *Final Determination to List Removal of Dead Wood and Dead Trees as a Key Threatening Process on Schedule 3 of the Threatened Species Conservation Act*, New South Wales Scientific Committee, www.environment.nsw.gov.au/determinations/DeadwoodRemovalKtp.htm.

NSW SC 2004a, *Final Determination to List Competition and Habitat Degradation by Feral Goats Capra hircus Linnaeus 1758 as a Key Threatening Process on Schedule 3 of the Threatened Species Conservation Act*, NSW Scientific Committee, www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=20017.

NSW SC 2004b, *Final Determination to List Predation, Habitat Degradation, Competition and Disease Transmission by Feral Pigs, Sus scrofa Linnaeus 1758 as a Key Threatening Process on Schedule 3 of the Threatened Species Conservation Act*, NSW Scientific Committee, www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=20020.

NSW SC 2011, *Loss and Degradation of Native Plant and Animal Habitat by Invasion of Escaped Garden Plants, including Aquatic Plants – Key threatening process listing*, NSW Scientific Committee, www.environment.nsw.gov.au/determinations/escapedgardenplantsFD.htm.

OEH 2011a, *NSW Threat Abatement Plan for Predation by the Red Fox* (Vulpes vulpes), Office of Environment and Heritage, Sydney.

OEH 2011b, *Sustainable Mountain Biking Strategy*, Office of Environment and Heritage, Sydney, www.environment.nsw.gov.au/parkmanagement/SustainableMtBStrategy.htm%20.

OEH 2012, *Kemendok National Park Fire Management Strategy*, Office of Environment and Heritage, Buronga NSW, www.environment.nsw.gov.au/firemanagement/FireManagementPlans.htm.

OEH 2013a, *Living with Fire in NSW National Parks: A strategy for managing bushfires in national parks and reserves 2012–2021*, revised edition, Office of Environment and Heritage, Sydney, www.environment.nsw.gov.au/resources/firemanagement/120690LiveFire.pdf.

OEH 2013b, *Saving our Species*, Office of Environment and Heritage, Sydney, www.environment.nsw.gov.au/savingourspecies/about.htm.

OEH 2014a, *Code of Practice for Horse Riding in Parks*, Office of Environment and Heritage, Sydney, https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Policy-and-law/horse-riding-in-parks-code-of-practice-140324.pdf

OEH 2014b, *Far West Climate Change Snapshot*, Office of Environment and Heritage, Sydney, www.climatechange.environment.nsw.gov.au/Climate-projections-for-NSW/Climate-projections-for-your-region/Far-West-Climate-Change-Downloads.

OEH 2015*, BioNet Atlas,* Office of Environment and Heritage, Sydney, www.bionet.nsw.gov.au/.

OEH 2017, *Biodiversity Conservation Program*, Office of Environment and Heritage, Sydney, www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/programs-legislation-and-framework/biodiversity-conservation-program.

OEH 2018, *Pets in Parks Policy*, National Parks and Wildlife Service, www.environment.nsw.gov.au/topics/parks-reserves-and-protected-areas/park-policies/pets-in-parks.

Paton DC 1996, *Overview of Feral and Managed Honeybees in Australia: Distribution, abundance, extent of interactions with native biota, evidence of impacts and future research*, ANCA, Canberra.

Sharpe C, D'Santos P & Healy S 2013, Fish surveys of Bengallow Creek, an ephemeral floodplain anabranch system of the Murray River near Euston, NSW, Summary of Findings Report for the NSW Office of Environment and Heritage.

Thackway R & Cresswell I 1995, *An Interim Biogeographic Regionalisation for Australia: A framework for establishing the national system of reserves*, Version 4.0. Australian Nature Conservation Agency, Canberra.

Tindale NB 1940, *Map Showing the Distribution of the Aboriginal Tribes of Australia*, National Library of Australia Digital Collections Maps, http://acms.sl.nsw.gov.au/album/albumView.aspx?itemID=1055279&acmsid=0.

TSSC 2001a, *Commonwealth Listing Advice on Predation, Habitat Degradation, Competition and Disease Transmission by Feral Pigs*, Threatened Species Scientific Committee, www.environment.gov.au/cgi-bin/sprat/public/publicshowkeythreat.pl?id=11.

TSSC 2001b, *Commonwealth Listing Advice on Loss of Terrestrial Climatic Habitat Caused by Anthropogenic Emissions of Greenhouse Gases*, Threatened Species Scientific Committee, www.environment.gov.au/cgi-bin/sprat/public/publicshowkeythreat.pl?id=7.

Val J 1997, *Pre-clearing Natural Vegetation of the Southern Mallee Planning Region*, NSW. Department of Land and Water Conservation, Buronga, NSW.

Val J, Chatfield A, McCarthy B, Summerell G & Jurskis V 2007, River Red Gum Rescue Project: Ecological responses to watering stressed river red gum (*Eucalyptus camaldulensis*) dominated wetlands in the Lower Murray Darling between lock 15 and the South Australian border, unpublished report for the NSW Department of Natural Resources, Buronga, NSW.

Walker PJ 1991, *Land Systems of Western New South Wales,* Technical Report No. 25, Soil Conservation Service of New South Wales.

Western LLS 2017, *Western Regional Strategic Weed Management Plan 2017–2022*, Western Local Land Services, http://western.lls.nsw.gov.au/__data/assets/pdf_file/0006/722391/Western-RSWMP-web.pdf.

Western LLS 2018, *Western Regional Strategic Pest Animal Management Plan 2018–2023*, Western Local Land Services, https://www.lls.nsw.gov.au/__data/assets/pdf_file/0018/820800/Western-Pest-Plan.pdf.