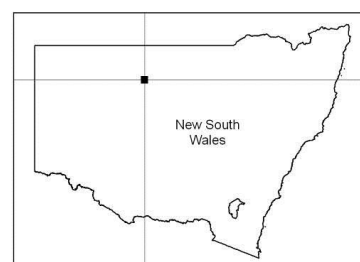


## Draft Plan of Management



## Toorale National Park and Toorale State Conservation Area



© 2018 State of NSW and the Office of Environment and Heritage

With the exception of photographs, the State of NSW and the Office of Environment and Heritage (OEH) are pleased to allow this material to be reproduced in whole or in part for educational and non-commercial use, provided the meaning is unchanged and its source, publisher and authorship are acknowledged. Specific permission is required for the reproduction of photographs.

OEH has compiled this publication in good faith, exercising all due care and attention. No representation is made about the accuracy, completeness or suitability of the information in this publication for any particular purpose. OEH shall not be liable for any damage which may occur to any person or organisation taking action or not on the basis of this publication.

All content in this publication is owned by OEH and is protected by Crown Copyright. It is licensed under the [Creative Commons Attribution 4.0 International \(CC BY 4.0\)](#), subject to the exemptions contained in the licence. The legal code for the licence is available at [Creative Commons](#). OEH asserts the right to be attributed as author of the original material in the following manner: © State of New South Wales and Office of Environment and Heritage 2018.

This publication is for discussion and comment only. Publication indicates the proposals are under consideration and are open for public discussion. Provisions in the final plan of management may not be the same as those in this draft plan.

## Acknowledgments

The NSW National Parks and Wildlife Service (NPWS) acknowledges that Toorale National Park and Toorale State Conservation Area are part of Country for the Kurnu-Baakandji People. NPWS would like to thank the Kurnu-Baakandji Joint Management Committee, Bourke Shire Council and Toorale neighbours for their assistance in preparing this plan.

This plan was prepared by staff of NPWS, part of the Office of Environment and Heritage. For additional information or any inquiries about these parks or this plan of management, contact the NPWS Bourke Area Office, 51 Oxley Street, Bourke or by telephone on (02) 6830 0200.

## Front cover image

*Warrego-Darling Junction*, Toorale (Badger Bates 2012).

This is one of a series of linocut prints that focuses on Badger's life as a child in the 1950s, travelling the ancient routes along the Darling River with his grandmother. The series re-tells the stories and events from this period and provides continuity between the creators, the ancestors and the Kurnu-Baakandji People today. This picture depicts the area at the junction of the Warrego and Darling rivers, part of Toorale National Park and Toorale State Conservation Area.

## Published by

59–61 Goulburn Street, Sydney NSW 2000  
PO Box A290, Sydney South NSW 1232

Phone: (02) 9995 5000 (switchboard)

Phone: 131 555 (environment information and publications requests)

Phone: 1300 361 967 (national parks, climate change and energy efficiency information and publications requests)

Fax: (02) 9995 5999

TTY: (02) 9211 4723

Email: [info@environment.nsw.gov.au](mailto:info@environment.nsw.gov.au)

Website: [www.environment.nsw.gov.au](http://www.environment.nsw.gov.au)

Report pollution and environmental incidents

Environment Line: 131 555 (NSW only) or [info@environment.nsw.gov.au](mailto:info@environment.nsw.gov.au)

See also [www.environment.nsw.gov.au/pollution](http://www.environment.nsw.gov.au/pollution)

ISBN 978-1-76039-999-3

OEH 2018/0040

*Toorale National Park and Toorale State Conservation Area Draft Plan of Management*,  
February 2018.




Printed on recycled paper

## Have your say

We want to know what you think about this draft plan. Your knowledge may help us manage Toorale National Park and Toorale State Conservation Area more effectively.

This draft plan has been developed with input from the Kurnu-Baakandji Joint Management Committee, local community members and key stakeholders and is now being placed on public exhibition for comment. Members of the public, whether as individuals or as members of community interest groups, are invited to comment in writing on this plan of management.

To give us feedback on the draft plan you can send a written submission by:

-  using the online submission form at <https://engage.environment.nsw.gov.au/consult>
-  emailing it to [npws.parkplanning@environment.nsw.gov.au](mailto:npws.parkplanning@environment.nsw.gov.au)
-  posting it to Manager Planning Evaluation and Assessment, PO Box 95, Parramatta NSW 2124.

Written submissions must be received by **7 May 2018**.

To help us make the best use of your feedback:

- Make sure we can tell what issue or part of the plan you are talking about. One way you can do this is to include the section heading and/or page number from the plan in your submission.
- Tell us how we can make the plan better. You may want to tell us what you know about the park or how you or other people use and value it.
- We are happy to hear any ideas or comments you may have and will consider them all, but please be aware that we can't always include all information or ideas in the final plan.

What happens to your feedback?

- Step 1: Your submission is part of the process of making this draft plan final. At the close of the public exhibition period we consider all submissions and prepare a submissions report. Note that multiple submissions received by the same author will be counted as a single submission.
- Step 2: We provide the Kurnu-Baakandji Joint Management Committee, the relevant Advisory Committee and the National Parks and Wildlife Advisory Council with the draft plan, all the submissions and the submissions report. They then consider the documents, make comments on the plan or suggest changes, and provide advice to the Minister for the Environment.
- Step 3: The Minister considers the plan, submissions and any advice, makes any necessary changes and decides whether to adopt the plan under the *National Parks and Wildlife Act 1974*.

### Your privacy

Your submission will be provided to several statutory advisory bodies as outlined above. Your comments on the draft plan may include 'personal information'. OEH complies with the NSW [Privacy and Personal Information Protection Act 1998](#) that regulates the collection, storage, quality, use and disclosure of [personal information](#). For details see [OEH and your privacy](#). Information that in some way identifies you may be gathered when you use our website or send us an email.

Your submission, in whole or part, or as part of a summary, may be made publicly available on our website. If you object to such publication, please indicate that on your submission. Should an access application under the *Government Information (Public Access) Act 2009* be received that requests access to your submission, your views about release will be sought, if you have indicated that you object to it being made public.

## Contents

	Welcome to Kurnu-Baakandji Country .....	vii
1.	INTRODUCTION .....	1
1.1	Location, reservation, representation and regional setting .....	1
1.2	Statement of significance .....	4
2.	MANAGEMENT CONTEXT .....	7
2.1	Legislative and policy framework .....	7
2.2	Management purposes and principles .....	7
2.3	Specific management directions .....	10
3.	VALUES .....	11
3.1	Landscape, catchment and geological significance .....	11
3.2	Rivers, wetlands and water for the environment .....	16
3.3	Native plants and communities .....	24
3.4	Native animals .....	37
3.5	Aboriginal cultural heritage .....	41
3.6	Shared heritage .....	44
3.7	Visitor use .....	51
3.8	Research, education and information .....	59
4.	THREATS .....	61
4.1	Pests .....	61
4.2	Fire .....	65
4.3	Climate change .....	66
5.	MANAGEMENT OPERATIONS AND OTHER USES .....	68
5.1	Management facilities and operations .....	68
5.2	Non-NPWS uses and operations .....	73
6.	IMPLEMENTATION .....	76
	References .....	103

## TABLES

Table 1.	Statewide vegetation classes found in Toorale .....	25
Table 2.	Threatened and significant animals recorded in Toorale .....	37
Table 3.	Species that are rare or have limited breeding abilities .....	39
Table 4.	Threats to threatened species recorded in Toorale .....	40
Table 5.	Examples of Kurnu-Baakandji totems .....	44
Table 6.	Significant weeds recorded in Toorale .....	63
Table 7.	Far West Region climate change snapshot .....	67
Table 8.	Park management buildings in Toorale* .....	69
Table 9.	List of management responses .....	76

## FIGURES

Figure 1.	Location map.....	vi
Figure 2.	Map of Toorale National Park and State Conservation Area.....	inside back cover
Figure 3.	Bioregions .....	2
Figure 4.	Model of Pallimnarchus – the giant freshwater crocodile .....	12
Figure 5.	Scald reclamation area showing water ponding trials .....	14
Figure 6.	Toorale’s water infrastructure .....	17
Figure 7.	Statewide vegetation classes found in Toorale .....	26
Figure 8.	Toorale Homestead Precinct .....	47

## APPENDICES

Appendix A.	Land systems .....	84
Appendix B.	Mitchell Landscapes .....	85
Appendix C.	Toorale dams.....	86
Appendix D.	Vegetation classes and communities of Toorale .....	89
Appendix E.	Culturally significant plants .....	91
Appendix F.	Culturally significant animals.....	97
Appendix G.	Toorale’s built heritage .....	100



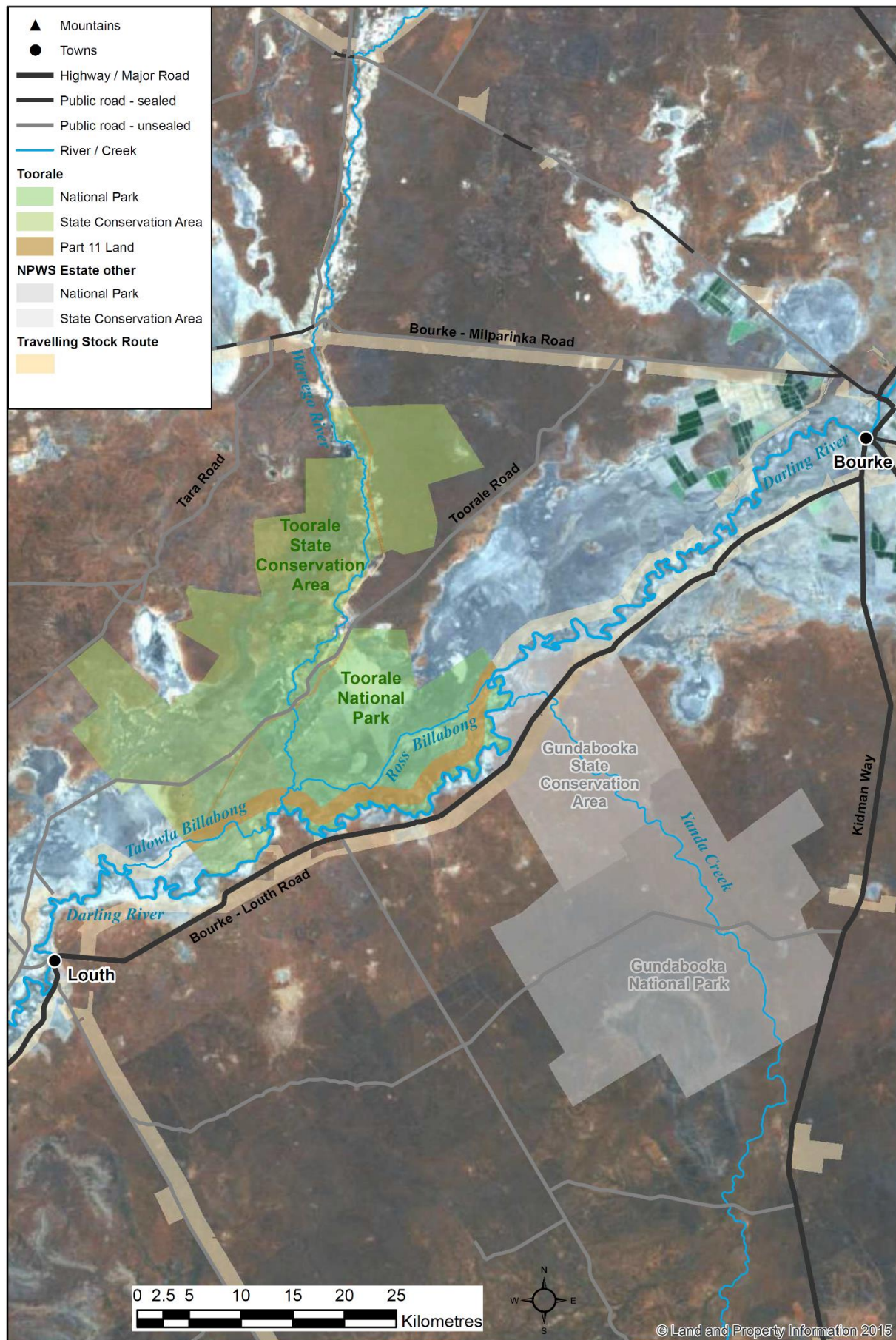


Figure 1. Location map

## **Welcome to Kurnu-Baakandji Country**

We the descendants of the traditional owners (first Peoples) who occupied the *Wariku* (Warrego) and *Baaka* (Darling) Rivers region invite you to take a journey into our World.

Toorale National Park and State Conservation Area, also referred to as 'Tooralee', sit within our Country. The land of the Kurnu-Baakandji People.

Here where these two rivers meet are rich landscapes of plants, animals, Aboriginal and European cultural heritage and shared history of both peoples.

Today our connection to Country is strengthened as we are again involved in decision-making on how to manage our Country. We come together to learn about and respect the old traditions while creating some that are new and maintaining our living culture.

We look forward to a close working relationship with the National Parks and Wildlife Service that is built around trust and respect and to restore, maintain and protect this important place for future generations.

*Kurnu-Baakandji Joint Management Committee 2016*

Blank page



# 1. Introduction

## 1.1 Location, reservation, representation and regional setting

### 1.1a Location and history

Toorale National Park and Toorale State Conservation Area were purchased by the NSW Government as Toorale Station in 2008. In this plan, the national park and state conservation area are collectively referred to as 'Toorale' or 'the park'. Together, the combined area of the national park and state conservation area is 85,251 hectares that represents one of the 15 largest parks in the State. It is located at the junction of the Darling and Warrego rivers, in the semi-arid environment of north-west New South Wales (see Figure 1). The two nearest towns to the park are Bourke in the north-east and Louth to the south-west. Mount Talowla Lookout, in the south-west corner of the park, is approximately 95 kilometres from Bourke and approximately 30 kilometres from Louth (see Figure 2). The park is bisected by Toorale Road (also known as the Paka-Tank Tilpa Road, the Bourke–Louth Road or Louth Road).

Toorale provides enduring connections to Country for Aboriginal people, despite access to the land and its resources having been affected by pastoral settlement. Prior to settlement, the Aboriginal community had complete interdependence with the land and natural resources. Due to its location at the junction of two major inland rivers, Toorale provided an abundance of bush foods and medicines, and still supports many of these resources today.

Pronounced as both 'Tu-RAL' and 'Tu-RAL-ee', Toorale Station was established in 1857 and was one of the first stations on the Darling River. In the 1880s, Toorale was a significant part of the largest sheep station in the world. During this time the station owner, innovator and philanthropist, Sir Samuel McCaughey (1835–1919, knighted in 1905), pioneered large-scale water infrastructure works, sank some of the earliest artesian bores, and used captured river flows to improve pasture and thus increase the station's carrying capacity. The Toorale Homestead stands as testimony to both his innovation and the successes of his endeavours. The homestead now forms an important piece of the rich cultural heritage of Toorale that also includes shearers' quarters, woolsheds and less obvious traces such as rubbish dumps, graves and earthworks. Post-settlement, some Aboriginal people maintained connections to Country through employment in a variety of roles working on Toorale Station.

The reservation of Toorale has guaranteed the continuation of relationships with and reconnection to Country for the Kurnu-Baakandji People. Reservation of Toorale provides opportunities for the protection of historic heritage values and allows for the conservation of significant natural values such as rivers, wetlands and semi-arid landscapes. The property's rich history retains ongoing connections within the Bourke community and beyond.

Toorale's conservation values were first formally recognised by the NSW National Parks and Wildlife Service (NPWS) in 1983 when 49,190 hectares of the station were established as a wildlife refuge under the *National Parks and Wildlife Act 1974*. In February 2002, the NPWS reserve establishment planning process highlighted Toorale's high conservation value wetlands, floodplain and riparian (river) habitats. The property was listed as one of interest for reservation, should it ever be placed on the market for sale.

In 2008 Toorale was advertised for sale and the NSW Government purchased the 91,383-hectare station from Clyde Agriculture (a subsidiary of the UK-based Swire Group) with considerable financial support from the Australian Government. The NSW Government was interested in acquiring Toorale for its outstanding natural and cultural values, while the Australian Government recognised the unique contribution Toorale would make to the National Reserve System and the value of securing the property's extensive water entitlements, which were at the time tied to land ownership. By contributing to the acquisition of Toorale, the

Australian Government secured Toorale's water extraction licences as part of the *Water for the Future* initiative in the Murray–Darling Basin.

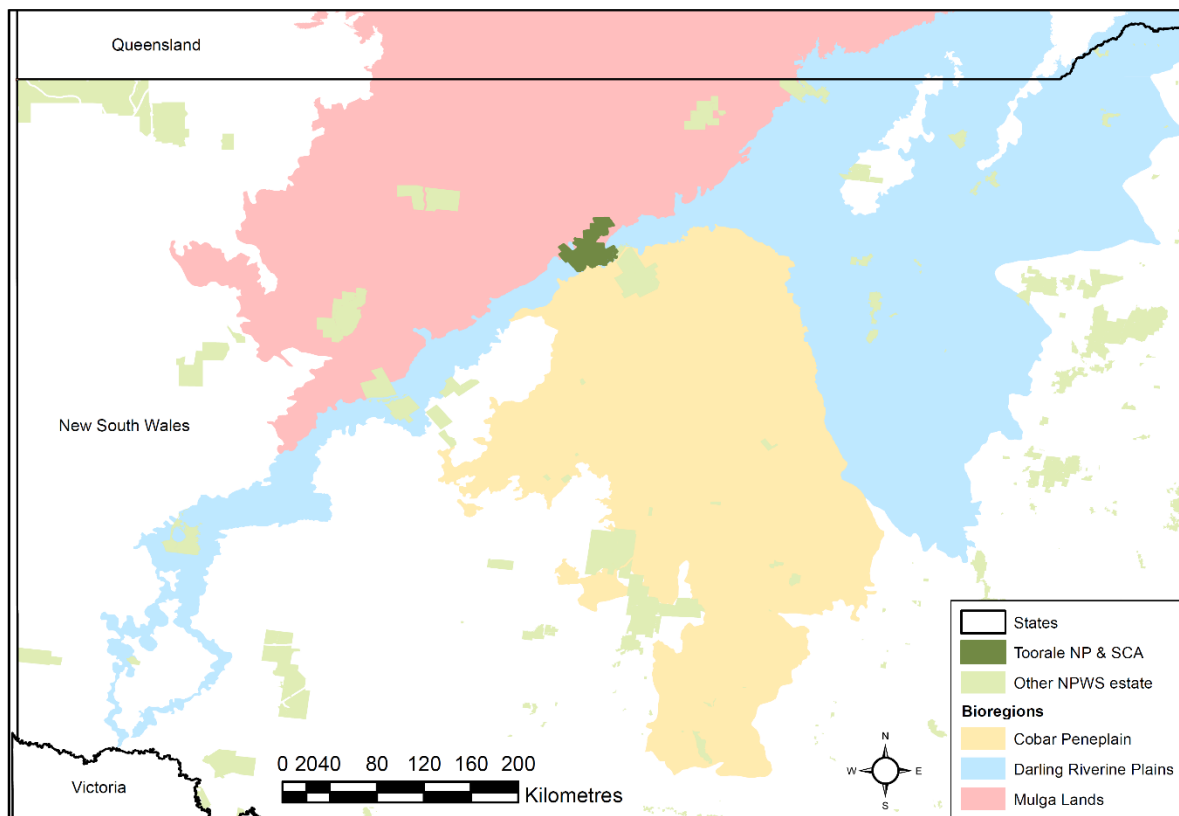
### 1.1b Toorale's contribution to the reserve system

At the time of purchase, the bioregions or subregions of Toorale were either entirely unrepresented or poorly represented in the NSW park system.

Bioregions are large, geographically distinct areas of land with common characteristics such as climate, ecological features and plant and animal communities (DoE no date). Bioregions and subregions are mapped at the national level and are known as IBRA regions (from Interim Bioregionalisation for Australia; Thackway & Cresswell 1995).

The southern section of the park is in the Darling Riverine Plains Bioregion and the northern section in the Mulga Lands Bioregion. A very small proportion of the park (67 hectares) along the Darling River lies in the Cobar Peneplain Bioregion (see Figure 3).

Additions to the NSW reserve system aim to conserve the full diversity of landscapes and native plants and animals by increasing the comprehensiveness (representation of each regional scale ecosystem), adequacy (amount of the ecosystem) or representativeness (representation of the variability within systems) of these values.



**Figure 3. Bioregions**

Toorale's purchase increased:

- *Comprehensiveness* by adding two previously unreserved subregions of the Mulga Lands Bioregion – the Warrego Sands (30,394 hectares) and the West Warrego (4810 hectares) to the reserve system.
- *Adequacy* by increasing the area of poorly reserved biogeographic subregions in the reserve system. Prior to Toorale's reservation, the Darling Riverine Plains Bioregion was

the State's most poorly reserved bioregion, with only 1.8% (approx. 169,374 hectares) of its total area (9,409,644 hectares) reserved. With the purchase of Toorale, 49,119 hectares of the Darling Riverine Plains Bioregion have been added to the reserve system. This lifted the proportion of the bioregion protected to approximately 2.4%.

Only 3.8% of the Mulga Lands Bioregion was reserved prior to the acquisition of Toorale. An additional 35,355 hectares (or 1.2%) of this bioregion was protected by the purchase and reservation of Toorale Station.

- *Representativeness* by increasing the variety of subregions in the reserve system. Three important IBRA subregions are represented in the park, including 49,119 hectares of the Louth Plains (a subregion of the Darling Riverine Plains Bioregion). The Louth Plains were previously very poorly reserved, at 0.9%, and the acquisition of Toorale lifted this to 17.8%.

Land systems (Walker 1991) and Mitchell landscapes (Mitchell 2008) are also used to illustrate representativeness of the park system. Prior to Toorale's reservation, 10 of the 12 land systems that occur in Toorale were not previously represented in the NSW park system. Of the two that were represented, only 2400 hectares were reserved in the adjacent Gundabooka National Park and State Conservation Area.

Eight Mitchell landscapes are represented within Toorale (see Section 3.1), an unusually high diversity. One of these, the Mid-Darling Plains Landscape, was not previously protected within the NSW park system. Five of the Mitchell landscapes are now significantly better represented following Toorale's reservation.

The reserve system also seeks to protect places of important Aboriginal and shared cultural heritage. The reservation of Toorale has allowed for the continuation of connections to Country for the Kurnu-Baakandji People and the protection of iconic Australian pastoral heritage.

### **1.1c Reservation**

On 26 November 2010, the majority of Toorale Station (85,251 hectares) was reserved under the National Parks and Wildlife Act as Toorale National Park (30,866 hectares) and Toorale State Conservation Area (54,385 hectares) — including the river bed where both sides of the Warrego River are bordered by the park.

In addition to reserved land, the park also includes 6132 hectares of unreserved lands that are vested in the Minister administering the National Parks and Wildlife Act for the purposes of Part 11 of that Act (see Figure 2). This Part 11 land incorporates:

- several travelling stock reserves (TSRs) including one that follows the Toorale Road road reserve and then continues through the park along East Booka Trail and Warrego Trail, and another along the Darling River (approximately 5950 hectares)
- a trigonometric reserve on Mount Talowla (approximately 4 hectares)
- a gravel quarry on Mount Burragurru used by Bourke Shire Council (approximately 5 hectares).

These areas are all Western Lands leases (with a lease purpose of conservation) held under Part 11 of the National Parks and Wildlife Act. The Minister administering the National Parks and Wildlife Act is lessee under the *Western Lands Act 1901*.

Areas that are not reserved as part of Toorale include:

- The 60-metre wide Toorale Road and road reserve. This road has been withdrawn from the associated Western Lands leases as part of a legal road network process and has been dedicated as a public road administered by Bourke Shire Council.
- The bed of the Darling River is a Crown waterway and not reserved as park.
- Where the park borders only one side of the Warrego River (e.g. upstream of Boera Dam), the river bed is a Crown waterway and is not NPWS estate (see Figure 2).

### **1.1d Regional setting**

Properties surrounding Toorale are mainly managed for sheep and cattle production, with some limited areas of cropping. Adjacent to Toorale's south-eastern edge across the Darling River are Gundabooka National Park and Gundabooka State Conservation Area (see Figure 1). All other adjoining properties are leases in perpetuity under the Western Lands Act.

In New South Wales, there are eight other parks on the Barwon–Darling River system: Budelah Nature Reserve, Gundabooka National Park and State Conservation Area, Barwon National Park and State Conservation Area, Paroo–Darling National Park and State Conservation Area and Kinchega National Park. Ledknapper Nature Reserve lies within the Warrego River catchment in New South Wales.

Toorale is located within the administrative areas of Bourke Shire Council and Western Local Land Services. East of the Warrego River, Toorale is administered by Nulla Nulla Local Aboriginal Land Council; west of the Warrego River Toorale is administered by an unconstituted local Aboriginal land council.

## **1.2 Statement of significance**

Toorale is an iconic place with unique conservation values and a rich cultural history. Toorale is of significance for the following values.

### **1.2a Geology, landscapes and soils**

Toorale is located at the confluence of the Warrego and Darling rivers. Across the Darling River to the south are Gundabooka National Park and State Conservation Area. The park straddles three of the most poorly reserved bioregions in New South Wales. It protects significant areas of the Darling Riverine Plains Bioregion (49,119 hectares) and Mulga Lands Bioregion (35,355 hectares), as well as a portion of the Cobar Peneplain Bioregion (67 hectares).

Toorale's high landscape and ecosystem diversity is reflected in the presence of 12 different land systems (Walker 1991) including old erosional surfaces of undulating downs, sand plains, dunefields and alluvial floodplains. Ten of these 12 land systems were not represented in the NSW park system prior to Toorale's reservation. Toorale also contains an unusually high diversity of Mitchell landscapes, one of which was not previously represented and five others that are now significantly better represented following Toorale's reservation.

Megafauna fossil sites are located within Crown land on the banks of the Darling River where it passes Toorale. These fossil sites are relatively rare in New South Wales and the deposits have the potential to yield information that will contribute to an understanding of the local area's natural history.

### **1.2b Biological significance**

Toorale is a large, highly diverse park with extensive, high conservation value wetlands, floodplains and riparian habitats, and supports a number of threatened species and communities. There are 27 vegetation communities in Toorale.

Approximately 18,600 hectares (or 20%) of Toorale is covered by Coolibah – Black Box Woodland Endangered Ecological Community, a threatened floodplain woodland community. Historic water management practices have created a vast wetland ecosystem that encompasses nearly 30,000 hectares on Toorale and adjoining properties.

A total of 284 native plants and 255 native animals have been recorded within the park. Native animals include 158 bird, 56 reptile, 27 mammal and 14 frog species. These animals occupy a wide range of ecological niches, for example, woodland birds, migratory wading birds, ground-nesting and hollow-nesting birds, and burrowing and arboreal mammals. The diversity of species reflects the variety of habitat elements in Toorale.

### **1.2c Rivers, wetlands and water for the environment**

Located at the junction of the Warrego and Darling rivers, Toorale is highly significant to the Kurnu-Baakandji Aboriginal People.

Toorale is also associated with significant water management and engineering achievements including the Boera Dam and Floodwaters Scheme constructed by Sir Samuel McCaughey in about 1892. This scheme was one of the most successful and massive 19th century civil engineering and water management constructions known to be undertaken by a private individual in New South Wales.

The acquisition and reservation of Toorale Station as a park represents a landmark stage in Australian history when the importance of preserving inland river water flows was recognised.

The transfer of water access licences to the Commonwealth Environmental Water Holder (CEWH) has allowed water in the park to be managed as environmental water to improve the health of rivers, wetlands and floodplains.

### **1.2d Aboriginal cultural heritage**

The area around the junction of the Warrego and Darling rivers is part of Country for the Kurnu-Baakandji Aboriginal People. Toorale has extensive evidence of Aboriginal occupation and activity, including over 500 known Aboriginal sites. These include artefacts, quarries, scarred trees, ovens, middens, stone arrangements, burials, tool manufacturing sites and Aboriginal post-contact sites.

### **1.2e Shared heritage**

Many Aboriginal people and families have a strong and ongoing connection to Toorale, having worked on the station for many generations over the past 150 years. Toorale therefore represents a unique opportunity for these individuals as well as the broader Kurnu-Baakandji community to maintain connections or reconnect with Country, renew kinship relations, support the teaching of younger generations, and develop and practise traditional customs.

Toorale is considered an icon of Australian pastoral heritage. At its peak in the late 19th century it was a significant part of the largest sheep station in the world, where up to 265,000 sheep were shorn in its 46-stand shearing shed. Toorale Station is associated with two of the most significant Australian wool barons of that time, Sir Samuel Wilson and Sir Samuel McCaughey.



Toorale played a central role in the stories that shaped the national mythologies of that era. Henry Lawson's brief stint at Toorale in 1892 was inspirational to his subsequent poetry. Toorale is also associated with the 1890s battles between shearers and pastoralists along the Darling River, the rise of unionism and the birth of the Labor Party in Australia.

The historic Toorale buildings, in particular the Old Toorale Woolshed (built around 1873–74) and Toorale Homestead (built around 1896), are 'iconic monuments to the pastoral history of the nation' as they 'represent the biggest and the best of the far western region's surviving historic pastoral buildings with the most significant technology and history attached' (Sheppard 2013).

### **1.2f Recreation and tourism**

Toorale offers visitors opportunities to appreciate spectacular natural values in a setting that articulates the significance of Toorale as a place of shared history between Aboriginal and non-Aboriginal peoples, and the changes brought to both communities and the landscape because of settlement and development.

### **1.2g Research and education**

The depth of knowledge about Toorale relative to its history of use by Aboriginal people and use in the post-settlement period provides opportunities for research in a range of fields including Aboriginal culture, archaeology, European settlement and innovation, colonial architecture, water management, wetland values and native plants and animals.

## **2. Management context**

### **2.1 Legislative and policy framework**

The management of national parks and state conservation areas in New South Wales is in the context of the legislative and policy framework of NPWS; primarily the National Parks and Wildlife Act and Regulation, the *Biodiversity Conservation Act 2016* and various NPWS policies.

Other legislation, strategies and international agreements may also apply to management of the park. The NSW *Environmental Planning and Assessment Act 1979* may require assessment of the environmental impacts of works proposed in this plan. The NSW *Heritage Act 1977* may apply to the development of listed heritage items or 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 and places listed on the National Heritage List.

A number of water entitlements and licences relevant to Toorale are held under the NSW *Water Act 1912* and the NSW *Water Management Act 2000*. These entitlements are used as environmental water by the Commonwealth Environmental Water Office (CEWO) in collaboration with Office of Environment and Heritage (OEH) (see Section 3.2f). Separate to these water access licences, the Minister administering the National Parks and Wildlife Act has retained a number of minor works approvals for the use and maintenance of dam structures and floodplain works.

A plan of management is a statutory document under the National Parks and Wildlife Act. Once the Minister has adopted a plan, 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 Toorale National Park or Toorale State Conservation Area. 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**

#### **2.2a 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 National Parks and Wildlife 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.

## **2.2b State conservation areas**

State conservation areas are reserved under the National Parks and Wildlife Act to protect and conserve areas that:

- contain significant or representative ecosystems, landforms or natural phenomena or places of cultural significance
- are capable of providing opportunities for sustainable visitor or tourist use and enjoyment, the sustainable use of buildings and structures, or research
- are capable of providing opportunities for uses permitted under other provisions of the National Parks and Wildlife Act.

Under section 30G of the National Parks and Wildlife Act, state conservation areas are managed to:

- conserve biodiversity, maintain ecosystem functions, protect natural phenomena and maintain natural landscapes
- conserve places, objects and features of cultural value
- provide for the undertaking of uses permitted under other provisions of the National Parks and Wildlife Act (including uses permitted under section 47J such as mineral exploration and mining), having regard to the conservation of the natural and cultural values of the state conservation area
- provide for sustainable visitor or tourist use and enjoyment that is compatible with conservation of the area's natural and cultural values and with uses permitted in the area
- provide for sustainable use (including adaptive re-use) of any buildings or structures or modified natural areas having regard to conservation of the area's natural and cultural values and with other uses permitted in the area
- provide for appropriate research and monitoring.

Land is reserved as a state conservation area primarily where mineral values preclude reservation as another category. The National Parks and Wildlife Act requires a review of the classification of state conservation areas every 5 years in consultation with the Minister administering the *Mining Act 1992*. The status of Toorale State Conservation Area was reviewed in 2008 and 2013 and its status remains unchanged. The review report noted that there are no exploration or mining titles over the park, but the mineral values of the land have not been adequately investigated. As such, at present the area should remain a state conservation area to allow for exploration, subject to environmental assessment.

Subject to the outcome of future reviews, Toorale State Conservation Area may be added to Toorale National Park. In the meantime, the management of the state conservation area will also be guided by the management principles for national parks as far as possible.

## 2.2c Aboriginal joint management

As traditional owners of the land Aboriginal people have a unique role to care for and manage Country. This role overlaps with the legislative responsibilities of OEH to manage land for conservation. Partnerships recognise and capitalise on these mutual interests and responsibilities, including recognising that:

- All parks and reserves are part of Aboriginal peoples' Country and are places where Aboriginal people can care for and access their Country and its resources. NPWS parks and reserves play an important role in the maintenance of Aboriginal culture and connection to Country.
- Aboriginal communities obtain cultural, social and economic benefits through being involved in park management.
- OEH, in partnership with the Aboriginal community, is better able to protect and interpret cultural heritage and to apply Aboriginal knowledge to land management and the conservation of cultural and natural values.
- Visitors to parks gain a greater understanding of Aboriginal cultural values and an enriched experience through interaction with Aboriginal people.

NPWS commenced consultation with Aboriginal people immediately following Toorale's purchase. During a Back to Country gathering in October 2010, an interim joint management advisory committee was nominated to draft a memorandum of understanding (MoU) that would formalise the working relationship between NPWS and the Kurnu-Baakandji People.

The MoU was signed at Toorale on 12 May 2012 and sets out the principles and agreements for how NPWS and the Kurnu-Baakandji People will work together to manage Toorale. The MoU commits NPWS to involving Aboriginal people in protecting and conserving Toorale's important cultural values. The Kurnu-Baakandji Joint Management Committee (JMC) was formalised on 1 December 2012 and has 12 traditional owner members along with a representative from NPWS. The joint management arrangement also aims to allow opportunities for Kurnu-Baakandji and other Aboriginal people to access Toorale.

## 2.2d State and national heritage significance

Toorale has significant heritage that has been identified at the local, state and national level.

'Toorale Homestead and outbuildings' are listed as a heritage item in the *Bourke Local Environmental Plan 2012* (Bourke Shire Council 2012) and are therefore also listed on the State Heritage Inventory. 'Toorale Homestead and Outbuildings, Toorale Station' and the 'Darling River (Bourke to Wentworth)' are both listed as Indicative Places on the National Heritage List (Department of Environment 2015). The 'Toorale Homestead and Outbuildings' are listed on the non-statutory Register of National Estate (Department of Environment 2015).

A conservation management plan, the *Toorale National Park and State Conservation Area Conservation Management Plan* has been prepared for the park (Sheppard 2013) that identifies that the Toorale Homestead and the Old Toorale Woolshed are likely to meet State Heritage Register listing requirements and could be nominated for inclusion in the future (see Section 3.6).

The conservation management plan is being published at the same time as this draft plan of management. All references to *Toorale Conservation Management Plan* or the conservation management plan in this plan of management refer to the final, endorsed conservation management plan that will provide guidance on how to manage heritage items on Toorale.

## **2.3 Specific management directions**

In addition to the general principles for the management of a national park and a state conservation area (see Section 2.2), the following specific management directions apply to the management of the park:

- Manage the national park and state conservation area together as one park.
- Recognise the intrinsic importance of Aboriginal cultural heritage values and ensure that these values inform park management.
- Support Aboriginal people in reconnecting with Country through cultural activities, involvement in managing Toorale and opportunities for employment on Toorale.
- Implement conservation management plan/s to ensure the protection of Toorale's unique Aboriginal and shared cultural heritage values.
- Minimise impacts on Toorale's outstanding natural and cultural values by conducting pest management activities as a high priority.
- Monitor regeneration of the highly modified former irrigated cropping area and, where appropriate, facilitate regeneration including support for improvements to hydrology and native species re-establishment.
- Ensure a safe environment for visitors and staff.
- Work with the CEWO, NSW Department of Primary Industries – Water (DPI – Water), and other authorities such as the Murray–Darling Basin Authority and the Northern Basin Aboriginal Nations to maintain or improve the condition and extent of Toorale's wetlands, waterways, floodplains and riparian zones.
- Ensure any modifications to Toorale's water storage infrastructure maintains or improves the park's natural and cultural values.
- Provide interpretation to educate visitors about Toorale's natural and cultural values.
- Promote the park as a tourist attraction.



### 3. Values

This plan aims to conserve Toorale's significant natural and cultural heritage values that contribute considerably to a comprehensive, adequate and representative reserve system in New South Wales. The park's natural values, including its landforms, plant and animal communities have influenced how the land has been used and valued by both Aboriginal and non-Aboriginal people. Natural and cultural values are closely linked.

To make the document clear and easy to use natural heritage, cultural heritage, threats and ongoing use are dealt with individually, although these features are interrelated.

#### 3.1 Landscape, catchment and geological significance

##### 3.1a Geology and geodiversity

Along the Darling River floodplain Toorale is a broad, largely flat landscape of deep black alluvial soils. Away from the Darling however, it is more variable and along the Warrego River it changes character, alternating between low red sand hills and grey Warrego channels, wetlands and floodplain. Small ephemeral lakes (gilgai) occur in depressions and swamps.

This variability supports plants that range from low ground covers through to tall eucalypt forests. The park also has two notable peaks: Mount Talowla (also known as Acton Hill) (114 metres above sea level) and Mount Burragurry (100 metres above sea level). These two red peaks are located in the south-west corner of the park and are surrounded by floodplain.

Toorale straddles three bioregions: Darling Riverine Plains, Mulga Lands and Cobar Peneplain (see Figure 3).

The landscape of the **Darling Riverine Plains Bioregion** is flat with river channel and floodplains. The geology dates back 2 million years and is dominated by alluvial deposits associated with the Darling River. These deposits form extensive floodplains that are up to 100 metres thick and sit on older sedimentary rocks and bedrock (NPWS 2003). Soils of this bioregion are typically grey clays from channels to flood fringes, with limited areas of higher red soils and patchy sand terraces.

The **Mulga Lands Bioregion** is dominated by horizontal sandstones and claystones that were deposited in an inland sea approximately 100 million years ago. These sediments vary in thickness across the basement rocks and they form the main water-bearing strata of the Great Artesian Basin (NPWS 2003).

Many parts of the Mulga Lands surface sandstones and more recent sands have formed silcrete, a tough fine-grained quartzite, that is found in the park and has been quarried by the Kurnu-Baakandji as a stone tool resource for many years. These rocks often contain plant fossil remains that indicate that the environment was once much wetter than it is now. Silcrete pebbles and boulders are dotted throughout the landscape as gibber. The Warrego River system has deposited sands and clays between the plateau areas of sandstones, and these alluvial areas are dominated by grey and brown cracking clays in channels and claypans (NPWS 2003).

Soils of the Warrego Sands subregion in Toorale are typically red earths, reddish-texture contrast soils and grey clays. Soils of the west Warrego are shallow stony loams and sandy red earths.

The **Cobar Peneplain Bioregion** is characterised by undulating plains with wide valleys and occasional low stony rises. A blanket of alluvial sediment, dating back 2 million years, sits over weathered sedimentary rock (which dates to 450 million years ago). Soils in the Cobar

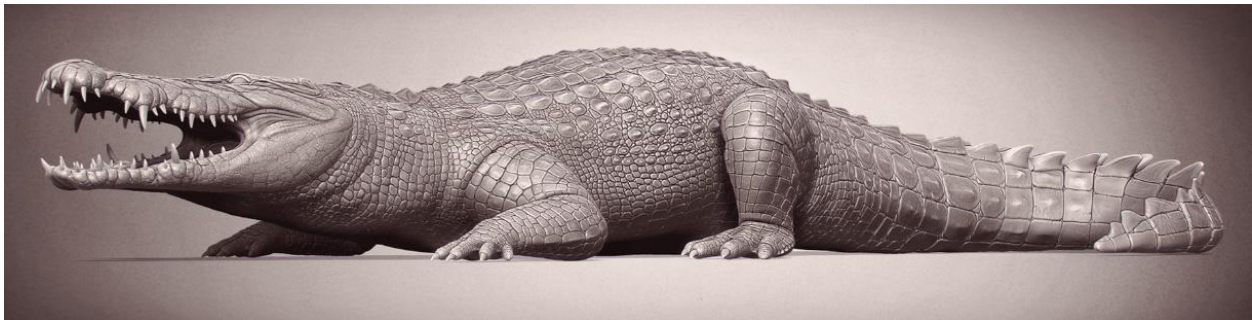
Peneplain are typically red earths with stony gravels on slopes. Brown clays and harsh-texture contrast soils occur in depressions and swamps.

### 3.1b Megafauna fossils

Megafauna fossil sites exist adjacent to Toorale, with one deposit known to extend into the park. These sites are significant for a number of reasons. Extinct megafauna and their fossil remains are of particular cultural significance to the Kurnu-Baakandji People, due to the connection of these animals to the dreaming. These fossil sites are relatively rare in New South Wales and the deposits have the potential to yield information that will contribute to our understanding of the local area's natural history (Sheppard 2013). This includes providing an important insight into how the climate was very different at Toorale some 100,000 to 200,000 years ago. Numerous species at the site help extend our understanding of the geographical distribution of Australia's megafauna. There is great potential for interpretation of the fossil material here as it adds another dimension into the park's past (Westaway et al. 2016).

The Redbank megafauna site is located on the western side of the Darling River. This site, and another nearby, have previously been investigated by Peter Thompson (1980). Redbank also seems to have been investigated by Alex Ritchie of the Australian Museum in the 1960s. As such, it is likely that fossils from the site are in the museum.

In 2015 the Redbank site was studied by the Australian Research Centre for Human Evolution based at Griffith University. A diverse range of mammal, reptile and fish fauna has been recovered from the surface of the site. The fossils are heavily fragmented so identification is not straightforward. The fauna includes crocodile (probably the giant freshwater crocodile, *Pallimnarchus*), a large varanid (possibly Komodo dragon), turtle, snake, large numbers of kangaroos, *Diprotodon*, lungfish and a large ray-finned fish (Westaway et al. 2016).



**Figure 4. Model of *Pallimnarchus* – the giant freshwater crocodile**

Source: ArtStation 2016.

The megafauna present indicate that at the time these animals lived in Toorale and the rivers and inland areas of Western New South Wales, these areas were far wetter than they are today and were most likely more humid. The ages of the megafauna generally range between 90,000 to 220,000 years ago (Westaway et al. 2016).

Further taxonomic assessment should be undertaken of the megafauna and an excavation of unexposed fossil deposits (as identified with ground-penetrating radar) has the potential to reveal a great deal more about this very interesting fossil locality.

The megafauna fossil site is extremely significant due to its rarity, scientific interest and cultural association with the Kurnu Baakandji People. It is vulnerable to erosion and flooding events, inappropriate visitation, fossicking, development and other ground disturbance. Under the NPWS *Fossicking Policy* (OEH 2017b), fossicking is generally not allowed in national park, unless specifically permitted by consent in a plan of management. Fossicking by the general

public is not permitted in Toorale. Given the scientific importance of the Toorale fossil site, fossicking can only be conducted for scientific purposes under a scientific licence.

### **3.1c Land systems**

Land systems are areas with recurring patterns of geology, geography and ecology. Mapping of the NSW Western Division identifies 12 different land systems on Toorale, reflecting high landscape and ecosystem diversity (see Appendix A) (Walker 1991).

The land systems present on Toorale range from old erosional surfaces of undulating downs, through to sand plains and dunefields of windblown origin, and also the recently deposited alluvial floodplains of the Louth Plains. Toorale's highly varied topography and geomorphology have enhanced the park's habitat richness by creating a variety of transition zones between ridges and floodplains, and between the riparian strips, floodplains and extensive temporary lakes (or dry lake beds).

### **3.1d NSW landscapes (Mitchell landscapes)**

Toorale contains a high diversity of Mitchell landscapes that is reflected in the wide range of plants and animals recorded on the property. Eight Mitchell landscapes are represented within Toorale (see Appendix B).

### **3.1e Scald reclamation areas**

Scalds are extensive bare areas where topsoil has been eroded (due to a combination of drought and total grazing pressure) leaving a clayey subsoil that is often saline (salty) and relatively impermeable to water. Along with most properties in Western New South Wales, Toorale suffered extensive scalding during the drought years of the early 20th century (Gowans et al. 2012).

Approximately 1200 hectares of Toorale were subject to scald reclamation works between 1992 and 2004, prior to reservation of the park. These scald reclamation activities involved constructing 1386 circular or horseshoe-shaped water ponds to pool water over the surface of the scald (see Figure 5). Some of Toorale's water ponds were seeded with combinations of old man saltbush (*Atriplex nummularia*), river saltbush (*Atriplex rhagodioides*), bladder saltbush (*Atriplex vesicaria*), bambatsi panic (or Makarikari panic) (*Panicum coloratum* var. *makarikariense*) and buffel grass (*Cenchrus ciliaris*) (P Thompson pers. comm., in Gowans et al. 2012).

The aim of water ponding is to allow water to infiltrate the soil in order to leach out salts and to crack the surface, thereby improving soil conditions for plant establishment and growth. Water ponding is regarded as the most successful technique of scald reclamation (Cunningham 1970; Cunningham et al. 1976). Limited work on the introduction of improved pastures behind ponding banks has, however, demonstrated there may be little value in this work compared with allowing natural colonisation by pastures from surrounding areas (Gowans et al. 2012).

Many of Toorale's scald reclamation sites are in areas on the western floodplain (see Section 3.2) that were inaccessible during the 2011 vegetation survey (Gowans et al. 2012). Those that were surveyed showed good coverage of native species, and species endemic to the area have established at the expense of seeded species. Photographic evidence indicates the scald rehabilitation appears to have been successful, however, a more detailed assessment is recommended when conditions allow (Gowans et al. 2012).



**Figure 5. Scald reclamation area showing water ponding trials**

Photograph taken approximately 5 kilometres downstream of Booka Dam on the western side of the Warrego River  
(Photo: J Smith, 10 March 2012)

### **3.1f Catchment values**

Toorale sits within the Western Local Land Services boundaries. *Western Local Strategic Plan 2016–2021* (Western LLS 2016) specifies catchment and management targets that address key natural resource management issues in this catchment area.

### **3.1g Geological and landscape values significant to Aboriginal culture and heritage**

The land around the lower Warrego River is a highly significant part of the cultural landscape of the Kurnu-Baakandji Aboriginal People. The Country between the Warrego and Darling rivers is central to creation stories and traditional cultural practices.

A preliminary assessment of Toorale's cultural values was conducted in 2009 (Aurecon 2009) and various site-specific surveys have been conducted in conjunction with Kurnu-Baakandji People. These surveys have indicated numerous geological and landscape values of Aboriginal cultural heritage including stone artefacts, scatters and a silcrete quarry and associated tool grinding and manufacturing area (Aurecon 2009). More information on cultural values is contained in Section 3.5.

### **Issues**

- The majority of the park is floodplain and therefore raised landscape features such as Mount Talowla and Mount Burragurry are highly significant components of the visual landscape.
- Accelerated soil erosion and sedimentation may occur as a result of management activities, development or other works.
- The megafauna fossil site is vulnerable to erosion, flooding, inappropriate visitation, fossicking, development and other ground disturbance. There is great potential for interpretation of the fossil material in Toorale National Park as it adds another dimension into the park's past.

- Further taxonomic assessment should be undertaken of the megafauna and an excavation of unexposed fossil deposits has the potential to reveal a great deal more.
- Aboriginal cultural landscapes and significant geological features may be impacted by inappropriate visitation, development or other works.
- Large areas of scald rehabilitation works provide an opportunity to measure the effectiveness of the technique on native vegetation recovery.
- An opportunity exists to improve knowledge of the geomorphic history of the region.

### **Desired outcomes**

- Areas of higher elevation such as Mount Talowla and Mount Burragurry are maintained free of developments that alter the skyline or viewscape.
- Severely degraded or eroded areas are rehabilitated, particularly those areas where threats to natural and cultural heritage values are greatest.
- Megafauna fossils and areas of special geomorphic significance are protected from inappropriate access and use.
- Understanding of the megafauna fossil sites uncovered at Toorale is improved.
- Understanding of the geomorphic (landform) history of the region is improved, forms the basis of management actions and, where appropriate, is presented to the wider community for education and interpretive purposes.
- The scenic and cultural values of the park are protected.

### **Management response**

- 3.1.1 Maintain the visual amenity of Mount Talowla, Mount Burragurry and the surrounding landscape.
- 3.1.2 Where practical, reduce accelerated soil erosion by controlling unnatural factors that could cause erosion (e.g. pest animals, impacts from earthmoving works).
- 3.1.3 Minimise erosion and/or impacts on the geomorphology and landscape features when constructing or maintaining roads, tracks, trails and facilities.
- 3.1.4 Plan and manage visitation to minimise impacts on Aboriginal cultural landscapes, megafauna fossil sites and significant geological and cultural features.
- 3.1.5 Investigate opportunities for further research on the megafauna fossil sites. Research will be undertaken in consultation with the Kurnu-Baakandji community, relevant experts and universities. Opportunities exist to work with research groups and other agencies to develop appropriate site protection and recognition, and to undertake monitoring, fossil collection, storage and interpretation.
- 3.1.6 Encourage or undertake a more detailed assessment of the scald rehabilitation areas. Where appropriate, scald reclamation techniques may be used in other parts of the park.
- 3.1.7 Encourage research on geological and landscape values that will inform management decision-making, education or interpretation.



## **3.2 Rivers, wetlands and water for the environment**

### **3.2a The Warrego and the Darling**

The Warrego and Darling rivers meet in the south-west of Toorale just upstream of Akuna Homestead (near Louth) (see Figure 1). Between them, the catchments of these rivers comprise 21% of the Murray–Darling Basin. Collectively they provide less than 5% of catchment flows (MDBA 2016).

The Darling River is the longest river in Australia and flows for about 2750 kilometres from its upper catchment in the Great Dividing Range (e.g. around Tamworth, Toowoomba and Roma) to its junction with the Murray River in south-west New South Wales (DPI Water 2015a). It flows from the north-east to the south-west of the park and forms Toorale's southern boundary (see Figures 1 and 2). At this point in the Murray–Darling Basin it is part of the Barwon–Darling Catchment, which makes up about 13% of the Murray–Darling Basin (MDBA 2016). The Barwon–Darling is unregulated, except for some low-level weirs near townships, but many of the tributaries of the system are highly regulated.

The Barwon–Darling corridor connects all the rivers, lakes and wetlands in the northern Basin; and then provides a connection to the southern Basin through the lower Darling River. The river system provides habitat during dry periods and travel pathways in the semi-arid inland. There are many billabongs and lagoons along the Barwon–Darling corridor, as well as lakes and wetlands on the floodplains, that provide major bird breeding sites (MDBA 2016).

The Warrego River's headwaters are just south of Ka Ka Mundi in the Carnarvon Ranges near Tambo in south-west Queensland. It flows south for around 800 kilometres, where it joins the Darling River in Toorale (DPI Water 2015b). It is essentially an episodic (intermittent) stream with flow varying with season and rainfall. The river ranges from major floods every 5 years or so, to extended periods with little or no flow. Only sporadically do substantial volumes of water flow down the Warrego to reach the Darling River (Cox et al. 2012).

The river is largely unregulated, with the exception of the Cunnamulla (Allan Tannock) Weir that diverts water for irrigation and town supply (MDBA 2016). Some water is also taken from the river by diversion of flow or overland flows. When the river is not flowing it forms a chain of permanent waterholes providing critical refuge for fish and waterbird populations (MDBA 2016). The wetlands of the Warrego and adjacent Paroo rivers are considered the most important area for waterbirds in the Murray–Darling Basin (MDBA 2016).

### **3.2b Altered water flows on Toorale**

Most of the alterations to water flows that existed before the 1860s were undertaken by Sir Samuel McCaughey, the owner of Toorale Station from 1880–1912 (see Section 3.6). McCaughey pioneered large-scale irrigation of native grasses, and his groundbreaking work involved the construction of in-stream storages (block banks or dam walls), flow diversion works, levee banks, training embankments, pumps and irrigation channels. McCaughey's aim was to maximise the storage of water on Toorale and to divert and retain water on floodplain pasture areas to support pastoral and agricultural activities, in particular to improve pasture.

Works were also carried out by other owners before and after McCaughey's time. These include the original construction of Peebles Dam in the 1870s to divert water from the Warrego River to Ross Billabong, and during the 1980s a higher and longer version of Peebles Dam was constructed to support the former irrigated cropping area.

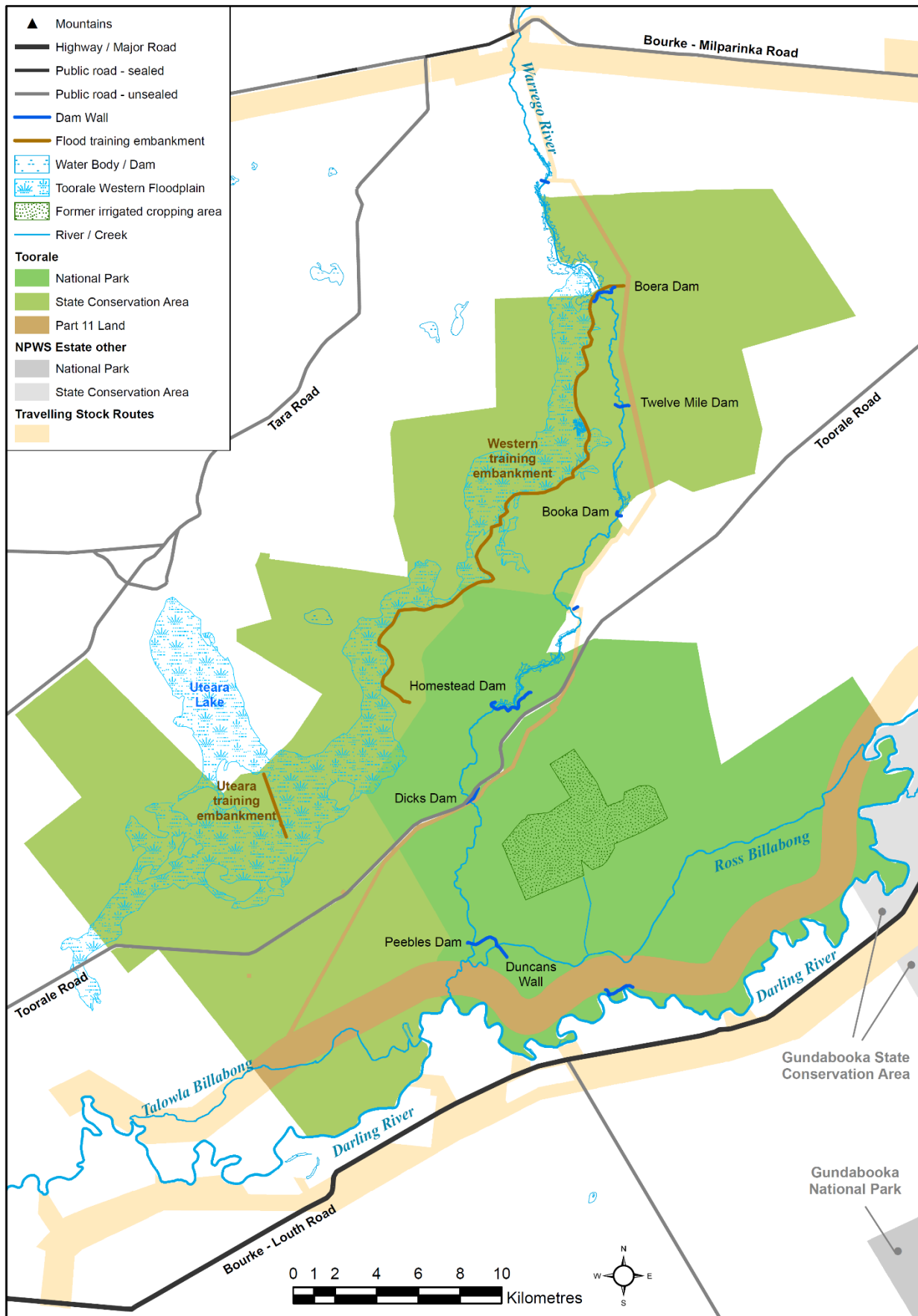


Figure 6. Toorale's water infrastructure

These structures have significantly altered the flow of this part of the Warrego for over 100 years. Modifications to these dams or how they operate may change the duration, extent or spread of flooding events.

At acquisition, Toorale had six major storages in varying state of repair along the Warrego as well as a large storage, Ross Billabong, fed by both the Darling and the Warrego. Together these structures originally provided approximately 14,000 megalitres (ML) of on-site water storage. There are also two training embankments west of the Warrego. Water management infrastructure is shown in Figure 6 and discussed further below.

### **3.2c The Warrego River on Toorale**

Prior to construction of dams on Toorale, the Warrego River would most likely have comprised a series of billabongs which would have been connected during moderate to high flows. During drought years, all but a few of the larger billabongs would have been dry for extended periods, and under extreme droughts the river would have completely dried. During high-flow events the river would have broken its banks, flooding the broader floodplain areas and stimulating rejuvenation of the floodplain ecosystems and ephemeral wetlands.

A study of recent Warrego River flooding on Toorale recorded 10 significant floods between 1988 and 2010 (Cox et al. 2012). These floods inundated about 13,000 to 40,000 hectares, and persisted on the western floodplain for up to 176 days (over 6 months). Floods that travel from the Warrego River to the western floodplain are often sufficient to reach the Darling River or return to the Warrego, most frequently near Booka Dam (Cox et al. 2012). The western floodplain also receives floodwaters that back up from the Darling River during high-flow flood events.

Outside of these significant floods however, the Warrego also receives low and medium flow events. It is these flows in particular that have been and are influenced by the 'Boera Dam and Toorale Floodwaters Scheme' which involved the construction of a series of block banks (dam walls) across the Warrego River channel in the late 19th century.

#### ***Dams along the Warrego***

There are six dams along the Warrego in Toorale. From north to south, these are (see Figure 6):

- Boera Dam
- Twelve Mile Dam (breached)
- Booka Dam
- Homestead Dam (also known as Keernie Dam) (breached)
- Dicks Dam
- Peebles Dam (breached).

To varying extents each of the dams retain silt deposits upstream of the dam walls. It is likely that deposits may be greater than 2 metres deep in some locations and this reduces storage capacity and biodiversity values. Appendix C includes a detailed description of each of the dams.

**Boera Dam**, in the northernmost part of the park, is the most significant. Taking advantage of a natural narrowing or choke in the river, the construction of Boera Dam increased the capture of water at this site. This reduced downstream flows in the Warrego River channel during low to moderate flow events and increased the water pushed onto the western floodplain of the Warrego by way of its bywash, enabling increased flows to spill out to the western floodplain (see Figure 6). With over 100 years of diversions, the western floodplain is now a vast wetland

ecosystem encompassing nearly 30,000 hectares on Toorale and adjoining properties. Any modifications to Boera Dam must consider any potential impacts on natural and cultural values, in particular any potential reduction of wetland values on the Warrego floodplain.

### ***Training embankments along the Warrego***

There are two other major structures that direct water flow on Toorale's western floodplain: the western training embankment and Uteara training embankment (see Figure 6).

The **western training embankment** is a levee or training bank that runs parallel to the Warrego. The embankment is 1–2 metres high and connects to the western side of the main Boera embankment and runs (intermittently) south-west for approximately 17 kilometres. The training bank's purpose is to prevent water that has spilled to the western floodplain from returning to the Warrego River. This training embankment also provides vehicle access to Boera Dam. Six gated pipes were installed within the training embankment to prevent the wall breaching during high flows. The gates would also pass flow back to the Twelve Mile and Booka dams for stock water replenishment in the era before pipes were installed at Boera Dam (i.e. pre-1965). These pipes were in disrepair when NPWS purchased Toorale, and the western training embankment now breaches during flood events and is subsequently repaired.

The **Uteara training embankment** runs adjacent to the neighbouring property Uteara Station. This structure is breached approximately 30 metres from the southern end of the embankment. Despite this, the embankment still facilitates a greater spread of water across the floodplain and into Uteara Lake. This is likely to increase the inundation area and duration of flood events on the upstream side of the embankment.

## **3.2d The Darling River at Toorale**

Like the Warrego, flows in the Darling are dependent on rainfall upstream and the timing, frequency and duration of flows influence river health and the health of the plant and animal communities it supports. Floods are highly significant for the communities on Toorale. As with the Warrego, Darling River floodwaters spread across large areas due to the relatively flat floodplain, and typically persist for a month or more (URS 2008). The Darling River floodplain is approximately 15 kilometres wide near Toorale and incorporates the lower Warrego River up to Toorale's Homestead Precinct. Often this occurs as a dry flood because the river rises and breaks its banks, spreading across the floodplain despite no rainfall having fallen locally.

Flooding of the Darling River floodplain near its confluence with the Warrego River can be caused by floodwaters from different sources, including southern and central Queensland, or from the north-western and central river valleys of New South Wales (URS 2008). There are no dams in the Darling where it flows through Toorale, however, a number of natural igneous rock bars divide up the river. One collection of these rocks is known as Hells Gate because the rocks made it difficult for paddle-steamers to pass. The Kurnu-Baakandji name for this area is *karnu yalpa* meaning 'many big rocks'. Some of these rock formations still bear the marks of dynamite detonations from the blasting out of these barriers to improve the passage for paddle-steamers. This practice was common throughout the Murray–Darling and has changed the flow of the river.

Another significant feature of the Darling in Toorale is Ross Billabong. A natural overflow channel of the Darling River (see Figure 6), the billabong channel breaks away from the Darling at the easterly end of the Toorale frontage (in the *karnu yalpa* many big rocks area) and then runs south-west, roughly parallel to the Darling and joins the Warrego just upstream of Peebles Dam. When the Darling River is in high flow, Ross Billabong crosses the Warrego River and re-enters the Darling River on the neighbouring property, Talowla, slightly upstream of where the western floodplain re-enters the Darling River.

Part of Ross Billabong was converted to a large water storage (dam) by the construction of a 2.84-kilometre long dam called Duncan's Wall and a block bank across an oxbow billabong at the Darling River end. This dam then filled either from natural high flows across the Warrego or Darling floodplain or by pumping water from the Darling River.

This water was used to supply water to 2064-hectares of former irrigated cropping area (see Figure 6) and its associated pumps and channels. Crops such as cotton and cereal (such as sorghum, wheat and grit corn) were irrigated. The area has not been irrigated since the time of purchase, but the former irrigated cropping area and associated water supply channels are still evident. The channels are a management concern because they support pests (see Section 4.1), are a safety risk and alter the pattern of floodwater flow across the floodplain.

### **3.2e Water-dependent values on Toorale**

Toorale supports a range of flood-dependent species and ecosystems including those which are culturally significant for the Kurnu-Baakandji and other Aboriginal people. Floodplain, waterway and riparian plant communities in and along the Warrego and Darling rivers have developed in response to the wetting and drying cycles they experience, and this is predominantly due to wetting by floods rather than local rainfall.

Soil wetting through flood events is essential for the life cycles of the longer-lived plants such as coolibah (*Eucalyptus coolibah*) and black box (*E. largiflorens*) which require specific inundation patterns for adult tree health, germination and seedling establishment. The close relationship between flooding and seedling recruitment is well known for a wide range of floodplain plants. Floods also provide the mechanism for connecting rivers, wetlands and floodplains that otherwise remain isolated under dry conditions. Isolation restricts the movement of nutrients, organic matter, water and biota (DSEWPaC 2013).

In Toorale and surrounding landscapes the pattern, spread and duration of flood events within floodplain, waterway and riparian communities has been altered by the development of water infrastructure. These developments commenced in the 1860s (Sheppard 2013) and flows have been diverted, modified and retained on Toorale in the intervening period of more than 100 years. During this time, native species and communities have become dependent on this altered regime of drying and wetting, as well as established climatic events. One of the fundamental changes resulting from these works was the expansion of vast wetlands to the west of the Warrego River; the western floodplain.

### **3.2f Environmental water, licences and entitlements**

At the time of purchase Toorale had a number of water licences. Under the provisions of the NSW Water Act, when Toorale was purchased its Warrego and Darling water licences were tied to the land. In other words, Clyde Agriculture could not sell the property's water entitlements and the land separately. Once water sharing plans for the relevant valleys were implemented (in 2011 and 2012), the water entitlements changed to water access licences under the NSW Water Management Act. This conversion allowed Toorale's significant water entitlements to be decoupled from the land.

In accordance with the NSW–Australian government funding arrangements, once Toorale was purchased ownership of the following water access licences was transferred to the Commonwealth Environmental Water Holder (CEWH):

- three separate licences to extract a total of 8106 ML from the Warrego River (from above Boera Dam, Boera Dam and Peebles Dam)
- a high-flow area-based licence to irrigate 1620 hectares, which was subsequently converted to a licence to extract 9720 ML from the Warrego River at Boera Dam
- five separate licences to extract a total of 7672 ML from the Darling River each year.



To put these volumes in perspective, the Warrego River's average annual volume is approximately 98,000 ML at Fords Bridge which is about 27 kilometres north of the park (this is based on OEH calculations for 1972 to 2012). Over the same period, the average annual discharge of the Darling River at Bourke was over 3 million ML (P Terrill [Office of Environment] 2013, pers. comm.).

These water access licences held by CEWH allow for the take of Commonwealth environmental water.

**Environmental water** is water that is allocated and managed specifically to improve the health of rivers, wetlands and floodplains.

CEWH directs NPWS to operate Toorale's water infrastructure so as to deliver the Commonwealth's water entitlements to environmental assets. The Australian Government has defined these environmental assets as:

That stretch of the Darling River between Toorale and the upstream influence of the Menindee Lakes scheme [and] the Warrego River channel and floodplain, including the existing storages, within Toorale (Australian Government 2012).

As such, management of water entitlements held by CEWH requires a cooperative relationship between the NSW and Australian governments. The use of Commonwealth-owned water entitlements is directed by CEWH in accordance with the provisions of the Commonwealth *Water Act 2007*. NPWS is required to operate water infrastructure on Toorale (e.g. regulator pipes at Boera and Booka dams) in accordance with licence conditions and has developed a 5-year environmental water use strategy that outlines operational procedures to facilitate this (Australian Government 2012).

In general, NPWS operates Boera Dam and Booka Dam regulators (pipes with valves) to pass water from the Warrego River to the Darling River. When there is flow entering a Warrego dam, NPWS must manually open the regulators in dam walls and leave them open until the flow reaches the Darling. Once CEWH has taken its environmental water allocation for the Darling, NPWS will open and close water infrastructure to maximise park management and/or downstream environmental outcomes. For example, the pipes may be closed to direct water onto the western floodplain. During medium to high flows both Boera and Booka dams are only accessible via adjoining private properties.

CEWH considers proposals from the NSW Government for the use of water in accordance with the *Basin Plan* (Murray Darling Basin Authority 2012) and CEWH's decision-making processes, and may approve a watering action where it is for the purpose of protecting or restoring environmental assets.

### **Cultural water**

Another important aspect of water management is access to water in the form of cultural flows. In 2009, Australia endorsed the United Nations Declaration on the Rights of Indigenous Peoples, which universally acknowledges Indigenous peoples' rights, including the following rights to water:

- the right to maintain their distinctive spiritual connection to water
- the right to access the resources required to maintain cultural heritage and undertake traditional practices
- the right to determine priorities and strategies for the development or use of their resources
- the right to conserve and protect the environment and the productive capacity of their lands, and
- the right to improve their economic and social conditions.

Cultural flows have been defined as:

water entitlements that are legally and beneficially owned by the Indigenous Nations of a sufficient and adequate quantity and quality to improve the spiritual, cultural, environmental, social and economic conditions of those Indigenous Nations (NCFRP 2010).

OEH supports the principles of cultural flows and will seek to work with the Kurnu-Baakandji People to pursue a cultural flow allocation.

### ***Licences and works approvals***

The Minister administering the National Parks and Wildlife Act has retained a number of relatively minor approvals for works (dams, diversion channels, bores, pumps and block banks) as well as various unregulated water entitlements for stock and domestic water in dams and bores. These approvals have conditions that limit the operation of the licence to a particular location and so prevent them from being separated from the land.

### ***Modifications to in-stream structures***

OEH and NPWS are working with the Commonwealth to determine appropriate modifications to Toorale's water infrastructure along the Warrego River and its floodplain. This may include decommissioning some dams or modifying others. Future works may provide opportunities to improve fish passage which is hindered during low to medium flows. The environmental benefits and impacts associated with any water infrastructure modifications require careful prior assessment.

### **Issues**

- Improvement of flows to values downstream of the park — by passing higher volumes of water through Toorale — needs to be balanced with the maintenance of key natural and cultural values on the park. The design and operation of in-stream structures must ensure:
  - maintenance of vegetation, including wetland condition on the western floodplain to conserve habitat and food availability for both terrestrial and aquatic species
  - the health and viability of important wetland communities and the species they support, including vulnerable blue-billed ducks (*Oxyura australis*) and brolgas (*Grus rubicunda*) and migratory species such as eastern great egrets (*Ardea modesta*), glossy ibis (*Plegadis falcinellus*) and the oriental pratincoles (*Glareola maldivarum*), including in-stream refugia and other habitat values
  - the heritage values of the Boera Dam and Toorale Floodwaters Scheme and the Toorale Homestead Precinct are conserved
  - access is available for visitor opportunities and the maintenance and protection of cultural and heritage values.
- Where in-stream regulating structures are retained for the delivery of Commonwealth water or the maintenance of park values, they require ongoing maintenance and operation.
- Access to Boera Dam and Booka Dam via neighbouring properties is required during periods of extended wet weather or during medium to high flows to operate regulators to deliver environmental water as directed by CEWH. These access arrangements need to be formalised.
- Without intervention, the breach at Homestead Dam and the bank wall will continue to erode during periods of high flow.

- Existing in-stream and floodplain structures are barriers to fish passage during low flows and some medium flows.
- There is an ongoing requirement for water to be supplied to the park through stock and domestic entitlements.
- Toorale's former irrigated cropping area and water supply channels modify floodplain water flows.

### **Desired outcomes**

- Water in the park is managed to maintain or improve the park's natural and cultural values (in particular, water-dependent ecosystems), and facilitate effective land management operations and amenity for visitors.
- Development, modifications and other works associated with in-stream structures have a net environmental benefit for natural and cultural values. Environmental and cultural impact assessments are conducted prior to any works or modifications.
- Water supply to the park for management purposes, including visitor facilities, is maintained.
- Cooperative relationships are maintained with water management authorities, neighbours and stakeholders.
- Access to Boera Dam and Booka Dam is available to regulate environment water.
- The importance of flooding and drying events to maintain key ecological processes is communicated to stakeholders, including authorities, neighbours and the community.
- Former cropping areas are allowed to revegetate.
- The impacts of riverbank subsidence and sedimentation are minimised.
- Where possible, significant cultural values are protected from flooding.
- Fish passage is improved.

### **Management response**

- 3.2.1 Operate water infrastructure in accordance with licence conditions, environmental water strategies, and, where required, CEWH instructions.
- 3.2.2 Ensure any modifications to in-stream water infrastructure maintain or improve the conservation values for which the property was reserved; are subject to environmental impact assessment and approvals; and are conducted in accordance with legislative requirements, including consideration of cultural values.
- 3.2.3 In making any changes to the watering frequency of the western floodplain or modifications to in-stream storages, consider the effect on habitat availability for wetland-dependent fauna, in-stream refugia and other habitat values, in particular the habitat values and plant communities of the western floodplain, threatened ecological communities, threatened plants and animals, and the maintenance of populations of culturally significant plants.
- 3.2.4 Work cooperatively with CEWO to facilitate delivery of the Australian Government's water entitlements to environmental assets and make representations to CEWO and DPI – Water regarding the delivery of CEWH's environmental water entitlements to environmental assets on Toorale.
- 3.2.5 Work with CEWH, DPI – Water, Kurnu-Baakandji JMC, neighbours and other interested parties to maintain or improve the condition and extent of Toorale's wetlands, floodplains and riparian zones.

- 3.2.6 Once CEWH has claimed its water allocation, operate water infrastructure to maximise park management and environmental outcomes (both within the boundaries of Toorale and further downstream) subject to licence conditions.
- 3.2.7 NPWS will seek to formalise agreements with Nulty Station and Booka Station owners to ensure staff and vehicle access to Boera and Booka dams is maintained for management purposes.
- 3.2.8 Maintain stock and domestic water entitlements.
- 3.2.9 Maintain and refurbish water infrastructure associated with surface and groundwater where appropriate.
- 3.2.10 Utilise water sourced from stock and domestic entitlements, including from the network of polyethylene pipe lines and tanks, to conduct pest control and fire management programs and to service visitor precincts and associated infrastructure as appropriate.
- 3.2.11 Review all existing off-stream ground tanks and rationalise them as appropriate to benefit effective park management.
- 3.2.12 Gather knowledge about water-dependent conservation values and the water requirements needed to maintain and improve these values.
- 3.2.13 Monitor native revegetation of the former irrigated cropping area, and supplement with native species plantings if required.
- 3.2.14 If needed, restore a more natural flow regime in areas modified by irrigated cropping infrastructure by modifying irrigation channel structures and/or their layout (see Section 3.3).
- 3.2.15 Where possible, ensure that any modifications to water infrastructure will improve fish passage.

### **3.3 Native plants and communities**

Toorale protects a diverse range of habitats of high conservation value. In particular, wetlands in a semi-arid environment provide habits that are otherwise absent from the landscape. Habitats in the park include riverine corridors of tall red gums along the Warrego and Darling, broad low woodlands and grasslands on the floodplains, low mulga woodlands on stony desert tablelands, and sandy plains and low hills with hophbush and turpentine. This diversity is evident in the classification of the park's vegetation into 27 plant community types.

Toorale also protects 284 native plant species (Gowans et al. 2012; Shelly et al. 2003; Kelly 2004; OEH 2015). In general, protecting a variety of vegetation types in parks provides a greater variety of habitats and ensures a higher level of biodiversity is supported. High habitat diversity within conservation reserves also provides greater resilience to the impacts of climate change. The large number and variety of communities found in Toorale highlights the importance of the park for biodiversity conservation in Western New South Wales.

#### **3.3a Vegetation communities**

The *NSW Vegetation Information System* (VIS) (OEH 2014b) is an integrated, hierarchical, information system. Broad vegetation formations and component statewide vegetation classes are described by Keith (2004). The finest-scale hierarchical units are 'plant community types'.

In May 2011 a comprehensive vegetation survey was undertaken in Toorale. In this study 27 plant community types were mapped as vegetation communities (Gowans et al. 2012) (see Appendix D). These correspond to 13 VIS statewide vegetation classes (see Table 1 and Figure 7). The survey was conducted after a period of high rainfall that was beneficial for plant growth,

but resulted in large areas of the floodplain being inaccessible. Further survey of these floodplain areas is therefore required (Gowans et al. 2012).

These communities are discussed below, grouped under the corresponding statewide vegetation class. Common plant names, where available, follow Gowans et al. (2012) and BioNet (OEH 2014b).

**Table 1. Statewide vegetation classes found in Toorale**

<b>Statewide vegetation class (from Keith 2004)</b>	<b>% of Toorale vegetation</b>
Riverine Chenopod Shrublands	43%
North-west Floodplain Woodlands	30%
Semi-arid Sand Plain Woodlands	11%
Sand Plain Mulga Shrublands	9%
Inland Floodplain Shrublands	8%
Western Peneplain Woodlands	7%
Gibber Transition Shrublands	3%
Stony Desert Mulga Shrublands	3%
Inland Floodplain Swamps	1%
Inland Rocky Hill Woodlands	1%
North-west Plain Shrublands	1%
Inland Riverine Forest	<1%

### ***Riverine Chenopod Shrublands***

Riverine Chenopod Shrublands includes the following vegetation communities:

- Chenopod Low Open Shrublands (floodplains)
- Anthropogenic Herbland/Crop.

Chenopod Low Open Shrubland (floodplains) is the most extensive vegetation community in Toorale, covering over 40% of the park. It is a highly variable community in both dominant life forms and species composition. Common chenopod subshrubs are flat-top saltbush (*Atriplex lindleyi*), tangled copperburr (*Sclerolaena divaricata*), cannonball burr (*Dissocarpus paradoxus*) and poverty bush (*Sclerolaena intricata*). In some places the community has a taller stratum of cotton bush (*Maireana aphylla*). In areas where shrubs are absent, the community forms a grassland of bunched kerosene grass (*Aristida contorta*), lovegrasses (*Eragrostis* spp.) and curly windmill grass (*Enteropogon acicularis*).

Riverine Chenopod Shrublands of the floodplains grow on slightly elevated rises on the alluvial plain. The pale clay soils are occasionally flooded and are prone to scalding, particularly when overgrazed and trampled by stock (Benson et al. 2010). Ponding structures have been constructed in the past to control scalding (see Section 3.1).

Wildflowers are abundant in spring. Carpets of daisies such as the common white sunray (*Rhodanthe floribunda*) grow with other showy herbs including goodenias (*Goodenia* spp.), tall mulla-mulla (*Ptilotus exaltatus* var. *exaltatus*) and bluebells (*Wahlenbergia gracilentia*). Native



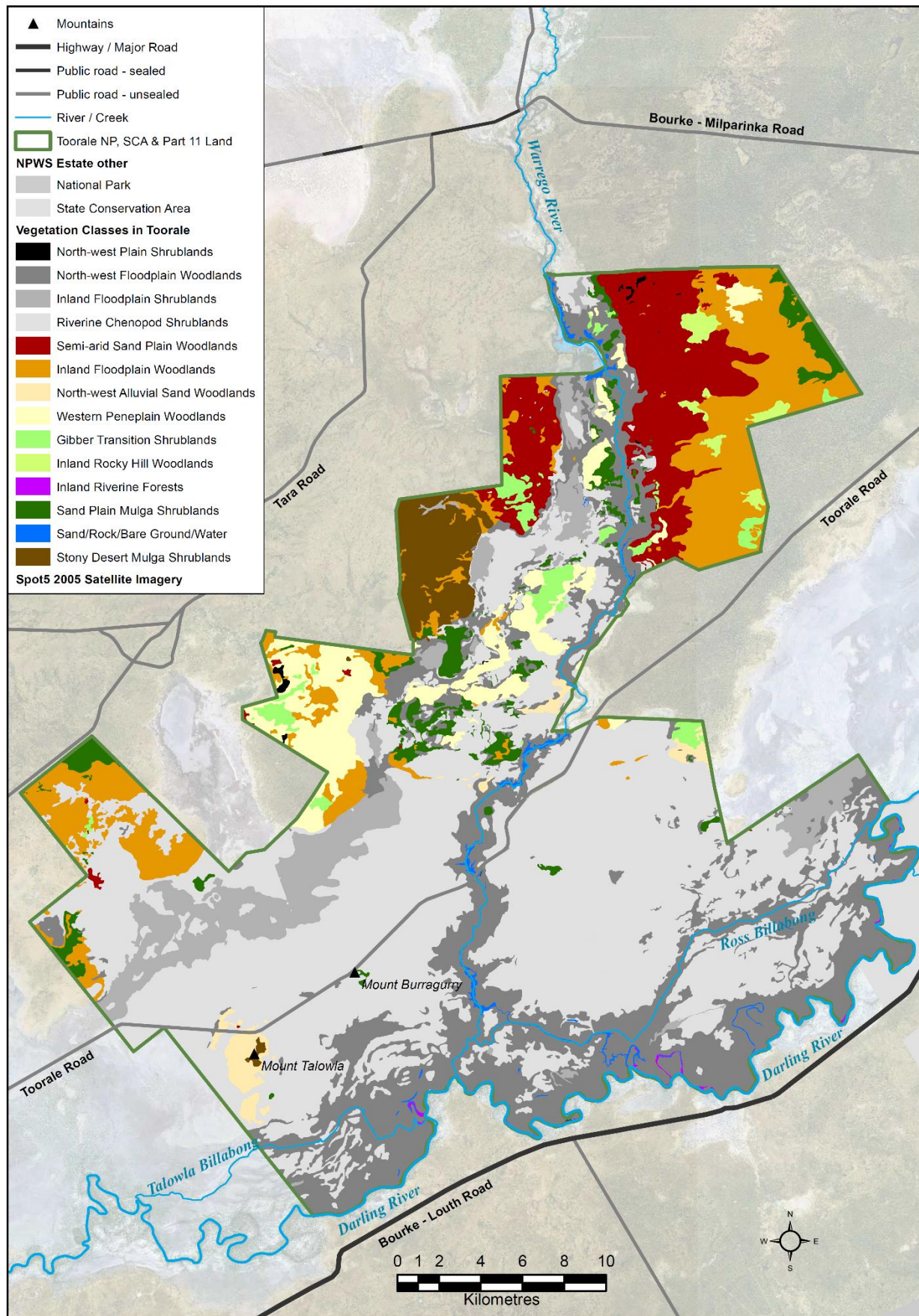


Figure 7. Statewide vegetation classes found in Toorale

creeping herbs — pink bindweed (*Convolvulus erubescens*), small crumbweed (*Chenopodium pumilio*), caustic weed (*Chamaesyce drummondii*) and pigweed (*Portulaca oleracea*) — fill the gaps between shrubs.

The Anthropogenic Herbland/Crop vegetation community is found in areas that have been significantly disturbed by past pastoral and irrigation activities, including previously cropped and irrigated paddocks, road verges, and areas around earth tanks, houses and infrastructure. These areas support a herbland of disturbance-responsive species.

An irrigated cropping area (see Figure 6) was created in the south-east section of Toorale in the 1980s. These paddocks were watered by a series of irrigation channels that were filled by pumping from the Darling River. This practice was discontinued when NPWS purchased the property and the water entitlements were transferred to CEWH. Without this artificial water supply there has been a gradual recovery of native plants. Pioneering native herbs and shrubs are colonising the remnants of the last sorghum (*Sorghum* sp.) crop. Natives include cannonball burr, buckbush (*Salsola kali* var. *kali*), pigweed, pop saltbush (*Atriplex holocarpa*), spreading saltbush (*A. limbata*), tangled copperburr and grasses. The presence of these species indicates the likely dominance of a Chenopod Low Open Shrubland prior to clearing for cropping. The presence of other species such as common nardoo (*Marsilea drummondii*), marsh millet (*Echinochloa inundata*) and knotweeds (*Polygonum* spp.) can be linked to the increased moisture regime.

At the time of purchase, with a crop having recently been harvested from the irrigated cropping area, active replanting or seeding of the cropping area was considered to help regeneration. With subsequent years of flooding carrying seeds onto the site, as well as natural recolonisation through windborne seeds and bird droppings, it is evident that native species will naturally revegetate this area. Species diversity and the percentage ground cover has rapidly increased between 2012 and 2016 (Andrew Wall [NPWS] 2016, pers. comm.).

A high number of exotic plant species are associated with the now defunct irrigation channels, with disturbance and sitting water favouring the weeds flaxleaf fleabane (*Conyza bonariensis*), African boxthorn (*Lycium ferocissimum*) and Noogoora burr (*Xanthium occidentale*). While the channels remain in place they will continue to be a source of invasion by moisture-dependent species and weeds with waterborne seeds because they hold ponded water for longer periods after rain (Gowans et al. 2012).

### **North-west Floodplain Woodlands**

The North-west Floodplain Woodlands encompass the following vegetation communities:

- Black Box Woodland Wetland
- Coolibah – River Cooba – Lignum Woodland Wetland
- Coolibah Open Woodland Wetland with Chenopod/Grassy Ground Cover
- Poplar Box Grassy Low Woodland.

The first three communities are all part of the Coolibah – Black Box Woodlands Endangered Ecological Community that is characterised by coolibah (*Eucalyptus coolibah* subsp. *coolibah*), and in some areas black box (*Eucalyptus largiflorens*).

Outer bends of the Darling and Warrego rivers and tributaries are lined by Coolibah Open Woodland. These woodlands extend onto the surrounding alluvial floodplains of grey, self-mulching clays. The structure of the floodplain vegetation varies from woodlands to very open, savannah-like, grassy woodlands with a sparse mid storey of shrubs and saplings. Woodlands characterised by black box or coolibah form mosaics with grasslands and wetlands. Other tree species may be present, including belah (*Casuarina cristata*), river cooba (*Acacia stenophylla*) and cooba (*Acacia salicina*).



Frequency and duration of overbank flooding events primarily determine which species grow in floodplain woodlands. The size and density of trees depend on the site's successional stage in relation to both natural and anthropogenic disturbances. Germination and growth of relatively dense cohorts of saplings, that thin naturally over decadal time scales, can be triggered by major floods. Any location may have been subject to a combination of disturbances (such as ringbarking, tree poisoning and partial clearing), all of which reduce tree density and determine the vegetation's current structure. The composition of the ground layer varies depending on past and present grazing pressure as well as climatic conditions and water regimes (NSW SC 2009).

Cooba, lignum (*Duma florulenta*) and nitre goosefoot (*Chenopodium nitrariaceum*) form a patchy, shrubby understorey to coolibah in wetter sites. Less frequently flooded areas have a chenopod understorey including nitre goosefoot, dillon bush (*Nitraria billardiensis*), pearl bluebush (*Maireana sedifolia*), thorny saltbush (*Rhagodia spinescens*) and various copperburrs (*Sclerolaena* spp.). Associated ground cover plants include comb chloris (*Chloris pectinata*), native millet (*Panicum decompositum*) and slender rat's tail grass (*Sporobolus creber*), and the weeds flaxleaf fleabane and burr medic (*Medicago polymorpha*).

On higher parts of the floodplain, black box becomes the dominant tree species over a mosaic of wetland and chenopod understorey species that characterise alluvial floodplains.

The other vegetation community in the North-west Floodplain Woodland vegetation class is Poplar Box Grassy Low Woodland. Poplar box (*Eucalyptus populnea* subsp. *bimbi*) grows in periodically flooded depressions on sand plains and alluvial plains. Shrubs are sparse or absent, and the ground cover of this community varies from almost bare to a dense cover of ephemeral species after flooding. Local variations in the understorey include those dominated by grasses — including common blown grass (*Lachnagrostis filiformis*), knottybutt grass (*Paspalidium constrictum*) and slender rat's tail grass — to those with chenopod subshrubs such as saltbush (*Atriplex leptocarpa* and *Atriplex stipitata*) and copperburrs. Following inundation, the ground is carpeted by common nardoo.

### **Semi-arid Sand Plain Woodlands**

The Semi-arid Sand Plain Woodlands vegetation class encompasses the Belah / Black Oak – Western Rosewood – Leopardwood Low Open Woodland vegetation community.

On dryland areas in the north of Toorale, red sandy rises and sand plains support extensive woodlands of belah / black oak (*Casuarina cristata* / *Casuarina pauper*), a subspecies of western rosewood (*Alectryon oleifolius* subsp. *canescens*) and leopardwood (*Flindersia maculosa*). In many places these species grow as part of a mosaic with either poplar box, ironwood (*Acacia excelsa*) or mulga (*Acacia aneura*). The understorey is highly variable and generally shrubby. Prickly wattle (*Acacia victoriae*), turpentine bush (*Eremophila sturtii*) and pimelea daisy bush (*Olearia pimeleoides*) are common, with the occasional warrior bush (*Apophyllum anomalum*). Associated trees include wilga (*Geijera parviflora*) and sugarwood (*Myoporum platycarpum*).

### **Sand Plain Mulga Shrublands**

The Sand Plain Mulga Shrublands vegetation class encompasses the following vegetation communities:

- Hooked Needlewood – Needlewood – Mulga – Turpentine Bush Open Shrubland
- Narrow-leaved Hopbush – Scrub Turpentine – Senna Shrubland
- Sand Plain Mulga Tall Shrubland
- White Cypress Pine – Mulga Shrubland.

Elevated plains of red sand and sandy loams along the western and far north-east boundaries of Toorale support mulga-dominated shrublands. Associated shrubs are typical of the red country, and include cabbage tree wattle (*Acacia cana*), narrow-leaved hopbush (*Dodonaea viscosa* subsp. *angustissima*), turpentine bush, emubush (*Eremophila longifolia*), dead finish (*Acacia tetragonophylla*) and Ivory's hakea (*Hakea ivoryi*). The ground layer is predominantly grassy, however, a diversity of herbs and small shrubs have also been recorded in this community (Gowans et al. 2012). Common grasses are bunched kerosene grass, Jericho wiregrass (*Aristida jerichoensis*), *Enneapogon nigricans* and woollybutt (*Eragrostis eriopoda*).

A tall shrubland also forms part of the dryland mosaic. It is dominated by narrow-leaved hopbush and turpentine bush, that colonise areas following disturbance, along with dead finish and prickly wattle. This community may be growing where vegetation has been previously cleared, and reducing total grazing pressure will allow perennial overstorey species to recolonise (Benson et al. 2010). The presence of buffel grass in the understorey supports the likelihood of past disturbance.

A restricted community growing in the north-east corner of the park is characterised by an overstorey of needlewood (*Hakea leucoptera*). Associated shrubs include mulga, cabbage tree wattle, dead finish and tar bush (*Eremophila glabra*).

Also restricted to the north-east of Toorale is a small patch of woodland dominated by white cypress pine (*Callitris glaucophylla*). This community fits within the White Cypress Pine – Mulga Shrubland statewide vegetation type (OEH 2013d). Ironwood and gidgee (*Acacia cambagei*) grow with white cypress pine in this area, along with narrow-leaved hopbush and turpentine bush. The understorey is grassy with scattered low chenopod shrubs. White cypress pine relies on rainfall events and rainfall patterns to stimulate regeneration. Seasonality of rainfall is important to germination together with prolonged periods of above-average rainfall. Provided that grazing levels are low, regeneration from such rainfall events may be successful. Regenerating populations rarely survive under grazing (Westbrooke, cited in Gowans et al. 2012).

### **Inland Floodplain Shrublands**

The Inland Floodplain Shrublands vegetation class encompasses the following vegetation communities:

- Lignum Shrubland Wetland
- Canegrass Swamp Tall Grassland Wetland
- Eurah Shrubland
- Lignum Fuchsia Shrubland
- River Cooba Swamp Wetland.

Lignum Shrubland Wetland covers around 6% of Toorale. Large areas of it are found on the western floodplain and localised patches grow on the Darling River floodplain. Lignum forms dense thickets if inundation persists, but can also have an open structure. Common nardoo, lesser joyweed (*Alternanthera denticulata*), sedges (e.g. *Cyperus difformis*) and rushes (*Juncus* spp.) provide a dense ground layer during wet times.

Small, confined swamps dominated by cane grass (*Eragrostis australasica*) have formed in periodically flooded, non-cracking clay pans and drainage depressions.

Eurah Shrubland is potentially a derived community where woodlands have been degraded or cleared. The largest stand of this community on Toorale occurs to the east of the Warrego River, near the original Boera Homestead site. The understorey is predominantly grassy and

contains some wetland species, including pale spike-sedge (*Eleocharis pallens*) and common nardoo.

Lignum fuchsia (*Eremophila polyclada*) has a similar habit to lignum, and is conspicuous when flowering due to its abundance of characteristic white emubush flowers. It forms discrete patches within the floodplain Chenopod Shrublands and retains some of the surrounding subshrubs in the understorey. The presence of lignum indicates this community may grow in slight depressions.

### **Western Peneplain Woodlands**

The Western Peneplain Woodlands vegetation class encompasses the following vegetation communities:

- Beefwood/Coolibah Woodland
- Ironwood Woodland.

Western Peneplain Woodlands are dominated by coolibah and beefwood (*Grevillea striata*) and occur on the elevated plains west of the Warrego River, south of Boera Dam. The community consists of a mix of typical dryland and floodplain species. The species composition has probably been influenced by the regulated flow of the Warrego River and the diversion of bywash from Boera Dam to the western floodplain. The common shrubs are typically dryland species (prickly wattle and turpentine bush) with an understorey of climbing saltbush (*Einadia nutans*) and ruby saltbush (*Enchylaena tomentosa*). The presence of coolibah in this dryland community suggests floodwaters from the surrounding floodplain have regularly inundated the peneplain. Characteristic wetland plants also occur in the understorey, including lesser joyweed and common joyweed (*Alternanthera nodiflora*), river mint (*Mentha australis*) and sesbania pea (*Sesbania cannabina*). Under natural circumstances, this community would not experience inundation (Gowans et al. 2012), so these species would not typically be present.

Several weed species occur in this woodland: Mexican poppy (*Argemone ochroleuca* subsp. *ochroleuca*), Mediterranean turnip (*Brassica tournefortii*), Maltese cockspur (*Centaurea melitensis*), flaxleaf fleabane, paddymelon (*Cucumis myriocarpus*), golden dodder (*Cuscuta campestris*) and Noogoora burr.

Ironwood-dominated Woodland covers around 3% of Toorale. It occurs on red-brown sandy plains, often as part of a mosaic with Belah / Black Oak – Western Rosewood – Leopardwood Low Open Woodland. Wilga, narrow-leaved hopbush, budda budda (*Eremophila mitchellii*) and turpentine bush characterise the shrub layer. Typical ground cover shrubs include grey copperburr (*Sclerolaena diacantha*), pin sida (*Sida fibulifera*) and desert goosefoot (*Chenopodium desertorum*) occasionally growing with grasses.

### **Gibber Transition Shrublands**

The Gibber Transition Shrublands vegetation class encompasses the following vegetation communities:

- Gidgee Chenopod Woodland
- Whitewood – Western Rosewood Low Woodland.

Gidgee and occasionally whitewood (*Atalaya hemiglauc*) form a tall shrubland on Toorale's transitional red sands and clay. The shrub layer is sparsely vegetated by prickly wattle, turpentine bush and budda. The ground layer comprises grasses and smaller chenopods including ruby saltbush, crown fissure-weed (*Maireana coronata*), black cotton bush (*Maireana decalvans*), wingless fissure-weed (*Maireana enchylaenoides*), grey copperburr and poverty bush.

Prevalent shrubs in the Whitewood – Western Rosewood Low Woodland vegetation community include turpentine, prickly wattle and shrubby rice-flower (*Pimelea microcephala* subsp. *microcephala*). The ground layer comprises the tufted perennial grass *Enneapogon nigricans*, and a range of small chenopod shrubs. A relatively large patch of this community occurs on the stony tablelands at Mount Talowla. The community is generally found on higher elevations, but has been mapped at Toorale on the alluvial plains to the west of the Warrego River, to the west of Homestead Dam on the Warrego back plains, and on plains to the north-west of Mount Talowla (Gowans et al. 2012). The shrubby components of this community are particularly affected by grazing and browsing by goats, and require respite from these impacts in combination with favourable seasons to allow for regeneration.

### **Stony Desert Mulga Shrublands**

The Stony Desert Mulga Shrublands encompass the Chenopod Low Open Shrubland (stony rises) and the Mulga Shrubland on Stony Rises vegetation communities.

Stony ridges in the dryland along the north-west boundary of Toorale support a mulga shrubland with a predominantly grassy understorey of bottle washers (*Enneapogon avenaceus*) and common blown grass.

Another Chenopod Low Open Shrubland occurs on the stony rises of Mount Talowa and Mount Burragurry. It is possible this community once supported a sparse overstorey of mulga and could be a variant of the Mulga Shrubland previously described (Gowans et al. 2012). The low shrubland includes black cotton bush, tangled copperburr and short-winged copperburr (*Sclerolaena brachyptera*). Various other chenopod subshrubs are common, along with forbs such as velvet potato bush (*Solanum ellipticum*), quena (*Solanum esuriale*) and long tails (*Ptilotus polystachyus* var. *polystachyus*).

### **Inland Floodplain Swamps**

The Inland Floodplain Swamps vegetation class encompasses the Shallow Freshwater Wetland Sedgeland vegetation community.

The periodically waterlogged floodplains are interspersed with localised swamps, ephemeral wetlands and stream levees. Areas associated with semipermanent water support a wetland of pale spike-sedge, rushes, pale knotweed (*Persicaria lapathifolia*) and common nardoo. A range of ephemeral species also occur following inundation. Lignum and coolibah are present where wetlands merge into the surrounding floodplain vegetation.

### **Inland Rocky Hill Woodlands**

The Inland Rocky Hill Woodlands vegetation class is categorised as Gum Coolibah Woodland in Gowans et al. (2012).

Aeolian (formed by wind) dunefields of calcareous red earths and sands in Toorale's north-east contain patches of gum coolibah (*Eucalyptus intertexta*) woodland. Low trees of gum coolibah and poplar box grow with a relatively dense shrub layer, commonly including turpentine bush and other *Eremophila* species. Ground cover is generally sparse and is dominated by pimelea daisy bush, ruby saltbush, desert goosefoot and the speargrass *Austrostipa acrociliata*.

### **North-west Plain Shrublands**

The North-west Plain Shrublands vegetation class encompasses the following vegetation communities:

- Leopardwood Low Woodland
- Supplejack Woodland.

Small patches of woodland dominated by supplejack (*Ventilago viminalis*) grow on Toorale's red sand plains. A corresponding vegetation type has been described at Gundabooka National Park. Supplejack originates as a vine that twines around the nearest stem to form a twisted multi-trunked tree and is frequently included as a component of other vegetation types. Where it occurs as the dominant species, supplejack grows with an open shrub layer of narrow-leaved hopbush, budda and turpentine. This community has a sparse, grassy ground layer of bunched kerosene grasses, erect kerosene grass (*Aristida holathera* var. *holathera*) and rat's tail couch (*Sporobolus mitchellii*).

Similarly, leopardwood is also usually part of a diverse dryland woodland and begins life as a tangled shrub superficially resembling African boxthorn. Leopardwood Low Woodland includes the native woody shrubs that characterise supplejack woodland, along with pimelea daisy bush and desert goosefoot.

### **Inland Riverine Forests**

The Inland Riverine Forests vegetation class encompasses the River Red Gum Tall to Very Tall Open Forest / Woodland Wetland vegetation community.

The banks and internal river bends of the Darling River on Toorale are lined by a tall open forest of river red gum (*Eucalyptus camaldulensis*). The shrub layer may be absent or consist of occasional river cooba, lignum and eurah (*Eremophila bignoniiflora*). Understorey plants include Warrego summer grass (*Paspalidium jubiflorum*), rat's tail couch, and herbs such as twining glycine (*Glycine clandestina*), lesser joyweed, sneezeweed (*Centipeda cunninghamii*) and the ubiquitous exotic burr medic.

Some locations that have been unnaturally inundated through the formation of water storages (e.g. banks, dam walls, channels and embankments) have experienced changes in woodland composition. For example, river red gums have germinated on storage walls and large mature river red gums in permanently inundated areas have died. A reversal of this trend is likely at a number of other sites as inundation frequency and duration changes over time (i.e. tree death in areas no longer irrigated and germination of river red gums in other areas).

### **3.3b Vegetation condition**

Many of Toorale's vegetation communities have an intact structure and high plant diversity. Away from the highly modified former irrigated cropping area, there is generally a low level of invasion by exotic plants. In the 2011 vegetation survey (Gowans et al. 2012), two-thirds of the vegetation communities consisted of only native species.

Results from the survey partially reflect the exceptionally good growing conditions from 2009 to 2011 (Gowans et al. 2012). The number of ephemeral native species recorded, particularly herbs and grasses, is atypically high. The elevated benchmark will have implications for interpreting results of future vegetation monitoring assessments. Future lower species diversity may be attributable to a climate response, rather than park management activities.

Rainfall events in 2012 promoted the growth or regeneration of relatively high levels of ground cover over much of the area. Multiple-aged stands of dominant overstorey species also reveal that relatively good opportunities for tree regeneration occurred on Toorale between 2009 and 2012.

Two species — belah and western rosewood — did not regenerate well during this time. Individuals of belah and western rosewood are probably hundreds of years old and in various stages of senescence. Regeneration of these species may have been limited during this period as they rarely reproduce from seedlings but tend to sucker. Replacement of tree species by suckering is not desirable over the long term because population health and viability are maintained by the genetic variation created during seed production. Westbrooke (cited in

Gowans et al. 2012) states that 3 years of above-average rainfall combined with low grazing pressure would be necessary to give any chance of seed regeneration. The structure and floristic composition of these communities will be greatly altered if these key overstorey species are not replaced.

Grazing (most likely by feral goats) since the removal of livestock in 2008 was found to be the most widespread disturbance type. It was recorded in 25 communities, albeit with relatively low severity. Soil erosion was recorded in 11 communities and soil disturbance by feral pigs in 8 communities (Gowans et al. 2012).

### 3.3c Threatened ecological communities

Approximately 20% (approx. 18,600 hectares) of Toorale is vegetated by floodplain woodlands that are classified as the Coolibah – Black Box Woodlands in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions Endangered Ecological Community (referred to as the Coolibah – Black Box Woodlands EEC) listed under the Biodiversity Conservation Act (NSW SC 2012). These woodlands are also classified as Coolibah – Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions EEC under the Commonwealth Environment Protection and Biodiversity Conservation Act (TSSC 2011a). Three vegetation communities identified in Toorale are encompassed by the EEC.

### 3.3d Threatened and significant plant species

**Tiny teeth** (*Dentella minutissima*), is listed as endangered under the Biodiversity Conservation Act. It is a small-leaved, inconspicuous, mat-forming plant that was found in Toorale in 2013. Tiny teeth is ephemeral and germinates on mud flats and grey cracking clays following receding floodwaters. Populations in Toorale occur on the bed and banks of the Warrego River, in particular on the drying beds of the artificial water storages Boera Dam, Homestead Dam, Dicks Dam and Ross Billabong. It is likely to be present in other locations. On the edges of dry waterholes, tiny teeth is part of the understorey to coolibah, black box and cooba woodlands. Just prior to this recording at Toorale, a population was found at the nearby property. Before this, the species was only known to occur in New South Wales at Nocolche Nature Reserve (about 130 kilometres north-west of the park).

Tiny teeth is thought to be highly sensitive to disturbance within its wetland or riparian habitat (Porteners & Robertson 2003). Riverbanks and wetlands are highly vulnerable to the impacts of grazing by domestic and feral animals, such as trampling and soil disturbance. Clearing, irrigation and river regulation practices have restricted available wetland habitats, and changed flooding regimes have reduced its regeneration potential (Porteners & Robertson 2003). In Toorale, tiny teeth is found growing in areas subject to intermittent inundation.

Another threatened plant species, the endangered **squash bush** (*Osteocarpum scleropterum*), was found in the vicinity of Toorale in 1885 and '20 miles west of Bourke' in 1974 (ALA 2013). Squash bush is a dwarf subshrub that appears to be highly sensitive to grazing. It is probably dependent on poorly draining clay soils on low-lying land that is free from grazing pressure and other impacts of stock and native herbivores (Porteners & Robertson 2003).

Specific threats to squash bush include grazing and trampling by stock and feral animals, habitat degradation, and changes in water quality (particularly increased nutrients and sedimentation). Recommended conservation actions include fencing to prevent grazing, trampling and other disturbance, and reducing disturbance of riparian areas (OEH 2016).

Though not currently listed as threatened, **slender spurge** (*Synostemon trachyspermus*) (previously *Sauropus trachyspermus*) has conservation significance due to the rarity of recent collections. Slender spurge is a low-growing herb that is known from five locations on Toorale's

Warrego floodplain. Prior to discovery on Toorale in 2008, this species had not been collected in New South Wales for 50 years (IRH Telford [School of Environmental and Rural Sciences, University of New England] 2009, pers. comm., 7 August).

Strategies for the recovery of threatened species, populations and ecological communities have been set out in a statewide *Biodiversity Conservation Program* (OEH 2017a, formerly known as the *Threatened Species Priorities Action Statement*). 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 2013c). Individual recovery plans may also be prepared for threatened species to consider management needs in more detail.

The priority strategies to recover the Coolibah – Black Box Woodlands EEC are provided on the OEH website.

### **3.3e Vegetation watering requirements**

All vegetation communities occurring on the floodplains in Toorale rely on water. However, the required extent, timing, frequency and duration of inundation vary for each vegetation community (Gowans et al. 2012). Most communities on the floodplain will degrade if flooding does not occur (Gowans et al. 2012; Benson 2006; Benson 2008; Benson et al. 2010). But on the other hand, tree death can result from too much water remaining in an area for too long (Roberts & Marston 2000; TSSC 2011b). The ideal frequency of flooding varies between communities, however, ideal flooding frequency is not yet known for many of the communities or species in Toorale (Gowans et al. 2012).

For example, the Coolibah – Black Box Woodlands EEC has a requirement for flood inundation, however, the desired frequency of inundation varies for coolibah (one in every 10 to 20 years) and black box (one in every 3 to 5 years). Black box can tolerate reduced frequencies, such as one in every 7 to 10 years, so long as flood duration / inundation lasts for longer than 4–6 months (TSSC 2011a).

Under natural or unregulated conditions (i.e. prior to the 1880s), Toorale's western floodplain would likely have been inundated less frequently than the floodplain immediately surrounding the main river channel. The construction of Boera Dam and the training embankments over 100 years ago has influenced the flow of water down the Warrego. As described in Section 3.2, these structures have restricted and diverted water away from the Warrego River channel and created an artificially increased flow of water to the west of the river. This has affected the composition of vegetation communities, for example, floodplain flora are present in otherwise dryland (elevated) areas (Gowans et al. 2012).

Large areas of the floodplain were inaccessible during the May 2011 vegetation survey and condition assessment, and as such further assessments are required to determine the implications of the altered flooding regime in the western floodplain.

Vegetation in the riparian zone along the Warrego River may also be affected by reduced flows resulting from the restriction and diversion created by the dams (Gowans et al. 2012). The frequency and duration of inundation downstream of the dams has altered and influenced the recruitment of key riparian overstorey species (Gowans et al. 2012).

It is possible that shallow freshwater wetland sedgeland has increased due to permanent or semipermanent water bodies at Boera Dam, Dicks Dam and Ross Billabong. The persistence of these wetlands relies on continued flooding and inundation.

Any modifications to Toorale's water storage infrastructure may alter the patterns of inundation in Toorale's western floodplain and riparian areas; patterns that have been established over the

last 100 years. Careful consideration of the consequences of changes to inundation is necessary prior to the works being conducted.

### **3.3f Former irrigated crop areas**

As described in Section 3.2, a network of irrigated cropping paddocks covering approximately 2064 hectares was established on Toorale in 1982 (see Figure 6, Former irrigated cropping area). The irrigation area was cleared and the ground levelled and used for crops including cotton and cereals such as sorghum, wheat and grit corn. A series of irrigation channels, lower than paddock height, were installed to direct water to and around the irrigation paddocks. The levelling of paddocks to facilitate a prescribed hydrology may have reduced the soil seedbank and may potentially affect native species recovery. However, native pioneer species are returning to the former irrigation area and it is likely the absence of artificial water will lead to a gradual recovery of the original native species composition (Gowans et al. 2012).

#### **Issues**

- Introduced animal species are degrading vegetation condition in Toorale. Feral pig and goat control, particularly following high rainfall events, will maximise the potential for native plant recovery over following seasons.
- Anecdotal reports suggest that stock grazing on Toorale was light prior to gazettal of the park. However, evidence exists that total grazing pressure has impacted vegetation structure and floristic diversity in the past, and that past grazing is still impacting Toorale (Gowans et al. 2012). Natural processes will allow recovery from the effects of historical grazing providing total grazing pressure is minimised.
- The endangered plant tiny teeth has recently been found on Toorale in association with receding floodwaters of the Warrego River and its storages. It is thought to be highly sensitive to disturbance. It is susceptible to damage from grazing by native and feral herbivores and trampling by hard-hoofed animals such as goats. This species is also likely to be at risk from altered flooding regimes. Tiny teeth is growing in the vicinity of potential infrastructure modification works.
- Slender spurge is a rare species that has only been recorded in a relatively small number of locations and its requirements for inundation are not currently known. Germination is likely to depend on flooding and is therefore likely to be susceptible to altered flooding regimes.
- Little is known about the occurrence of the endangered squash bush on Toorale, nor about its requirements.
- Increased flooding and changed water levels have altered the floristic composition and structure of communities in some areas of Toorale. Further detailed and targeted assessment is needed to determine the impacts of past and future water regulation on Toorale's vegetation communities.
- Appropriate watering of Toorale's western floodplain will need to be negotiated with CEWO to ensure that the condition of high conservation value native plants and communities is maintained or improved.
- The former irrigated cropping area and irrigation channels have created an artificial hydrology that has the following potential impacts on flora values:
  - promoting the establishment of river red gum and wetland vegetation in areas unlikely to support these communities without water supplements
  - impounding areas that would have been only periodically flooded in the past and leading to the degradation of floodplain woodlands and death of individual plants due to prolonged inundation – poorer canopy health is evident in localised areas of coolibah woodland on the Warrego floodplain (Gowans et al. 2012)



- potentially restricting flow across floodplains, reducing the watering of vegetation that needs occasional inundation
- promoting the establishment and spread of pest plant species.
- Permanently marked vegetation survey sites have been established and can be used for ongoing assessment of vegetation changes due to management activities. Analysis of future monitoring data should consider the implications that favourable climatic conditions had on the benchmarks set by the 2011 vegetation survey (Gowans et al. 2012). Additional sites may be required in wetland areas unable to be surveyed in 2011.
- The former irrigated cropping area appears to be regenerating naturally with a return of native pioneer species. Triggers for active revegetation works can be linked to periodic monitoring of the native versus exotic species richness/cover in permanently marked vegetation sites.

### **Desired outcomes**

- Populations of plants and ecological communities of conservation significance are conserved.
- Negative impacts on threatened species and ecological communities are minimised.
- Threats to native plants and plants communities — such as pests and weeds, inappropriate fire, altered water regimes and climate change — are minimised (see Section 4).
- The habitat and populations of all threatened plant species are protected and maintained.
- Structural diversity and habitat values are allowed to re-establish in degraded areas.
- A greater understanding of the factors driving vegetation systems is achieved, including watering requirements for the ecosystems on Toorale's western floodplain.
- If found in Toorale, squash bush is conserved.

### **Management response**

- 3.3.1 Implement relevant strategies in the *Biodiversity Conservation Program* and recovery plans for any threatened species, populations or ecological communities that occur in the parks. Ensure threatened plant populations are appropriately considered in the planning for any construction works in and around existing irrigation infrastructure.
- 3.3.2 Support research into the watering requirements for vegetation communities, particularly on Toorale's western floodplain.
- 3.3.3 Monitor changes to vegetation (including vegetation condition). Prioritise vegetation surveys of previously unsurveyed areas.
- 3.3.4 Monitor the response of native vegetation to hydrological changes. The results will guide water management, including maintaining conservation values.
- 3.3.5 Allow degraded native vegetation to regenerate and intervene where necessary and practical.
- 3.3.6 Monitor the return of the former irrigated cropping area to a natural ecosystem.
- 3.3.7 Encourage research into native plant populations on Toorale.

### 3.4 Native animals

Toorale is a large, highly diverse park that protects a range of landscapes, soil types, vegetation communities and habitats, including dryland, wetland, floodplain and riparian areas. The variety of habitats is significant because, while native animals can occupy many habitats, some are restricted to one vegetation type, some use different habitats in different seasons, and others require one habitat type for shelter and another for food (Shelly et al. 2003). For example, red-tailed black-cockatoos (*Calyptrorhynchus banksii samueli*) roost and breed in large, old river red gums along the Darling River, however, they commonly feed in open plains and grasslands several kilometres from the river.

Toorale supports many threatened animals listed under the Biodiversity Conservation Act, Environment Protection and Biodiversity Conservation Act and *Fisheries Management Act 1994* (see Table 2). This includes 2 endangered and 16 vulnerable birds, 2 vulnerable mammals and 3 endangered reptiles. It is also likely that four aquatic species listed under the Fisheries Management Act inhabit Toorale's river systems.

**Table 2. Threatened and significant animals recorded in Toorale**

Common name	Scientific name	BC Act status	FM Act status	EPBC Act status
<b>Reptiles</b>				
Interior blink snake	<i>Ramphotyphlops endoterus</i>	E		
Leopard ctenotus	<i>Ctenotus pantherinus</i>	E		
Ringed brown snake	<i>Pseudonaja modesta</i>	E		
<b>Birds</b>				
Australian bustard	<i>Ardeotis australis</i>	E		
Barking owl	<i>Ninox connivens</i>	V		
Black falcon	<i>Falco subniger</i>	V		
Blue-billed duck	<i>Oxyura australis</i>	V		
Brolga	<i>Grus rubicunda</i>	V		
Eastern great egret	<i>Ardea modesta</i>			M <sup>1</sup>
Glossy ibis	<i>Plegadis falcinellus</i>			M <sup>1</sup>
Grey-crowned babbler (eastern subspecies)	<i>Pomatostomus temporalis temporalis</i>	V		
Grey falcon	<i>Falco hypoleusoc</i>	V		
Hall's babbler	<i>Pomatostomus halli</i>	V		
Hooded plover	<i>Thinornis rubricollis</i>	E		
Little eagle	<i>Hieraaetus morphnoides</i>	V		
Pink cockatoo	<i>Lophochroa leadbeateri</i>	V		
Oriental pratincole	<i>Glareola maldivarum</i>			M <sup>1</sup>
Painted honeyeater	<i>Grantiella picta</i>	V		
Pink cockatoo	<i>Lophochroa leadbeateri</i>	V		
Rainbow bee-eater	<i>Merops ornatus</i>			M <sup>1</sup>

Common name	Scientific name	BC Act status	FM Act status	EPBC Act status
Red-tailed black-cockatoo	<i>Calyptorhynchus banksii samueli</i>	V		
Shy heathwren	<i>Hylacola cautus</i>	V		
Spotted harrier	<i>Circus assimilis</i>	V		
Varied sittella	<i>Daphoenositta chrysoptera</i>	V		
White-fronted chat	<i>Epthianura albifrons</i>	V		
<b>Mammals</b>				
Little pied bat	<i>Chalinolobus picatus</i>	V		
Yellow-bellied sheath-tail-bat	<i>Saccolaimus flaviventris</i>	V		
<b>Fish <sup>2</sup></b>				
Murray cod	<i>Maccullochella peelii</i>			V
Olive perchlet	<i>Ambassis agassizii</i>		EP	
Purple spotted gudgeon	<i>Morgurnda adspersa</i>		E	
Silver perch	<i>Bidyanus bidyanus</i>		V	
<b>Mollusc <sup>2</sup></b>				
River snail	<i>Notopala sublineata</i>		E	

BC Act = Biodiversity Conservation Act; FM Act = Fisheries Management Act; EPBC Act = Environment Protection and Biodiversity Conservation Act.

E = endangered; V = vulnerable; EP = endangered population; M = migratory.

<sup>1</sup> These migratory species are also part of international agreements such as the Japan–Australia and China–Australia migratory bird agreements (JAMBA and CAMBA).

<sup>2</sup> These species are expected to inhabit the Warrego and Darling river systems.

Native animal surveys on sections of the property were conducted in 2003, 2004 and 2015 (e.g. Kelly 2004; Shelly et al. 2003). These surveys, along with other opportunistic sightings, have recorded 255 native animal species (although 7 are only identified to genus level), including 158 birds, 56 reptiles, 27 mammals and 14 frogs. The diversity of species, occupying a wide range of ecological niches (such as woodland birds, migratory wading birds, ground-nesters, hollow-nesters, burrowing and arboreal mammals) is significant and indicates the variety of habitat elements in Toorale.

A further 16 animals that have also been recorded on Toorale, while not currently listed as threatened species, are of conservation concern in the NSW Western Division. Generally these species are rare or have limited breeding opportunities in the Western Division (see Table 3).

Toorale supports a wide array of habitat elements, including leaf litter, woody debris, cracking soils and hollow-bearing trees. **Leaf litter** and **coarse woody debris** are important for many invertebrates, reptiles, amphibians, birds and some mammals. These habitat elements are present in most, if not all, of Toorale's vegetation communities.

**Hollow-bearing trees** are a valuable and often essential resource for many species as refuges from the weather and predators, and as safe sites for breeding. They are found in most of Toorale's woodland vegetation communities (Gowans et al. 2012). **Cracking soils** provide habitat for numerous invertebrates, reptiles and burrowing mammals.

**Table 3. Species that are rare or have limited breeding abilities**

Common name	Scientific name
<b>Reptile</b>	
Murray turtle	<i>Emydura macquarii</i>
<b>Birds</b>	
Australian pelican	<i>Pelecanus conspicillatus</i>
Bourke's parrot	<i>Neopsephotus bourkii</i>
Crested bellbird (southern)	<i>Oreoica gutturalis</i>
Australasian darter	<i>Anhinga novaehollandiae</i>
Great cormorant	<i>Phalacrocorax carbo</i>
Olive-backed oriole	<i>Oriolus sagittatus</i>
Pied cormorant	<i>Phalacrocorax varius</i>
<b>Mammals</b>	
Swamp wallaby	<i>Wallabia bicolor</i>
<b>Amphibians</b>	
Broad-palmed frog	<i>Litoria latopalmata</i>
Desert froglet	<i>Crinia deserticola</i>
Rough frog	<i>Cyclorana verrucosa</i>

Source: to be confirmed.

Of the park's 27 vegetation communities, 12 are floodplain communities and 15 are dryland communities. The **floodplain communities** cover around 67% (or 62,000 hectares) of Toorale, and the dryland communities about 33% (or 30,000 hectares) (Gowans et al. 2012). Utilisation of both of these areas by animals changes significantly over time and is tied to episodic events that can potentially be separated by decades, such as periods of inundation and drought. Toorale's 15 **dryland communities** are generally elevated relative to the rest of the landscape and therefore provide important flood refugia for all native animals. These dryland habitats are also particularly important for reptiles.

The **Aquatic Ecological Community in the Natural Drainage System of the Lowland Catchment of the Darling River** is listed under the NSW Fisheries Management Act as an endangered ecological community (FSC 2003). This aquatic endangered ecological community includes all native fish and aquatic invertebrates within all natural creeks, rivers, streams and associated lagoons, billabongs, lakes, flow diversions to anabranches and the floodplains of the Darling River within New South Wales, and incorporates the Warrego River. This habitat potentially provides refuge for a number of species listed on the Fisheries Management Act, including the endangered olive perchlet and purple spotted gudgeon; and the vulnerable silver perch. Murray cod may also be found in the lower reaches of the Warrego River.

A number of direct and indirect threats to native animals and their habitat values may occur to varying degrees in the park. A summary of existing threats to threatened species is provided in Table 4 (the table does not include those threats that were ameliorated by reservation of the land). Species other than those listed under the Biodiversity Conservation Act, along with the park's overall biodiversity, are also variously impacted by these threats. In order to retain the conservation value and long-term persistence of native species in the park, management will need to focus on reducing and controlling these threats. Threats are addressed in detail in Section 4.

**Table 4. Threats to threatened species recorded in or near Toorale**

<b>Threat</b>	<b>Threatened species affected (BC Act)</b>
Loss of wetland habitat through clearing, draining and/or groundwater extraction	Brolga, blue-billed duck
Predation by foxes and/or cats	Australian bustard, Hall's babbler, shy heathwren, white-fronted chat, little pied bat
Too-frequent burning of areas of habitat	Red-tailed black-cockatoo, barking owl, blue-billed duck
Regulation of river flows and water harvesting schemes pose a major threat to flooding regimes of wetland breeding areas; and/or habitat alteration due to modification of river flows and floodplains	Blue-billed duck, white-fronted chat
Overgrazing by introduced herbivores, in particular goats	Red-tailed black-cockatoo, painted honeyeater, pink cockatoo, hooded robin, Hall's babbler, grey-crowned babbler

Source: OEH 2012b.

As described in Section 3.3, strategies for the recovery of threatened species and populations have been set out in the statewide *Biodiversity Conservation Program*. Individual recovery plans may also be prepared for threatened species to consider management needs in more detail. Many of the priority actions to assist in recovery of Toorale's threatened species were accomplished through the reservation of the property.

### Issues

- Pest animal control is an important component in maintaining the condition of native animal habitat in Toorale (see Section 4.1).
- Improving knowledge of Toorale's native animals and their habitat requirements will assist in developing management strategies, such as strategies for pests and fire.
- The full suite of native animal species present in Toorale is not yet known. Nor is it understood how species composition in Toorale varies seasonally or in response to fire or the drought–flood cycle.
- There is evidence of historic firewood collection and vegetation clearing in the park (Gowans et al. 2012), in particular of the Coolibah – Black Box Woodlands EEC. Such historic activity means there may be a lack of important components of structural diversity in certain areas of the park (e.g. coarse woody debris and tree hollows).

### Desired outcomes

- Knowledge of Toorale's native animal assemblages and habitat requirements is increased.
- Conservation values of vegetation communities within the park are maintained or improved.
- Threats to native animals — such as pests, inappropriate fire, altered water regimes and climate change — are minimised (see Section 4).
- Development or other works have minimal impact on native animals and overall biodiversity.
- Structural diversity and habitat values are allowed to naturally regenerate/restore in degraded areas, and intervention is undertaken where practical.

- Opportunities for fish passage are maximised.

### **Management response**

- 3.4.1 Implement relevant strategies in the *Biodiversity Conservation Program* and recovery plans for threatened animal species and populations in the park.
- 3.4.2 Encourage research into native animal distribution, abundance and interactions.
- 3.4.3 Ensure environmental assessments are conducted for any development activities, including any proposed modifications to Toorale's water infrastructure.
- 3.4.4 Management of riverine habitats will support the maintenance and recovery of the lowland Darling River Aquatic EEC and its associated values. Where appropriate, consider reinstating large woody debris, removing artificial barriers and use of effective erosion control methods.

## **3.5 Aboriginal cultural heritage**

### **3.5a Aboriginal heritage**

Toorale supports a diverse assemblage of cultural material of both Aboriginal and pastoral origins. In addition to this, many Aboriginal people retain a strong cultural connection to Toorale as a station, as part of Country and as a park. While discussed separately in this plan, it is recognised that the practice of traditional Aboriginal customs and the maintenance of societal rules and beliefs overlaps with, and has continued through, the post-settlement era; thus creating a rich tapestry of shared history in Toorale. This history of complex relationships between people and environment is reflected in the current landscape and is significant to both Aboriginal and non-Aboriginal people.

Central to the ongoing management of Toorale is recognition of its importance as part of Country for Aboriginal people. Unlike the majority of lands within Kurnu-Baakandji Country, Toorale provides access to Country for the practice, renewal and creation of tradition, customs and cultural activities. This includes teaching children culture, holding culture camps and involving Aboriginal people in decision-making about how Country is managed. Toorale is especially important due to its location at the junction of the Warrego and Darling rivers, that are both of spiritual and cultural significance.

In managing Toorale, it is recognised that the cultural landscape of Aboriginal people is made up of all of Country. The land, water, plants and animals within a landscape are central to Aboriginal spirituality and contribute to Aboriginal identity. Aboriginal communities associate Country 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.

The name Baakandji comes from the word *paaka* meaning Darling River (Hercus 1993). So the Baakandji People belong to the Darling River and lands varying distances either side, from Bourke to Wentworth. The Baakandji community is divided into subgroups and Toorale falls into the Country of the Kurnu-Baakandji. To the north of Toorale is Murrawarri/Murawari Country and to the south-east is Ngemba/Ngiyampaa Country.

An interim joint management advisory committee was established in 2010. The formal Kurnu-Baakandji Joint Management Committee (JMC) was created in 2012 and is made up of 12 traditional owners and their families, along with a representative from NPWS. A memorandum of understanding (MoU) was signed in 2012 to formalise the working relationship between NPWS and the Kurnu-Baakandji People. The MoU ensures involvement of Aboriginal people in the protection and conservation of Toorale's important cultural values.

### 3.5b Aboriginal cultural material

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. NPWS will consult with and involve Aboriginal communities in managing Aboriginal sites, places and related issues, and in promoting and presenting Aboriginal culture and history.

Kurnu-Baakandji People have relationships with the landscape of Toorale, including the Darling and Warrego rivers, the red rocky rises of Mount Talowla and the red sand hills of the floodplains and river margins.

It is likely that they have lived on this Country for more than 30,000 years. This is based on studies undertaken in other parts of the Murray–Darling Basin, including a study in 1990 by Balme and Hope on the Willandra Lakes (situated adjacent to the Darling River). They found that Indigenous people have been living in the Murray–Darling Basin for about 36,000 years (Hudson, cited in Aurecon 2009). Although debate continues, human remains at Lake Mungo (further south along the Murray–Darling) are dated between 40,000 and 60,000 years old (Westaway & Hiscock 2005).

The long history of Aboriginal occupation of Toorale is clearly evident from the number of Aboriginal sites recorded. A number of specific cultural site surveys have been conducted on Toorale, including a preliminary heritage assessment and archaeological survey in 2009 (Hudson, cited in Aurecon 2009), a sample survey in 2009 (Martin 2010), and surveys of fence lines and tourist nodes (OzArk 2016; Martin 2010, 2012, 2013). Over 500 archaeological resources including relics, sites, human remains and cultural materials have been recorded. Some areas along the Darling and Warrego rivers and at the junction of sand plains and floodplains contain hundreds of artefacts, while other areas contain only single isolated artefacts (Martin et al. 2013). As these surveys have only been conducted in specific locations, as more surveys are conducted in other parts of the park many more resources will no doubt be found.

Aboriginal sites are places with evidence of Aboriginal occupation or are places that are related to other aspects of Aboriginal culture. These sites are important as evidence of Aboriginal history and as part of the culture of local Aboriginal people.

Sites recorded on Toorale provide evidence of sacred places; tool-making and the manufacture of other items; food gathering, preparation and consumption; resource management; and important events in people's lives (summarised in Martin 2012).

From this evidence and the documented oral history (Martin et al. 2013), it is clear that Toorale's landscape fostered an enduring Aboriginal community: the rivers in the area supplied fish, turtles, mussels, waterbirds and other resources; and the grasslands, forests and arid areas supplied essential resources that were harvested and managed.

The majority of Aboriginal sites along the river channels are habitation sites that contain stone artefacts and fireplace remains. Relics, sites and other cultural materials have been found throughout the park and several burial sites have been located (Hudson, cited in Aurecon 2009; Martin et al. 2013) along with egg-shaped kopi or gypsum burial markers (Martin et al. 2013). On the south-west edge of Toorale, silcrete deposits (used for making stone tools) are found and are known as manufacturing sites (Martin et al. 2013). Evidence of quarrying is present on top of Mount Talowla, on Mount Burragurry, on Stony Hill (along Darling River Drive) and on a quartzite outcrop at *Karnu Yalpa* Many Big Rocks Picnic Area. All four sites have bedrock anvils, cores, flakes and waste rock. Mount Talowla also has some small circular stone arrangements and Mount Burragurry has a red and yellow ochre outcrop, both of which may have been used by Aboriginal people.

The most common cultural materials recorded on Toorale are flaked stone artefacts. These have been found in all landforms and are often located in association with ovens, mainly on the

high levee banks, terraces and dunes. Erosion from overgrazing has removed large amounts of archaeological material from higher ground (Martin et al. 2013). Tools made from flaked stone include large woodworking choppers, adzes, flake tools (with round, notched and straight edges), pirri points and a range of blade tools. Toorale also has evidence of edge-ground stone artefacts (such as axes and hatchets), along with several pieces of ground ochre (Martin et al. 2013).

Scarred and modified trees are also common in Toorale (Martin et al. 2013). These include river red gum and coolibah trees with scars resulting from the removal of wood and bark for shields, bowls, food collecting dishes (coolamons), canoes and 'drag-alongs' used by women for collecting food in swamps and billabongs. Boera Dam, including the floor of the water storage, contains many scarred trees that were scarred prior to construction of the dam and their subsequent inundation and death. It is therefore likely that these scarred trees pre-date the 1880s and possibly pre-date European settlement.

A range of seed and other food-grinding equipment is widely distributed throughout Toorale and includes soft-seed grinding dishes and topstones, mortars and pestles for grinding hard seeds and pounding roots. Many large mortars and pestles have been found on Toorale's western floodplain, indicating this was an area where the Kurnu-Baakandji would pound up *ngartu* (seeds of a wetland fern), also known as common nardoo (Martin et al. 2013).

Middens are found on top of the river bank and also on the edge of high terraces. They consist of mussel shell, ash, charcoal, burnt clay or stone heat retainers from cooking ovens, rare artefacts and in some places freshwater snail shells.

### **3.5c Culturally important plants**

Aboriginal people's knowledge of the plants of Toorale was comprehensive, with the majority of plants having been identified as traditionally used for one or more purposes, including bush tucker and medicinal purposes (Martin et al. 2013). Culturally important plants found in Toorale include those that bear edible fruits, tubers, seeds, stems, leaves and nuts. Some of these require cooking before they are safe or palatable for consumption. These plants include trees, bushes, seasonal herbs and long-living subterranean bulbs. The location of various plant resources in Toorale closely follows landforms, and the resources found on sand plains are very different to those found on floodplains or riverbanks. A table listing many of the culturally significant plants (including those used for medicinal purposes), the general location of these plants on Toorale, and known traditional uses is provided in Appendix E.

Culturally important plants are also often found in and around water, including the Warrego River dams. The continued availability of culturally important plants (such as pennyroyal and reeds) in locations like Homestead Dam where they can be easily accessed and used as a teaching tool is important to Kurnu-Baakandji People. Reeds from the homestead dams were used by Aboriginal people to make nets for duck hunting, baskets and fish nets (Martin et al. 2013).

The location of plants within the landscape also determines their availability across time. This is due to the dynamic nature of the landscape that is governed by natural processes such as flood and drought. During floods for example, only resources on the drier hills and sand plains are accessible, while the post-flood environment provides rich resources on recently inundated floodplains.

The Kurnu-Baakandji community have expressed concern that some plants have been lost or reduced in abundance due to altered fire management across the landscape since European settlement. Plants are also totemic and certain plants must be protected, actively cared for and not eaten.



The Kurnu-Baakandji can take cultural resources from Toorale or use cultural resources within Toorale for the purposes of cultural resource use as defined in the Draft Aboriginal Partnerships Policy (DECCW 2010a). Cultural resource use will be subject to a licence or consent agreement and ongoing monitoring of its impacts (DECCW 2010a).

### 3.5d Culturally important animals and moieties

Animals are centrally important to the culture of the Kurnu-Baakandji People. Some animals have been used for bush meat tucker (*wanga*) and others for bush medicine. Other species, such as brolgas and black swans (*Cygnus atratus*) are considered culturally important and are not eaten. Animals also convey important social information: the totem (or meat *wanga*) of a person determines whom they can and cannot marry and conveys cultural responsibilities held throughout the person's lifetime and passed on to children through matrilineal lines (Martin et al. 2013).

For example, the Kurnu-Baakandji are divided into two distinct classes or matrilineal moieties, named *Makwara* and *Kilpara*. Traditionally, a person can only marry someone who belongs to the opposite moiety to their own. *Makwara* have a special relationship (or moiety totem) with Eaglehawk, and *Kilpara* have a special relationship with Crow.

The Baakandji matrilineal moieties came about in the Dreamtime when the various laws and customs regulating social organisation were given out by the ancestors. Thus:

... the world was created by beings whom they call Nooralie – beings that existed a very long time ago ... (which) had the form of the Crow and the Eagle. There was continual war between these two beings, but peace was made at length. They agreed that the [people] should be divided into two classes – the Mak-quarra or Eaglehawk, and the Kilparra or Crow .... Out of [this] final agreement arose the two classes, and hence a law governing marriages amongst those classes (Source: Smyth 1878, vol. 1, pp. 423–4 cited in Martin et al. 2013).

Makwara and Kilpara can be further broken down into moiety totems or *wanga* (meat or social totems) as shown in Table 5.

**Table 5. Examples of Kurnu-Baakandji totems**

Moiety	Moiety totem <i>wanga</i> (meat)	Social totems
<i>Kilpara</i>	Crow ( <i>Waku</i> )	Emu, black duck, crow, black kangaroo and others
<i>Makwara</i>	Eaglehawk ( <i>Wariku</i> or <i>Pilyara</i> )	Red kangaroo, eagle, pelican, teal duck and others

A summary of many of the culturally significant animals recorded on Toorale is provided in Appendix F.

## 3.6 Shared heritage

Cultural heritage comprises places and items that may have historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance. Toorale is considered an icon of Australian pastoral heritage and exemplifies the history of land settlement and pastoralism in New South Wales that has defined much of Australia's cultural identity.

Aboriginal people have remained a part of the Toorale story since European settlement. This initially occurred through continuing life on the land. Over time the landscape was modified, reducing the abundance of and access to traditional foods. This circumstance, along with the introduction of new ideas and cultural systems, led to the participation of Aboriginal people in early station life. Aboriginal people were employed in a range of roles including stockmen,

fencers, blacksmiths, rouseabouts, domestics, shearers, timber cutters, labourers, gardeners, horse tailers and usefals (members of the Kurnu-Baakandji JMAC 2013, pers. comm.; Sheppard 2013; Martin et al. 2013). This association has continued with the employment of Kurnu-Baakandji People (by NPWS) as field officers and cultural heritage officers during archaeological surveys (Martin 2013).

While significantly altering the relationship Aboriginal people had with the land, the continued employment of Aboriginal people at Toorale enabled the Kurnu-Baakandji and other Aboriginal people to maintain strong connections to Country. Kurnu-Baakandji language words are found on old pastoral and county maps of Toorale. For example *Yarramarra* (the name of the run containing the homestead complex) is composed of the Kurnu-Baakandji words for tree (*yarra*) and hand (*marra*). *Booka Booka* on the Warrego means dead or really bad stink (Hercus 1993).

A rich oral history of Toorale exists, not only among the Aboriginal people but also among the many non-Aboriginal people who have connections to Toorale through past management, employment or visitation (Bates & Martin 2000).

### **3.6a Toorale's pastoral history: 1857 to 2008**

The first lease of Toorale was taken up in 1857 by WB Tooth. Toorale's lease ownership changed over time and the property grew and contracted in accordance with the fortunes of the owners. The station was managed for over 150 years as a pastoral (and later agricultural) property.

Toorale was 1,200,000 acres (about 485,600 hectares) at the time it was purchased by Irishman, Sir Samuel Wilson in 1871. In 1880, Wilson sold Toorale along with its neighbouring property, Dunlop, to his nephew, Sir Samuel McCaughey. Wilson and McCaughey were the most significant figures in the Australian wool industry in the 19th century (Sheppard 2013). From 1880 to 1912 McCaughey owned the lease of Toorale and its neighbouring properties (Dunlop, Fort Bourke and Nocolache stations); a total holding of approximately 3,000,000 acres (over 1.2 million hectares).

These combined leases meant that, in the 1880s, Toorale was a significant part of the largest sheep station in the world. At its peak, 265,000 sheep were shorn in Toorale's 46-stand shearing shed (the Old Toorale Woolshed) that was the first in Australia to have electric lights. It is believed that an early iteration of Peebles Dam was built at this time to supply water to the wool scour (P Terrill [OEH] 2013, pers. comm.). Bales of wool were loaded on to barges and transported by paddle-steamers down the Darling River to Adelaide.

During the 1880s and 1890s, McCaughey pioneered large-scale water infrastructure works and constructed what is known as the Boera Dam and Toorale Floodwaters Scheme (see Section 3.2). He also pioneered the use of heavy machinery for ploughing and soil excavation. In 1912 McCaughey sold Toorale to his niece's husband, Mathew Robinson, and Thomas Vincent who carried on McCaughey's approach to property management until they sold Toorale in 1924. From 1924 to 2008 Toorale's lease was owned by several corporations who managed it for large-scale grazing of sheep and cattle. More recently, cotton and cereal crops were grown following the installation of irrigation in the 1980s.

In 2008 Toorale was purchased from Clyde Agriculture by the NSW Government (with considerable financial support from the Australian Government) to protect important natural and cultural values as part of the National Reserve System and to secure water for the environment of the Murray–Darling Basin (see Section 1.1).

### **3.6b Toorale's built heritage**

The park retains a significant amount of built infrastructure and built heritage relating to its prior use, including homesteads, woolsheds, shearers' quarters, meat houses, kitchens and sheds. An historic heritage inventory of Toorale's heritage identified more than 70 built heritage items and over 150 items of moveable heritage (Sheppard et al. 2013).

The *Toorale Conservation Management Plan* (Sheppard 2013) includes an assessment of the heritage significance of built items and ranks them as either:

- state significance with potential for national significance
- state significance
- high, medium or low local significance
- not significant.

Two of the most significant historic 19th-century buildings on Toorale are the Toorale Homestead (built around 1896) and Old Toorale Woolshed (built in 1873–74). The conservation management plan recognises them as:

iconic monuments to the pastoral history of the nation ... they are ... rare surviving nineteenth century buildings, which although currently dilapidated are the biggest and the best of the far western region's surviving historic pastoral buildings, with the most significant technology and history attached.

The homestead and the woolshed were unused and in a state of disrepair when Toorale was purchased by the NSW Government in 2008. Emergency restoration and repair works to the homestead including making the roof weathertight and secure, re-instating the verandah posts, replacing the verandah boards and cement, treating termites, and underpinning the structure with a new foundation has stabilised the building. The woolshed has had its roof repaired and the eastern end of the shed has been fully restored after a severe windstorm caused severe damage to the already dilapidated structure in 2014. A second stage of remediation works has repaired the sheep yards on the northern side of the woolshed, re-established posts and reinstated the roof structure and cladding.

The conservation management plan also identified the Boera Dam and Floodwaters Scheme as having state significance with potential national significance. Furthermore, the whole property (or the homestead or woolshed individually) might also meet the National Heritage List thresholds and could be nominated for the National Heritage List in the future.

Appendix G lists all items of built heritage and their significance value (as per the conservation management plan). Depending on future park management and visitor use requirements and the heritage significance values, these built items will either be:

- used or adaptively re-used to allow visitor enjoyment and appreciation of Toorale's heritage
- used or re-used for park management operations (see Section 5.1)
- sold, donated or removed from park (in particular, items with low or no heritage significance).

#### ***Toorale Homestead Precinct***

The iconic, enormous 27-room Toorale Homestead was built by McCaughey in 1896 in the Regency Italianate style and clad in imported ripple iron. McCaughey gifted the homestead as a wedding present to his favourite niece, Louise, and her husband Matthew Robinson who was the Toorale Station manager at the time. The building represents an important stage in the

development of an Australian vernacular architecture due to the climate control measures incorporated into the design (Sheppard 2013).

The conservation management plan states that Toorale Homestead (see Figure 8) meets the criteria for listing on the State Heritage Register and also has potential national significance (Sheppard 2013). 'Toorale Homestead and Outbuildings' is listed as an Indicative Place on the National Heritage List.

A number of other buildings and built items in the precinct have state heritage values according to the conservation management plan (see Appendix G):

- meat house (however, the significance of the meat house has been elevated because of its association with and proximity to the homestead — assessed as an individual building, it is of local significance only)
- blacksmith and carpenters' shop
- stables
- elevated tanks
- motor garage.

The numerous and sizeable dams on Toorale ensured there was always sufficient water to maintain a beautiful homestead garden. There are many remnants of landscaped garden in the vicinity of the homestead including a moat for irrigation and two large Phoenix palms (*Phoenix* sp.) flanking the front of the homestead.



**Figure 8. Toorale Homestead** (Photo credit: Sonya Ardil, OEH)

A number of archaeologically significant sites also occur in the Toorale Homestead Precinct, including a rubbish tip that contains historically significant agricultural equipment and provides a visual record of early station life. A small cemetery containing at least three graves, is also of

high archaeological significance. The cemetery is in need of repair (Sheppard 2013). There is also an isolated child's grave to the north-west of the Homestead Shearing Precinct.

At the time of purchase the Toorale Homestead Precinct also included the Boera Homestead. Built in about 1955 and originally located on the south-east end of Boera Dam among a complex of outstation buildings, Boera Homestead was thought to be either associated with the expansion of Boera Dam in 1955 or it was a postwar soldier settlement block. The building was an asbestos fibro-cement clad house with a corrugated iron roof and four bedrooms. Boera Homestead was moved to the Toorale Homestead Precinct between 1982 and 1988 and set down on stumps in what was formerly the front garden of the homestead. It is understood the building was relocated to provide accommodation because the homestead was so poorly maintained that it was largely unusable. The Station Manager for Clyde Agriculture is understood to have lived in the relocated Boera Homestead.

The Boera Homestead had moderate local heritage value, but detracted from important sight lines to the homestead. It has been sold and removed from the park. A red demountable and a white cottage in the Toorale Homestead Precinct also do not contribute to the heritage values of the precinct and have been removed from the park (see Section 5.1b and Appendix G).

### **Old Toorale Woolshed**

The Old Toorale Woolshed, near Ross Billabong, was built in 1873–74. It is:

a legendary, giant shearing shed of great technological significance. ... The 'gigantic' and 'giant' shearing sheds of the past are a rapidly diminishing resource (Sheppard 2013).

The Old Toorale Woolshed was a replacement for the original shed that burned down. It is the only surviving building from the Samuel Wilson period (1871–1880). The sheep yard remnants may date from the late 1860s. The woolshed was designed by the Melbourne architectural firm Crouch and Wilson. The shed components, except for the local timber posts, appear to have been selected for light-weight cartage and were all imported from England (Sheppard 2013).

The Old Toorale Woolshed is associated with a number of technological innovations. It was the earliest known farm building in Australia to be built with iron structural roof framing and it incorporated the most innovative shearing machine technology of its time. Toorale was also the first sheep station in Australia to use electrical lighting for its wool scour in 1887 (Sheppard 2013).

The woolshed and sheep yards both appear to meet State Heritage Register listing requirements, and also appear to meet National Heritage List criteria and thresholds (Sheppard 2013). The Old Toorale shearers' dining room and kitchen, and the old overseers' quarters toilet also have high local heritage significance. The Old Toorale Woolshed and associated wool scour site have high archaeological significance. There are numerous other buildings in this precinct that are of local heritage significance, including sheds, accommodation and cook's huts (Sheppard 2013).

Henry Lawson spent time working as a rouseabout in the Old Toorale Woolshed in 1892. Lawson's time at Toorale is said to have inspired the poem *The Boss's Boots*, together with other works based on the district, including *A Stranger on the Darling*, *The Darling River*, *In the Storm that is to Come* and *Bourke*. He refers to the Darling River as a 'muddy gutter' and his written legacy describes the 'horrors of the country' where 'men tramp and work like dogs'. Toorale is also associated with the 1890s battles between shearers and pastoralists mainly along the Darling River, the rise of unionism and the birth of the Labor Party in Australia (Sheppard 2013).

### ***Homestead Dam Shearing Precinct***

The Toorale Shearing Precinct (see Figure 2) contains a cluster of buildings and is located to the north of the Toorale Homestead Precinct, on the other side of the Homestead Dam. Two buildings of technological interest are located in this precinct: a British-designed Nissen hut (a semicircular shed) and an American-designed Quonset hut. Both are World War II structures purchased after the war and re-erected on the property. These two huts were re-used as shearing sheds and they now sit side-by-side near a more recently erected Homestead Dam shearing shed.

Homestead Dam hangar is associated with an airstrip. The hangar was constructed in about 1990 and has been upgraded for Aboriginal cultural purposes including as a keeping place for items of movable Aboriginal cultural heritage, and as a cultural craft workshop space.

### ***Other buildings or built items in the park***

The **Station Manager's house** was built in about 1992 by Clyde Agriculture and is located south-west of the Toorale Homestead Precinct. This building is currently used by NPWS for staff accommodation.

Other buildings in Toorale that are of moderate or low local significance or no significance are listed in Appendix G. Some of these buildings, or building complexes, are of historical interest because they provide a link to the soldier settlement history following World War II, or because they form part of a group of related items with a shared history. These include Akuna, Dara and Acton Hill Homestead complexes that were all soldier settlement blocks (see Figure 2 and Sheppard 2013).

**Akuna Homestead**, built in about 1954, is located 1.5 kilometres west of the Warrego–Darling River junction, on the high north bank of the Darling River. The history of Akuna Homestead is not well known. It is thought the original two-room cottage was built by Kevin Cross, who drew the block in the post-war soldier settlement scheme. The building appears to have been extended over time. It is now a four-bedroom homestead clad in weatherboards with a corrugated iron roof. Akuna Homestead has been used by NPWS for staff accommodation since 2009. A shed (known as Polly's studio) sits inside the yard of Akuna.

**Dara Homestead**, built around 1954, is approximately 20 kilometres west of Toorale Homestead. Its history is not well known, however, it is thought that it was a shearers' quarters at some stage and then later a family home. Various sleepouts and rooms have been added over the years, and in 2009 it was hit by a severe windstorm that removed roofing, exposed the interior and damaged much of the building. The associated woolshed has also been irreparably damaged in a storm and has been decommissioned and made safe. Materials from the building have been re-used on park.

The **Mount Talowla Shearing Shed** (Acton Hill) previously included an outbuilding complex that is thought to have surrounded Harry Gillet's hut (the soldier settler). However, the hut is demolished and the surviving buildings in the complex comprise the meat house, water tanks, a former windmill, a fuel store and the shearers' toilets. There is evidence of a few other buildings in the form of slabs and building remnants and materials.

The **round horse yard** to the east of the Kurnu-Baakandji Cultural Camp (west of the stables) has high local significance according to the conservation management plan (Sheppard 2013).

A 2064-hectare irrigated cropping area was established in 1982 (see Figure 6). There are several buildings in the adjacent **Irrigation Precinct** (all assessed as having low local significance) which may be re-used for park management purposes (see Section 5.1).

### ***Moveable heritage***

Toorale also has a range of items of moveable heritage such as horse bridles, tins, old vehicles and farm equipment that require cataloguing, preservation and protection.

### ***Sites of archaeological significance***

The conservation management plan identifies several sites of high archaeological significance. These are sites that, if subject to archaeological investigation, have the potential to provide information about the history and heritage of a place that may not be obtainable from other sources. Sites of high archaeological significance in Toorale (other than those noted above) are:

- the original Toorale Homestead site on the banks of the Darling River
- the site of an old pub on the Warrego River.

### **Issues**

- The Toorale Homestead and Old Toorale Woolshed buildings had fallen into disrepair prior to the purchase of the property by NPWS. Emergency stabilisation works have been undertaken, however, ongoing conservation works are needed.
- There are opportunities and constraints regarding any future use or re-use of heritage buildings in Toorale for visitors (see Section 3.7).
- Increased visitation has the potential to impact historic heritage items, archaeological sites and cultural landscape values. Archaeological remains and movable relics are vulnerable to fossicking and vandalism as well as general deterioration and natural events such as flooding.
- Significant items, including the Toorale Homestead and outbuildings and the Old Toorale Woolshed and sheep yards, may not be adequately recognised on statutory state or national heritage lists.
- Contaminants and dangerous substances exist at some sites as a relic of former use, such as asbestos, petrochemical residue or chemicals from activities such as sheep dipping. These require management to avoid harm to the environment and to avoid exposure of visitors, parks staff and contractors (see Section 5.1).
- Water storage near heritage buildings is required for use in structural firefighting. These requirements will be informed by, but not limited to, any heritage protection requirements for listed buildings under the Heritage Act.

### **Desired outcomes**

- Negative impacts on shared historic and cultural heritage values are minimised.
- Knowledge of the shared historic and cultural values of the park is improved.
- Significant historic features and places are appropriately identified, recorded, conserved, managed and interpreted so visitors can experience the full spectrum of landscapes, cultures and shared histories found in the park.
- Oral history is recorded, curated and interpreted for visitors where appropriate.
- Where possible, significant cultural values are protected from flooding.
- Dangerous or unnecessary remnants of former uses of Toorale do not negatively impact park values or pose a threat to the wellbeing of the environment or the people within it.

### **Management response**

- 3.6.1 The *Toorale Conservation Management Plan* will guide essential works required to maintain and enhance significant heritage values.



- 3.6.2 Actively involve the Kurnu-Baakandji and other Aboriginal people in conservation management and interpretation of Toorale's shared historic heritage.
- 3.6.3 Actively promote opportunities for people to tell their stories about Toorale and to appreciate other people's stories (past and present) through appropriate promotion and curation.
- 3.6.4 Undertake a heritage assessment prior to any works that have the potential to impact historic sites and places.
- 3.6.5 Regularly monitor and conduct works on Toorale Homestead and the Old Toorale Woolshed, as necessary, to ensure they are weatherproof and stable.
- 3.6.6 Ensure a photographic record of Toorale Homestead and the Old Toorale Woolshed complexes is maintained.
- 3.6.7 Relocate or remove buildings with low/no heritage value from the Toorale Homestead Precinct.
- 3.6.8 Manage buildings on Toorale in accordance with Appendix G.
- 3.6.9 Sell or dispose of items that have low or no heritage value or are not needed for future use.
- 3.6.10 Views to and from significant buildings, landmarks and aesthetically pleasing items of movable heritage will be retained and where practical enhanced. This may involve clearing vegetation.
- 3.6.11 In accordance with relevant policy and legislation, place items or locations that pose a risk to human health or the environment on a risk register, and manage them appropriately or remove them.
- 3.6.12 In consultation with relevant stakeholders, investigate opportunities to have relevant heritage values in the park recognised on statutory heritage lists such as the NSW State Heritage Register and Commonwealth National Heritage List.

### **3.7 Visitor use**

NPWS parks provide a range of visitor opportunities. NPWS aims to ensure that visitors enjoy, experience and appreciate Toorale while ensuring park values are conserved and protected.

Despite its history as an agricultural property, the beauty of Toorale's landscape is evident at every turn, with expansive views across floodplains to fringing forests and distant hills. Toorale has had little previous use for public recreation purposes, although locals have a history of camping and fishing on sections of the Darling River.

The *Toorale and Gundabooka Nature Tourism Action Plan* (NPWS 2012) was prepared in consultation with a range of local stakeholders and contains a suite of actions to support establishment of visitation and tourism to Toorale. Since 2012 it has been progressively implemented, and the park was opened to independent travellers in Easter 2015. The Toorale Homestead Precinct was opened to visitors in August 2017.

Key considerations in developing visitor experiences in Toorale include:

- building on the existing opportunities within the area and region, such as Bourke and the Darling River Run
- providing complementary rather than competing experiences
- supporting local businesses
- promoting Toorale with commercial tour operators

- building on existing opportunities and strengths in the Western New South Wales, such as the development of loops drives that link visitors back to major centres and local businesses
- maintaining landscape views and settings.

Wherever possible, these experiences will incorporate opportunities for Aboriginal employment. The Kurnu-Baakandji JMC continues to provide valuable advice in the development of visitor experiences.

The nature tourism action plan identifies that the main drawcards for Toorale are:

- Aboriginal heritage and connection to Toorale through history
- the pastoral and agricultural history of the property
- the rivers and wetlands
- scenic landscapes
- wildlife, in particular birds and wildflowers.

Along with the adjacent Gundabooka National Park and State Conservation Area, there is significant potential to work with partners to develop and promote the park as part of the broader tourism experience, particularly with nearby Bourke.

As with other parks and towns in Western New South Wales, visitation to Toorale is strongly seasonal with the main visitor season extending from autumn to spring (peaking in the school holiday periods), and with lowest visitor numbers during the heat of summer. Access to the park is by council-managed Toorale Road that bisects the park (see Figure 1). Toorale Road is closed by Bourke Shire Council during periods of wet weather or when Dicks Dam causeway is covered by water from wet or dry floods down the Warrego or when floodwater from the Darling backs up the Warrego.

Visitor use is discussed below in relation to visitor sites and attractions (day use and camping areas); nature-based recreation opportunities (including bushwalking, birdwatching and fishing); and group activities and events.

### **3.7a Visitor sites and attractions — day use areas, tourist drives and camps**

Day use areas, typically picnic facilities or sites for interpretation and education, are often the main destination for many visitors to parks. Providing camps (campgrounds) within a park allows visitors to have a more in-depth experience and access to experiences that are not otherwise available to day visitors. Day use areas, tourist drives and camps are discussed below.

#### ***Yuthuru Paaka Thuru Darling River Drive, Karnu Yalpa Many Big Rocks Picnic Area, Yapara Paaka Thuru Darling River Camp***

*Yuthuru Paaka Thuru Darling River Drive* runs south-east from Toorale Road, crossing the black soil plains of the Darling River floodplain (see Figure 2). Visitors are rewarded with views of Mount Gundabooka to the south, across the Darling River. Mount Gundabooka is an impressive outcrop of sandstone rising to 495 metres above sea level. The loop drive passes through open grassland, skirting the red sand islands of the black soil plain, and takes the visitor to Coolibah – Black Box Woodlands and the fringing river red gums of the Darling, before returning to Toorale Road. Surveys of this area have revealed abundant evidence of Aboriginal occupation revealing the appeal of this area to people across many years.

*Yuthuru Paaka Thuru* also functions as the access route to the *Karnu Yalpa Many Big Rocks Picnic Area* and *Yapara Paaka Thuru Darling River Camp*. The route and sites have been

designed for day visitors to take in points of interest while also supporting ongoing use of the area by locals.

The full *Yuthuru Paaka Thuru* Darling River Drive is about 40 kilometres and takes approximately 1.5 hours to complete by vehicle. To maintain the natural character of the loop and to minimise impacts on natural and cultural heritage, the drive has been largely constructed of native soil which for the most part is sticky, grey/black soil. *Yuthuru Paaka Thuru* is therefore periodically inaccessible due to local rainfall as well as floodwaters.

*Karnu Yalpa* Many Big Rocks Picnic Area provides access to the Darling River for day visitors to the park, without causing disturbance to campers at the *Yapara Paaka Thuru* Darling River Camp. The day use area has picnic tables and signage, and consideration will be given to installing toilet facilities. The location of the picnic area in the floodplain requires careful design of facilities and it is possible that a relocatable toilet will be used so that it can be moved out ahead of floodwaters.

Some local users have traditionally accessed the Darling River at Toorale for fishing and camping and this will continue to be supported. *Yapara Paaka Thuru* Darling River Camp provides campsites near known fishing hotspots. Historically, use of this area by visitors has been at relatively low levels and undertaken by user groups who are self-sufficient and who prefer no facilities. The impacts of use of this site will, however, be monitored and where environmental, cultural or social impacts are identified, consideration will be given to installing additional facilities or limiting use of the area. Significant design, environmental and cultural impact assessments are required when locating facilities within the flood zone of the Darling River. The licensing and management of recreational fishing are discussed in Section 5.

Camping and accommodation options with more facilities are available at Gundabooka National Park and in nearby towns such as Louth and Bourke.

### ***Toorale Homestead Precinct***

The Toorale Homestead Precinct represents the hub of past innovation, construction and farming life on the property. It contains a wealth of historic buildings and cultural heritage and provides opportunities for interpreting the shared history, Aboriginal and non-Aboriginal, of Toorale.

Of particular interest to visitors to this precinct is the Toorale Homestead. Guided tours to the homestead have been conducted since Toorale was reserved and will continue. Although stabilisation works have been undertaken, the Toorale Homestead remains unsafe for visitors without a guide. NPWS and the Kurnu-Baakandji JMC have agreed that, for the foreseeable future, visitor access to the homestead will be permitted only as part of a guided tour or other supervised means.

Within the precinct, interpretation, pathways and toilet facilities have been provided and will continue to be developed consistent with the Toorale Interpretation Strategy (Godden et al. 2013). Access to historic buildings, such as the blacksmith and carpenters' shop, may be made accessible to visitors as guided by the *Toorale Conservation Management Plan*.

Visitor access to the precinct may be closed at night to reduce the likelihood of unauthorised activities, to ensure the protection and security of heritage values and public safety. It may also be temporarily closed for operational purposes and / or visitor safety such as when construction or maintenance works are under way.

### ***Withawithalaana Mount Talowla Lookout***

Located approximately 1.5 hours' drive from Bourke, Mount Talowla is situated adjacent to Toorale Road and provides the highest viewpoint within Toorale. While only 114 metres above sea level, the lookout provides expansive and spectacular views over a predominantly flat floodplain landscape which includes the Darling River and the Warrego River's western floodplain. Mount Burragurry, Mount Gunderbooka and the Dunlop Ranges feature on the horizon. The almost table-top formation of Mount Talowla provides uninterrupted views in all directions.

*Withawithalaana* is the first visitor site encountered when entering the park from the south-west (i.e. from Louth). It acts as an orientation point for visitors and provides a short-stay experience. A short walk from the carpark leads to several vantage points along the hill. It is largely used by visitors travelling between Bourke and Louth, by those sightseeing as part of a longer visit to the park, or by those on a tour. *Withawithalaana* provides basic orientation and park information as well as information specific to Mount Talowla. Aboriginal art work has been worked into these elements.

### ***Dicks Dam***

Dicks Dam is a causeway along Toorale Road where the road intersects the Warrego River (see Section 5.1). Though only a low barrier to water movement, Dicks Dam does hold water for some time after rain or river flow and provides an easily accessible spot on the Warrego River to observe birdlife, to fish or to experience the Warrego River and adjacent landscapes. In the past, it has supported occasional use by locals for camping or yabbing.

Visitor use of the Dicks Dam area is currently informal, with vehicles parking on the roadside. It is clearly a desirable vantage point, particularly when it holds water, and could become an attractive short-stay experience for visitors. The Dicks Dam site may provide an opportunity to communicate the values of the Warrego River.

Because Toorale Road, including Dicks Dam causeway, is excised from the park and managed by Bourke Shire Council, any proposals in this area would be undertaken in cooperation with Bourke Shire Council.

### ***Homestead Dam Shearing Precinct***

Lying to the north-west of the Homestead Precinct across the Warrego is the Homestead Dam Shearing Precinct that encompasses the historic Nissen hut and Quonset hut, and the more recently constructed Homestead Dam hangar. This precinct also supports a range of bush foods. The precinct has been incorporated into Discovery Tours of the park, and buildings within the precinct may be used for events to support broader cultural tourism initiatives and the sharing of cultural knowledge.

### ***Warrego River wetlands***

The Warrego River and its wetlands, that include the western floodplain and water infrastructure (e.g. dams and training embankments), support high conservation value biodiversity (see Sections 3.3 and 3.4). Accessing the Warrego wetlands, will be especially popular with visitors interested in birdlife. This area also tells a story about Toorale's fame as one of the first NSW properties to have major water infrastructure for the modification and capture of river flows, and about the broader history of water management.

### ***Warrego Wetlands Drive***

The Warrego Wetlands Drive will allow visitors to Toorale to experience a different landscape including driving the edge of long stretches of wetlands, providing excellent opportunities for

bird watching and wildlife observation. The drive will be maintained to two-wheel drive and one-way four-wheel drive access standard (see Figure 2). Points of interest may include low-key facilities to support viewing, such as seating or shelter.

#### *Warrego Wetlands Picnic Area*

This area, near the intersection of Western Floodplain Trail and Yandaroo Bore Trail will offer visitors an opportunity to watch waterbirds and walk through woodlands. Facilities for day visitors are under construction in this area, including a boardwalk, viewing platform and toilet.

#### *Proposed Boera Camp and Picnic Area*

Boera Dam is a picturesque location that may be suitable for development in the future as a camp and picnic area. The main attraction at this site is (almost) permanent water and the ability to fish or appreciate birds and other wildlife. Management trails already access this site and would be reclassified as park roads if public access was enabled. Facilities would be low-key (including a toilet and fire pit) and directional and regulatory signage will be required.

#### **Old Toorale Woolshed**

The Old Toorale Woolshed, sheep yards and associated buildings are likely to be a drawcard for special interest groups such as poetry enthusiasts (due to the association with Henry Lawson) or people with an interest in pastoral enterprises, architecture or the history of the area. The annual Bourke Poets Trek traverses Toorale for this purpose.

Sitting on the Coolibah flats, it provides a different perspective on Toorale's past. Current access to the site is unsafe and unsuitable for independent travellers due to the need to traverse steep and unstable culverts, drains and embankments, and high weed load in some areas along the trail. Access is therefore only for management purposes or with consent from NPWS. There are some dormant trails from when Toorale was managed as a farm. If feasible, an appropriate alternative access may be constructed to facilitate visitor access to the woolshed.

#### **Issues**

- Toorale's attractive and diverse natural values and complex and interesting cultural values provide opportunities to engage and inform visitors.
- Toorale's remoteness and periodically inundated landscapes provide challenges for visitor access.
- The richness of Aboriginal sites and artefacts and the presence of important heritage buildings and other items in Toorale provide both opportunities and constraints in the development of visitor experiences.
- Parts of the park present hazards to unaccompanied visitors.
- There are several buildings near the Toorale Homestead Precinct that are used (or planned for use) by NPWS and the Kurnu-Baakandji JMC (see Section 5.1). Use of the area surrounding the Toorale Homestead Precinct by visitors must consider the potential for different user groups to have divergent needs, the management requirements for the site, and the need to maintain the security of heritage items and the safety of visitors.

#### **Desired outcomes**

- Opportunities for visitation will be provided for independent travellers at identified locations. Low-key nature and culture-based recreation is appropriate.
- Visitor use of Toorale will be monitored to ensure the delivery of appropriate visitor experiences, the protection of natural and cultural values and visitor safety.

- Guided tours of Toorale Homestead and other key locations provide a unique visitor experience.

### **Management response**

- 3.7.1 Provide and maintain visitor facilities at *Yuthuru Paaka Thuru* Darling River Drive *Karnu Yalpa* Many Big Rocks Picnic Area, *Yapara Paaka Thuru* Darling River Camp, *Withawithalaana* Mount Talowla Lookout and the Warrego Wetlands Picnic Area.
- 3.7.2 Subject to demand, feasibility, environmental and cultural heritage assessments, construct, upgrade or realign the existing roads/tracks to the proposed Boera Camp and Picnic Area to provide visitor access and establish picnic and camping facilities.
- 3.7.3 Investigate, in conjunction with Bourke Shire Council, options to develop a picnic area at Dicks Dam.
- 3.7.4 Permit campfires within designated fire pits in camps. Fires are permitted in other locations with NPWS consent. Firewood collection is not allowed in the parks and visitor will be encouraged to bring their own firewood.
- 3.7.5 Allow remote, walk-in camping in areas more than 500 metres from precincts, park roads, management trails and facilities.
- 3.7.6 Maintain the Toorale Homestead Precinct for day use by independent travellers, subject to cultural, environmental and safety assessments.
- 3.7.7 Use of the area surrounding the Toorale Homestead Precinct by visitors must consider the potential for different user groups to have divergent needs, the management requirements for the site, and the need to maintain the security of heritage items and the safety of visitors.
- 3.7.8 Use Homestead Dam Shearing Precinct for tours and cultural activities, and consider adaptive re-use of heritage and other buildings.
- 3.7.9 Support opportunities for guided visitor access to Toorale Homestead and the Old Toorale Woolshed.
- 3.7.10 Investigate options for provision of safe access for independent travellers to the Old Toorale Woolshed.
- 3.7.11 Maintain park roads shown on Figure 2.
- 3.7.12 Consider the maintenance of views, the location of flood prone areas and the maintenance of heritage values in heritage precincts when designing and placing facilities and signage. Separate all day use and camping facilities.

### **3.7b Nature-based recreation opportunities**

Toorale lends itself to self-reliant, nature-based recreation such as bushwalking, fishing and birdwatching activities by groups or individuals.

#### ***Bushwalking***

Bushwalking allows visitors to be in close contact with the environment and can increase people's understanding and enjoyment of parks and the environment generally. The park road and management trail network in Toorale provides for a range of self-reliant walking opportunities and provides scope for the future development of shorter loop trails or longer multi-day walks.

It is anticipated that only a small proportion of visitors who are experienced and well-equipped will use the large remote areas of Toorale. Hazards such as open channels, unstable heritage

structures and hazardous materials occur in certain locations and Toorale also experiences extremes of temperature and landscapes prone to flooding.

### ***Birdwatching and nature appreciation***

Toorale's varied landscapes provide opportunities for nature appreciation in a range of settings. Toorale is of interest for birdwatchers and nature enthusiasts, with the park supporting a large number and diversity of bird species, from the iconic brolga and wedge-tailed eagle (*Aquila audax*), to ground-dwelling quail, small woodland birds and large congregations of waterbirds.

The park also provides opportunities to experience nature in isolation. The enjoyment of this sense of remoteness is unlikely to be impacted by other user groups due to the size of the area covered by the park and the nature of visitation.

### ***Cycling***

Despite the lack of significant gradients or obstacles, the appeal of Toorale's wide open spaces may interest some cyclists. Cyclists are permitted to use park roads (see Figure 2).

### ***Horse riding***

Horse riding is a popular recreational activity that has cultural associations for many Australians. General horse riding in the park is not considered suitable, however, NPWS in consultation with the Kurnu-Baakandji JMC may issue consent for horse riding with conditions.

### ***Recreational fishing***

Members of the local community use Toorale for recreational fishing. Areas accessed from the *Yuthuru Paaka Thuru* Darling River Drive near *Karnu Yalpa* Many Big Rocks Picnic Area are known to be particularly popular. Fish species targeted in the park and surrounding areas include the iconic Murray cod (*Maccullochella peelii*) and golden perch 'yellow belly' (*Macquaria ambigua*). European carp (*Cyprinus carpio*) are also often caught. Fishing for yabbies at Dicks Dam has also traditionally been undertaken and the proposed location of visitor facilities (see above) seeks to support ongoing use of Toorale by the local community as well as visitors. The licensing and management of recreational and commercial fishing are discussed in Section 5.

## **3.7c Group activities and events**

Group activities can provide opportunities for people who would not otherwise be able to experience the park. They can promote environmental understanding and support for conservation. Large groups can, however, have a greater impact on the environment and other park visitors. All activities must be consistent with park management principles and be compatible with the natural and cultural heritage values of the park.

Organised group activities of a commercial nature require licensing under the National Parks and Wildlife Regulation. Non-commercial large-scale organised group activities also require consent. Applications for commercial tourism operators and large non-commercial group activities will be assessed in accordance with relevant NPWS policies and procedures.

Commercial tour operators in Toorale work cooperatively with NPWS to increase opportunities for a range of visitor groups to access Toorale's features. Operators have expressed most interest in visiting the Toorale Homestead Precinct. However, as opportunities for a greater range of nature-based experiences arise, it is likely that experiences such as birdwatching will increasingly become the focus for visitation.

Group cycling and walking events and activities are allowed on park roads, however, prior consent is required for these events/activities on management trails.

As mentioned above, the Old Toorale Woolshed is likely to be a drawcard for special interest groups such as poetry enthusiasts. The annual Bourke Poets Trek traverse Toorale for this purpose.

Apart from the toilets in the Toorale Homestead precinct, the Kurnu-Baakandji Cultural Camp is the only site on Toorale with toilets for visitor use (as of 2015), it is intended that these facilities, along with the associated kitchen, will be made available for use by groups. There is no intention to allow the Cultural Camp to be used by independent travellers.

### **Issues**

- Toorale provides opportunities for passive, self-reliant, nature-based recreation, however, the climate can be extreme and visitors must be aware of the risks associated with a remote environment.
- Parts of the Toorale Homestead Precinct, Toorale Shearing Precinct, the Old Toorale Woolshed and some remote areas of the park present hazards to unaccompanied visitors.
- Commercial and non-commercial groups may impact park values.

### **Desired outcomes**

- Visitor use of Toorale is appropriate and ecologically sustainable.
- Visitor use of Toorale increases, and is promoted and encouraged.
- Negative impacts of visitors on park values are minimised.
- Visitor opportunities, including those for groups, encourage appreciation and awareness of the park's values and conservation.
- Group activities have minimal impacts on natural and cultural values and other users.
- Visitor use of Toorale acknowledges Toorale as part of Kurnu-Baakandji Country and incorporates Aboriginal cultural knowledge and stories where appropriate.
- Visitor experiences provided on Toorale complement existing and potential recreational and commercial opportunities.

### **Management response**

- 3.7.13 Walking tracks will be developed in Toorale. Short loop trails in association with the Toorale Homestead Precinct or in association with visitor nodes may be developed, subject to environmental and cultural impact assessment.
- 3.7.14 Cycling is permitted on park roads.
- 3.7.15 Horse riding may be undertaken on park roads and management trails subject to consent and any necessary conditions. Consultation with the Kurnu-Baakandji JMC will be undertaken prior to a consent being issued by NPWS.
- 3.7.16 Opportunities for recreational fishing will be facilitated on both the Darling and Warrego rivers (see Section 5.2).
- 3.7.17 Use of Toorale by groups, including commercial and special interest groups, will be supported; in particular where a group's expertise provides mutual benefit in the improvement of knowledge, understanding or management of the park.
- 3.7.18 Group cycling and walking events/activities will only be allowed on management trails with prior consent. Limits on group size and timing of operations may be imposed to limit impacts on natural or cultural values, other visitors or park operations.
- 3.7.19 Employment of Kurnu-Baakandji and other Aboriginal people in the delivery of or support for group or commercial activities in the park will be encouraged.



3.7.20 Allow the Kurnu-Baakandji Cultural Camp toilets and kitchen to be used by groups.

### **3.8 Research, education and information**

Research, education and information provision helps to protect natural and cultural heritage, promotes support for conservation, and increases the enjoyment and satisfaction of visitors.

Promoting public awareness of NPWS conservation responsibilities, the heritage value of Toorale and the recreational opportunities available is an essential aspect of managing Toorale and increasing the understanding, enjoyment and satisfaction of visitors.

Directional signage is an important consideration in the development of Toorale for visitors given the remote location, the lack of long-term visitation to the site and the potential risk to visitors from climatic extremes.

The Toorale Interpretation Strategy (Godden et al. 2013) includes objectives such as:

- protecting important park values and visitor safety by successfully interpreting sensitive sites in another location or off-site
- encouraging stewardship and appreciation of our natural and cultural heritage.

Key considerations in the development of interpretation also include opportunities to reflect the shared heritage of Toorale between Aboriginal and non-Aboriginal people, the ability of interpretive structures to withstand environmental extremes, and the ability of interpretation projects to adapt with changing visitation and park knowledge and management over time.

Current proposals for interpretation are guided by the interpretation strategy and are closely linked to the staged development of visitor sites. The initial priorities for the park are *Withawithalaana* Mount Talowla Lookout, *Yuthuru Paaka Thuru* Darling River Drive, the Toorale Homestead Precinct and Warrego Wetlands Day Use Area. Any further interpretation projects would be subject to demand and feasibility.

#### **Issues**

- Toorale's distance from Bourke (about 70 kilometres) and its unsealed access provide both constraints and opportunities in communicating Toorale's values.
- The diversity, significance and beauty of Toorale's natural values provide a range of opportunities for interpretation and communication.
- The well-documented and diverse histories of Toorale provide a range of opportunities for telling the stories of Toorale.
- There is a strong connection to Toorale within both Aboriginal and non-Aboriginal communities.

#### **Desired outcomes**

- Toorale attracts more visitors.
- The values of Toorale are made accessible and understandable to the public in a way that promotes appreciation of their importance and need for conservation.
- Visitors are aware of the park's recreation opportunities and can easily find their way to designated park facilities, sites and attractions.
- Visitors gain an appreciation of Toorale's natural and cultural heritage values.
- The shared history of Toorale provides opportunities to share the value of Country to Aboriginal people as both a constant and changing value.

### **Management response**

- 3.8.1 The Kurnu-Baakandji JMC and the local Aboriginal community will continue to be consulted in the development of material and programs for the interpretation of Toorale.
- 3.8.2 Partnerships will be pursued to provide interpretive materials (e.g. photographic essays), either off-park or on-park, for values that are sensitive to visitor impacts or are in sensitive locations.
- 3.8.3 Physical interpretation in the park, such as displays and signage, will be developed to require minimal maintenance and to maximise longevity.
- 3.8.4 Signage to provide directional, regulatory, reassurance and safety functions will be designed to minimise visual impacts on the environment.
- 3.8.5 Interpretation of Toorale's values will be undertaken in a staged manner and will be linked with the development of visitor sites.
- 3.8.6 NPWS will work with peak bodies in the promotion and communication of park values. Visitor opportunities in Toorale will be linked with broader community and tourism initiatives and, wherever possible, include partnerships with business, local government and special interest groups.

## 4. Threats

### 4.1 Pests

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

NPWS prepares regional pest management strategies that identify pest species across that region's parks and priorities for control, including actions listed in the *Biodiversity Conservation Program* (see Sections 3.3 and 3.4), threat abatement plans, and other strategies such as the *NSW Biodiversity Priorities for Widespread Weeds* (NSW DPI & OEH 2011) and the *NSW Biosecurity Strategy 2013–2021* (DPI 2013).

The NPWS regional pest management strategy for the Far West Region (OEH 2013b) identifies pest species and priority programs for Toorale. The overriding objective of the pest management strategy is to minimise adverse impacts of introduced species on biodiversity and other park and community values while complying with legislative responsibilities. The strategy also identifies where other site- or pest-specific plans or strategies need to be developed to provide a more detailed approach.

The pest management strategy identifies the significant pest species that have been recorded in Toorale along with the impacts these pest species have on ecological values and neighbouring properties. The pest animals that are the highest priority for control in Toorale are feral goats and feral pigs. Other pests that may occur in Toorale include Australian plague locust (*Chortoicetes terminifera*) and introduced pests and waterborne weeds in the river systems.

The *Biosecurity Act 2015* and regulations provide specific legal requirements for the prevention, eradication or containment of state-level priority weeds. These requirements apply equally to both public and privately owned land. A regional strategic weed management plan prepared under the *Biosecurity Act* identifies those pest plants that are being prioritised for management action, investment and compliance effort within the Western Local Land Services region (Western LLS 2017). These priorities will be implemented via the relevant NPWS pest management strategy.

The 2011 vegetation survey of Toorale (Gowans et al. 2012) identified 32 weed species, including 5 priority weeds (see Table 6). Toorale's floodplains are particularly susceptible to weeds that disperse via floodwaters. Weed control is undertaken in accordance with seasonal conditions. Strategic control of weeds such as African boxthorn, using a combination of methods such as herbicide application and manual removal, is required to minimise impacts on native species.

#### 4.1a Pest animals recorded in Toorale

##### **Goats**

Competition and habitat degradation by goats (*Capra hircus*) is listed as a key threatening process in New South Wales and nationally (NSW SC 2004a; DoE 2009). Feral goats graze on native plants, compete with native animals for shelter, spread weeds, trample vegetation and damage Aboriginal heritage sites. Congregation of goats in favoured locations can result in erosion and impacts on amenity.

The major control method for feral goats is mustering by licensed contractors. Since acquisition of Toorale, tens of thousands of goats have been removed from the park by mustering. Other control methods will be applied as appropriate.

## **Pigs**

Predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*) is listed as a key threatening process in New South Wales and nationally (NSW SC 2004b; TSSC 2001b).

Pigs spread weeds, including Noogoora burr and Bathurst burr (*Xanthium spinosum*). Pigs forage, wallow and dig in wetland areas, and disturb and damage soils, roots, sensitive ground flora and wetland environments. Pigs dig up the taproot of the culturally important plant tarvine (*Boerhavia dominii*) (see Appendix E). Disturbed areas are at increased risk of weed invasion and soil erosion. Soil disturbance has been observed in the Coolibah – Black Box Woodlands EEC in the park (Gowans et al. 2012).

Pigs are active predators of native birds, reptiles (including their eggs), frogs, soil invertebrates, the underground storage organs of plants and fruiting bodies of fungi. Pigs are also a potential host of several exotic diseases.

A threat abatement plan for pigs has been prepared under the Environment Protection and Biodiversity Conservation Act (DEH 2005) and sets out a national framework to guide coordinated actions to address this threatening process.

Pigs have been recorded in high densities on floodplain areas of Toorale. Since acquisition, NPWS has removed many thousands of pigs from the park (and from neighbouring properties) by aerial and opportunistic control. Trapping and poisoning is also conducted at strategic locations.

## **Red fox**

Predation by the red fox (*Vulpes vulpes*) is listed as a key threatening process in New South Wales and nationally (NSW SC 1998; DoE 2009). Foxes contribute to regional declines and extinctions of a wide range of native fauna, particularly among medium-sized, ground-dwelling and semi-arboreal mammals, ground-nesting birds and freshwater turtles.

Species known to occur in Toorale that are listed on the Biodiversity Conservation Act and threatened by red fox predation are the Australian bustard, Hall's babbler and white-fronted chat. Foxes also contribute to the dispersal of weeds such as Noogoora and Bathurst burrs. There are widespread populations of foxes in the park.

A threat abatement plan for foxes has been prepared under the Environment Protection and Biodiversity Conservation Act (DEWHA 2008b) and under the Biodiversity Conservation Act (OEH 2011a). The NSW plan outlines monitoring programs at priority sites. Toorale is not a priority site, however, the results of the monitoring program will inform future control actions at Toorale. Foxes have been controlled in the park (and in neighbouring properties) by aerial and opportunistic control and fox bait stations. There are 270 bait stations located in strategic locations in the park. Baits are set out for a three-week program as required, at intervals throughout the year.

## **Wild dogs**

Wild dogs — including dingos (*Canis lupus dingo*), feral domestic dogs (*Canis lupus familiaris*) and their hybrids — are a declared pest under the *Local Land Services Act 2013* due to their impacts on livestock. NPWS has a statutory obligation to control wild dogs on its estate. Predation by wild dogs may also have significant impacts on the distribution and abundance of native wildlife.

Only small numbers of wild dogs have been observed at Toorale since it was acquired in 2008. Control of dogs in the park is largely carried out via baiting stations (as described for fox control). Other control methods will be applied as appropriate.

### **Cats**

Predation by feral cats (*Felis catus*) is listed as a key threatening process in New South Wales and nationally (NSW SC 2000c; DoE 2009). Most at risk are small mammals such as rodents, dasyurids (i.e. native marsupials) and ground-nesting birds. There are widespread populations of feral cats in the park. Cat removal from Toorale (and from neighbouring properties) is by aerial and opportunistic control methods. An approved strategic method of cat control is required. In 2013 a disease was observed in feral cats in the park and was believed to be cat AIDS (acquired immune deficiency syndrome). If the disease recurs, NPWS will seek to participate in studies to gain greater understanding of this disease and its effects.

### **European rabbits**

Competition and grazing by feral European rabbits (*Oryctolagus cuniculus*) has been listed as a key threatening process in New South Wales and nationally (NSW SC 2002; DEWHA 2008a).

Rabbits reduce the regeneration of native plants by grazing and ringbarking saplings; compete with native animals for food and shelter; damage historic and cultural sites; increase soil erosion; and are a food source (prey) for other pest animals such as wild dogs, foxes and feral cats. There is a risk rabbit numbers may increase after control programs reduce rabbit predators such as wild dogs, foxes and cats.

There are scattered populations of rabbits in the park. Control of rabbits is carried out by monitoring, baiting and warren-ripping activities, if necessary. Warren ripping will not be undertaken in sandhill country due to the potential risk to cultural sites. Any ripping activity will be preceded by an assessment of natural and cultural values.

## **4.1b Significant weeds**

Table 6 lists the significant weeds that have been recorded in Toorale.

**Table 6. Significant weeds recorded in Toorale**

<b>Name</b>	<b>Distribution</b>	<b>Risks/potential impacts</b>
African boxthorn ( <i>Lycium ferocissimum</i> ) <sup>N, S</sup>	Scattered throughout, prefers red soils	Outcompetes natives Forms an impenetrable, spiny thicket and provides habitat for feral animals (e.g. pigs, goats)
Athel pine ( <i>Tamarix aphylla</i> ) <sup>N, S</sup>	Scattered, riparian areas	Outcompetes natives Dries up and salts water holes, springs and rivers and can be damaging to metal infrastructure because it causes rapid decay
Bathurst burr ( <i>Xanthium spinosum</i> )	4 sites in 2011 vegetation survey	Outcompetes natives, as well as crops and pastures Grows in dense stands, can create barriers around watercourses Burrs cling to clothing, reduce amenity

Name	Distribution	Risks/potential impacts
Buffel grass ( <i>Cenchrus ciliaris</i> )	Broadly distributed landscape weed	Included in the invasion of native plant communities by exotic perennial grasses key threatening process under Biodiversity Conservation Act (NSW SC 2003) Alters fuel load and fire behaviour in many plant communities
Century plant ( <i>Agave americana</i> )	Old Dara Homestead site	Garden escapee; without intervention an isolated population will continue to spread
Giant reed ( <i>Arundo donax</i> ) <sup>R</sup>	Warrego Dam walls	Likely to have been planted to stabilise banks
Golden dodder ( <i>Cuscuta campestris</i> )	Toorale's western floodplain	A parasitic plant that removes nutrients, reduces yield (of crops and pasture) and can kill the host plant
Mexican poppy ( <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i> )	Infestations on floodplains and disturbed areas; spread by floodwaters	Annual herb that competes with and replaces native species Impacts on amenity values within infested areas, reducing the natural values of creeks and rivers High nuisance properties – prickly stems, leaves and seed capsules
Noogoora burr ( <i>Xanthium occidentale</i> )	Found along waterways	Outcompetes natives, crops and pastures Grows in dense stands, can create barriers around watercourses Burs cling to clothing, reduce amenity
Parkinsonia ( <i>Parkinsonia aculeata</i> ) <sup>N, S</sup>	One at Toorale Homestead; treated	Dense, often impenetrable, thorny thickets effect water, bore drains, floodplains and grasslands Makes land inaccessible, restricts access to water edges and excludes native vegetation
Phoenix palms ( <i>Phoenix</i> sp.)	Homestead Dam walls	Isolated population, risk of spread. Note those at Toorale Homestead retained – cultural plantings.
Prickly pear ( <i>Opuntia</i> sp.) <sup>S, R</sup>	In the garden of the Original Boera Homestead site	Invasive weed Garden escapee at this site, risk of spread
Thornapple ( <i>Datura ferox</i> )	Disturbed areas; mainly irrigation channels	High risk of spread
Wild tobacco ( <i>Solanum mauritianum</i> )	Boera Dam wall	Isolated population, risk of spread

<sup>N</sup> Weed of National Significance.

<sup>S</sup> State-level priority weeds (Western LLS 2017).

<sup>R</sup> Regional priority weeds (Western LLS 2017).

### Desired outcomes

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

## **Management response**

- 4.1.1 Manage pest species in accordance with pest management strategies relevant to the park. Undertake additional control of pest animals and weeds in accordance with emerging threats, seasonal conditions and identified impacts on natural and cultural values.
- 4.1.2 Where appropriate, seek the cooperation of neighbours, Western Local Land Services and Bourke Shire Council in implementing weed and pest control programs.
- 4.1.3 Monitor priority weeds and their impacts. Treat any new outbreaks of pests or weed species where possible and update the relevant pest management strategies accordingly to reflect new information.
- 4.1.4 Prioritise the control of weeds and pest animals that negatively impact cultural values and resources.
- 4.1.5 Manage Australian plague locusts under the direction of Western Local Land Services as lead agency and the Australian Plague Locust Commission.
- 4.1.6 Where required, work with the DPI – Fisheries to monitor aquatic weeds.
- 4.1.7 Allow professional pest management contractors to use dogs and motor bikes off park roads and management trails to muster feral goats, subject to the terms and conditions of any contract issued by NPWS.

## **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 fires have been listed as a key threatening process under the Biodiversity Conservation Act (NSW SC 2000b).

The fire history of Toorale prior to its acquisition is largely unknown, other than via anecdotal reports. Observations of the vegetation in Toorale suggest that fire has occurred infrequently in the recent past (Gowans et al. 2012), and that there have not been any large-scale fires in recent history.

The park's fire history since acquisition in 2008 is well-documented and mapped. Since Toorale was acquired, prescribed burns and ecological burn trials have been conducted.

Wildfires at Toorale usually occur following a La Niña event, where rainfall patterns in Far West New South Wales are above average over two consecutive years. This promotes the growth of ephemeral grasses and raises the fuel loads enough to carry fire. The most recent wildfire events were in 1974–75, 1984–85 and 2012–13.

Most wildfires are caused by lightning associated with storm fronts moving in from the west or north-west. These thunderstorms are sometimes accompanied by heavy localised rainfall, that may extinguish fires started by lightning. This has been observed NPWS staff on Toorale and neighbouring properties several times over the past few years. Thunderstorms are often followed by gusty winds or a significant south-westerly wind shift. If the storm does not bring rain, these winds may increase fire behaviour significantly depending on the time of day.

A prescribed burn program has been developed and implemented to reduce the potential spread of wildfire and limit negative impacts on park values.

A fire management strategy that defines the fire management approach for the park has been prepared (OEH 2012c) in consultation with the Barwon Darling Zone Bush Fire Management Committee. The fire management strategy outlines the recent fire history of Toorale, key assets within 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 Bourke Local Emergency Management Committee and the Barwon Darling Zone Bush Fire Management Committee. Cooperative arrangements include fire planning, fuel management and information sharing. Hazard reduction programs, ecological burning proposals and trail works are submitted annually to the Barwon Darling Zone 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 conservation of native plant and animal communities.

#### **Management response**

- 4.2.1 Implement the park's fire management strategy.
- 4.2.2 Maintain involvement with and membership of the Barwon Darling Zone Bush Fire Management Committee and maintain cooperative arrangements with local Rural Fire Service brigades and other fire authorities and surrounding landowners regarding fuel management and fire suppression.
- 4.2.3 Manage the park to protect biodiversity in accordance with fire regimes identified in the fire management strategy.
- 4.2.4 Consider the fire needs of threatened species and culturally important plants and animals (see Sections 3.3, 3.4 and 3.5, and Appendix E and Appendix F) when undertaking fire planning.

### **4.3 Climate change**

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

The latest information on projected changes to climate are from the NSW and ACT Regional Climate Modelling (NARClm) project (OEH 2014a). The climate projections for 2020–2039 are described as 'near future'; and projections for 2060–2079 are described as 'far future'. The snapshot shown in Table 7 is for the Far West Region that includes Toorale (OEH 2014a).

The projected increases in temperature, number of hot days and severe fire weather days (OEH 2014a) are likely to influence bushfire frequency and intensity across the Far West Region and result in an earlier start to the bushfire season (DECCW 2010b). By 2070 the area around Toorale and Bourke is projected to have more than 40 hot days (i.e. > 35°C) per year.



**Table 7. Far West Region climate change snapshot**

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

Source: OEH 2014a.

Evaporation rates are likely to increase, creating drier conditions throughout the year, particularly in spring. Reduced vegetation cover, caused by poorer growing conditions, is likely to leave many soils vulnerable to increased wind erosion (DECCW 2010b). Higher rainfalls in summer and autumn are likely to accelerate all forms of soil erosion across the region and increase runoff at these times of year (DECCW 2010b).

Such changes in the region's climate may significantly alter biodiversity and ecosystem processes. Effects are likely to be most intense where existing pressures are exacerbated, and for riverine and wetland ecosystems. The population size and distribution of species is forecast to change, as well species composition and the geographical extent of habitats and ecosystems. The potential impact of climate change is difficult to assess since it depends on the compounding effects of other pressures, particularly barriers to migration and pressure from feral animals. Species most at risk are those unable to migrate or adapt, particularly those with small population sizes or slow growth rates.

Programs to reduce the pressures arising from other threats, such as habitat fragmentation, pest species, bushfires and pollution, will help reduce the severity of the effects of climate change.

### **Desired outcomes**

- The effects of climate change on natural systems are minimised.
- The carbon footprint of management operations is minimised.

### **Management response**

- 4.3.1 Continue existing fire, pest and weed management programs to increase Toorale's ability to cope with future disturbances, including climate change, and encourage research into appropriate indicators to monitor the effects of climate change.
- 4.3.2 Maintain and seek to improve Toorale's connectivity with its surrounding landscapes particularly through water management.
- 4.3.3 Align park management with relevant climate change strategies where appropriate.
- 4.3.4 Undertake strategies to minimise carbon emissions from activities in the parks, such as through the installation of solar panels.

## **5. Management operations and other uses**

### **5.1 Management facilities and operations**

Toorale contains a number of buildings and associated infrastructure related to its past use as a pastoral and agricultural property. Some of this infrastructure has been used or will be adapted and re-used for park management operations and staff accommodation.

#### **5.1a Kurnu-Baakandji Cultural Camp**

The Kurnu-Baakandji Cultural Camp comprises several buildings to the west of Toorale Homestead Precinct (see Section 3.6). It is maintained to provide comfortable short-stay accommodation and meeting facilities for small to medium-sized groups. The Kurnu-Baakandji JMC will have preferential use of the Cultural Camp for their meetings. It is also envisaged that the camp will provide accommodation for school groups, visiting researchers, birdwatching groups and the like subject to prior consultation with NPWS.

Infrastructure in the precinct includes Toorale's former shearers' quarters and the associated kitchen – dining room building, as well as two ablution blocks (one old and one new), the Cook's Room (separate one-room hut), and an old meat safe. These facilities were originally used to accommodate shearers and other short-term workers.

The quarters and kitchen-dining were constructed around 1978 and appear to have replaced buildings that were probably constructed in the 1870s. New kitchen facilities and other improvements have been made by NPWS to improve the amenity of the site.

The shearers' quarters consist of 10 bedrooms arranged in back-to-back rows (i.e. five rooms on the northern side and five on the southern side). Each room accommodates two single beds. The kitchen – dining room is a corrugated iron-clad, gable-roofed, two-room building. Internal linings are battened fibrous cement sheeting.

Pending environmental and feasibility assessments, a new building may be constructed in this precinct for use by the JMC as a cultural centre. The building will be located within the existing footprint of the precinct. In the event Homestead Dam is re-instated, consideration will also be given to the construction of a platform or jetty for fishing and wildlife observation.

Opportunities for camping in isolation from other user groups or management operations will also be provided for cultural purposes including events, celebrations, family gatherings or for renewing, maintaining or developing cultural practice. This will include two locations along the Darling and one in red country west of the Warrego. Sites will be chosen based on cultural appropriateness, amenity, safety, and environmental and cultural assessment.

#### **5.1b Park management buildings and infrastructure**

The Irrigation Precinct is located 6.5 kilometres south-east of the Toorale Homestead adjacent to the former irrigated cropping area (see Figure 2). The exact timing of construction of buildings in the Irrigation Precinct is not known, but aerial images place it between 1984 and 2000. All buildings in the precinct were assessed as having low local heritage significance (Sheppard 2013).

Other buildings used for park management purposes are located in Homestead Dam Shearing Precinct, within and near the Toorale Homestead Precinct and other areas in the park. See Table 8 and Appendix G.

**Table 8. Park management buildings in Toorale\***

<b>Description</b>	<b>Use</b>
<b>Irrigation Precinct</b>	
Irrigation bunkhouse kitchen	NPWS office, group meeting area for pest and fire control activities, group catering
Irrigation bunkhouse	Dormitory accommodation
Irrigation overseer's house	Staff accommodation
Irrigation manager's house	Staff accommodation
Cook's house	Staff accommodation
Demountables	Currently in state of disrepair; remove from park
Maintenance shed (old)	Equipment storage & workshop
Chemical shed (new)	Constructed in 2011 (after purchase by NPWS)
Machinery shed	Constructed in 2012 (after purchase by NPWS)
Storage area	Storage
Pump shed & water filtration plant	Water reticulation for the precinct (domestic water)
Fuel deposit complex	Fuel storage
Crib room	Staff wash room and tea room
<b>Homestead Dam Shearing Precinct</b>	
Homestead Dam shearing shed	Park management operations
Nissen hut	Park management operations
Quonset hut	Park management operations
<b>Others</b>	
Akuna Homestead	Staff accommodation
Station Manger's House (near Toorale Homestead)	Staff accommodation

\*Table 8 does not include buildings that are not being adaptively re-used for management purposes.

There is an airstrip located to the west of the Irrigation Precinct (see Figure 2). This airstrip remains operational and is maintained to Royal Flying Doctor Service standards for use in management operations and emergencies. Suitability for use by private pilots or commercial operators will be considered.

There is a shooting range just to the south of the Irrigation Precinct. Pending environmental approvals and feasibility assessment the shooting range may be upgraded to meet Firearms Registry specifications as an approved shooting range under the Firearms Regulation 2006. Pending approval, the range could be used only as a training facility for local staff and agency firearm specialists.

### ***Infrastructure surplus to park management requirements***

Toorale contains many buildings and infrastructure that are either not required or not suitable for park operations. Surplus infrastructure includes modern cattle yards, dongas (demountable buildings), irrigation pumps and sheep-dip sites. Surplus infrastructure will be disposed of.

The Dara Woolshed was irreparably damaged in a storm and has been decommissioned and made safe. The Boera Homestead, formerly located in the Toorale Homestead Precinct, was not required for management operations and detracted from the values of the Toorale Homestead Precinct. It was sold and removed from the park in January 2017. See Section 3.6.

The airstrip in the Shearing Shed Precinct adjacent to the hangar is not required for management purposes. The airstrip will be allowed to revegetate.

### **5.1c Boundary fences**

Toorale does not have a complete stock-proof boundary fence, however, NPWS staff are working with neighbours to establish a boundary fence around the park in accordance with NPWS policy. Appropriate environmental impact assessments (including consideration of cultural values, sites and objects) and arrangements made with neighbours will be undertaken prior to construction.

Internal fences that are determined to have no heritage value will be removed to improve safety for visitors, staff and wildlife. Management of fences with heritage values will be guided by the *Toorale Conservation Management Plan*.

### **5.1d Park roads and management trails**

Toorale Road, which bisects the park (see Figure 1), is classified as Rural Local Road 10 (RLR10). The road, including the causeway at Dicks Dam, is administered and maintained by Bourke Shire Council. This is the only public road passing through Toorale. Council closes the road when weather conditions render it impassable to traffic.

Toorale has hundreds of kilometres of management trails and park roads. All of Toorale's management trails and park roads shown on Figure 2 are maintained by NPWS consistent with Rural Fire Service Bush Fire Coordinating Committee 'category 1 fire management trails' (RFS 2013). All management trails and park roads are affected by flooding and some trails on the black soil plains frequently become impassable in wet conditions.

Where conditions permit, a boundary management trail will be constructed inside the boundary fence around Toorale. The boundary fenceline and trail will serve as a firebreak and provide access for park management activities.

The management trail that follows the top of the western training embankment (see Figure 6) becomes impassable when flooding breaches the embankment. When this occurs NPWS can only access northern sections of Toorale, including Boera Dam and Booka Dam, by crossing into the neighbouring properties. Access to these dams is essential to operate water regulators at times of medium to high flow. Access has previously been arranged via an informal agreement with the property owners. A formal agreement with these property owners is desirable (see Section 5.2a) and continued cooperative relationships with the property owners is essential.

### **5.1e Water supply**

NPWS has upgraded the infrastructure that supplies water to buildings so that all buildings currently used for management operations have a water tank.

Water for management operations is extracted from Homestead Dam on the Warrego River when there is sufficient volume available (note: this dam currently breached). This is by unregulated entitlement for stock and domestic purposes. When Homestead Dam is low or dry, non-potable water for management operations is pumped from the Darling River under 'basic rights' entitlements and is stored in tanks located in the Irrigation Precinct.

## **Off-stream water supplies and storages**

A series of off-stream ground tanks and a network of poly pipes and poly tanks have been constructed on Toorale. These tanks will be reviewed and, if deemed unnecessary for park management purposes, will be decommissioned. All water access points have been documented in the *Toorale National Park Fire Management Strategy* (OEH 2012c).

## **Operation of Booka and Dicks dams**

Booka and Dicks dams sit on the boundary of the park. The Booka Dam wall crosses Toorale's eastern boundary. As such, part of the dam wall sits on the neighbouring property, Booka Station. The works approval for the dam is issued to NPWS and a permissive occupancy is granted by the owners of Booka Station to allow NPWS to have part of the dam on Booka Station.

The bank/wall of Dicks Dam is a causeway on a public road (Toorale Road) administered by Bourke Shire Council. The Minister administering the National Parks and Wildlife Act holds the works approval for the dam, including the wall/causeway. As such, council requires an agreement with OEH to formalise arrangements for them to access, maintain and undertake any works to the structure. At the time of writing (2016) the Minister administering the National Parks and Wildlife Act holds an unregulated entitlement for Dicks Dam for stock water.

### **5.1f Quarries**

Prior to the reservation of Toorale, four quarries were developed by the former station owners.

A sand quarry in the Irrigation Precinct will be maintained for essential park management purposes (see Figure 2). Extracting quarry material from within the park reduces the potential of introducing pathogens, pests and weed seeds from outside the park. Use of local materials also helps maintain a natural visual landscape for park facilities.

A stone quarry located near the boundary with Booka Station was previously used by Aboriginal people as a silcrete quarry and will be allowed to revegetate. Another stone quarry located near Mount Talowla has been closed and allowed to revegetate.

Another quarry on Mount Burragurry (see Figure 2) is in a 5-hectare area that was not reserved as part of the state conservation area. See Section 5.2.

## **Issues**

- Toorale is an important part of Country for Kurnu-Baakandji People. The park provides opportunities for cultural practice and cooperative park management.
- The erection of boundary fences requires cooperative relationships with neighbouring property owners.
- Clay soils and periodic flooding cause deterioration of boundary fences.
- Stock-proof boundary fencing is difficult to maintain during extreme dry and extreme wet periods.
- Toorale has hundreds of kilometres of park roads and management trails. The majority are on black soil plains that are prone to movement.
- Management trails and park roads may become impassable during wet conditions (caused by rainfall or flooding) and roads may be damaged as a result.
- NPWS access to the northern area of the park is cut when the western training embankment is breached. Access to the park is required through private property in some situations.

- Many buildings contain asbestos and need appropriate risk management.
- Identified surplus infrastructure that relates to former agricultural uses needs to be disposed of.
- Buildings need ongoing maintenance and repair.
- The value of off-stream ground tanks for fire and pest management purposes needs to be considered against the potential for these tanks to unnaturally maintain populations of pest animals (such as pigs and goats).

### **Desired outcomes**

- Cultural practice is enabled in the park.
- Stock from adjacent private properties are not able to enter the park.
- A large proportion of Toorale is accessible by management trails or park roads for management operations, weather permitting.
- Cooperative relationships are maintained with owners of neighbouring properties to ensure access to the park.
- Quarrying, road construction and maintenance, and fencing activities do not affect natural and cultural values.

### **Management response**

- 5.1.1 Allow the Kurnu-Baakandji JMC preferential use of the Kurnu-Baakandji Cultural Camp for their meetings, culture camps and family bookings. Allow the Cultural Camp to be used to accommodate school groups, visiting researchers, birdwatching groups etc. at other times.
- 5.1.2 Allow the Kurnu-Baakandji JMC opportunities to camp in the park in isolation from other groups or management operations, subject to prior consent.
- 5.1.3 Assess the feasibility of upgrading the existing shooting range to meet Firearms Registry specifications as an approved shooting range for use as a training facility for local staff and agency firearm specialists.
- 5.1.4 Establish stock-proof boundary fences in cooperation with neighbours and in accordance with NPWS policy.
- 5.1.5 Undertake environmental assessments prior to any works with the potential to impact natural or cultural values, such as fencing, trail maintenance, road works or quarrying activities.
- 5.1.6 Maintain management trails as category 1 fire management trails. Maintain all park roads and management trails shown on Figure 2. Park roads may be temporarily closed to reduce impacts, maintenance costs or because of park operations.
- 5.1.7 Maintain cooperative relationships with owners of the neighbouring properties to ensure access to the park for management operations.
- 5.1.8 Adaptive re-use of buildings will be guided by the *Toorale Conservation Management Plan*.
- 5.1.9 Compile an asbestos register and management plan for structures in the park and carry out required risk management works.
- 5.1.10 Relocate, sell or donate surplus infrastructure and remove non-associated materials and rubbish.
- 5.1.11 Where required, assess chemical contamination levels at sites such as sheep-dip sites, and manage them in accordance with policy and legislation where required.

- 5.1.12 Maintain the airstrip west of the Irrigation Precinct to Royal Flying Doctor Service standards for use in management operations and emergencies.
- 5.1.13 NPWS will work cooperatively with the owners of Booka Station in the management of Booka Dam and its associated and dependent values.
- 5.1.14 Maintain structures used for management operations.

## **5.2 Non-NPWS uses and operations**

### **5.2a Leases and licences**

No leases or licences for non-NPWS uses or operations exist on Toorale.

An informal agreement exists with the owners of the neighbouring property, Booka Station, for the part of Booka Dam that is located on the neighbouring property.

Cooperative management of the causeway and water entitlements of Dicks Dam is required (see Section 5.1).

Licences related to use and regulation of Commonwealth environmental water, NPWS works approvals and other entitlements are discussed in Section 3.2.

### **5.2b Easements and rights of way**

No easements or rights of way have been established on Toorale. Consent for access may be negotiated on a case-by-case basis if neighbours need to use management trails or park roads. This may occur, for example, during wet periods when access is restricted, or if stock enter the park or need to be transported through the park to leave the area.

### **5.2c Travelling stock reserves**

Many travelling stock reserves (TSRs) were excluded from the area reserved as Toorale National Park and Toorale State Conservation Area. These are travelling stock route 32957, travelling stock route 84485, travelling stock route 63183, and travelling stock and camping reserve 32962. These lands total approximately 5950 hectares but have not been accurately surveyed. Most of these reserves are situated within the park boundaries (see Figure 2). The travelling stock routes are not fenced off from the surrounding national park or state conservation area.

The travelling stock routes are managed consistently with provisions for travelling stock routes within the Western Division and are included in the underlying Western Lands lease. Western Lands leases are held by the Minister administering the National Parks and Wildlife Act under the Western Lands Act.

### **5.2d Trigonometric station**

Trigonometric Reserve 46044 is approximately 4 hectares, and is excluded from the reserved area of Toorale State Conservation Area. The Western Lands lease is held in the name of the Minister administering the National Parks and Wildlife Act.

The trigonometric reserve is on the western side of the top of Mount Talowla and includes a trigonometric station located at Mount Talowla's highest point. Access is through the state conservation area off Toorale Road. There is no formed vehicle track to the trig station.



### **5.2e Quarry**

The gravel quarry on Mount Burragurry (see Figure 2) is approximately 5 hectares and was not reserved as part of Toorale State Conservation Area. This Part 11 land is a Western Lands lease held by the Minister administering the National Parks and Wildlife Act under the Western Lands Act.

This quarry is operated by Bourke Shire Council as a source of road material. The quarry can be directly accessed from Toorale Road. Bourke Shire Council has a quarry site management plan that addresses how quarries are operated and managed.

### **5.2f Fishing activities**

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

The predominant fishing activity at Toorale is recreational and commercial fishing for yabbies. Recreational fishers are required by law to carry a receipt showing payment of the NSW recreational fishing fee. The use of yabby traps in waters within the park is permissible subject to conditions under the *Fisheries Management Regulation 2010*.

Inland commercial fishers have an interest in fishing the Darling and Warrego rivers when conditions allow, and occasionally require an access permit for access through the park.

### **5.2g Mining and exploration**

Exploration for minerals and petroleum, as well as mining and petroleum production, are permissible uses within state conservation areas. There are no current (as of 2016) exploration licences for Toorale State Conservation Area.

The NSW Department of Industry is the lead authority for mining and petroleum activities, including mineral exploration and mine site rehabilitation. OEH and the Department of Industry work together to ensure that exploration and production proposals in state conservation areas comply with all statutory requirements, including any necessary environmental impact and cultural heritage assessments and approvals.

Cultural heritage assessments will include the consideration of the rich and varied cultural record of the Kurnu-Baakandji Aboriginal people across Toorale and their ongoing connection to Country – including the state conservation area. The Kurnu-Baakandji JMC have clearly expressed that any mineral exploration or mining activity on Country is not supported and that the Kurnu-Baakandji JMC would object to any applications for either.

### **Issues**

- Ongoing management and maintenance of structures not owned or wholly owned by NPWS is required to maintain or enhance the park's values.
- Ongoing cooperative arrangements with Toorale neighbours are needed to allow effective park and neighbouring property management.
- Regular use of travelling stock routes may impact natural and cultural values on park
- Occasional access to the trigonometric station by third parties may be required on an ongoing basis.
- Ongoing access to the Darling and Warrego rivers is required by recreational and commercial fishers.

- Small-scale quarry operations occur adjacent to the state conservation area.
- Exploration and extractive activities have the potential to negatively impact park values.
- The Toorale Kurnu-Baakandji JMC does not support any mineral or mining exploration within the park.

#### **Desired outcomes**

- The natural and cultural values of the park are maintained or enhanced.
- Existing access arrangements are maintained.
- Non-NPWS uses have minimal impact on natural and cultural values.
- Park boundaries are rationalised by inclusion of TSRs into the reserved area of the park.
- Any impacts from mining or mineral exploration are reversible.

#### **Management response**

- 5.2.1 Leases, licences or other cooperative arrangements will be negotiated with relevant parties as required.
- 5.2.2 NPWS will seek to work cooperatively with Bourke Shire Council in matters of mutual interest.
- 5.2.3 Existing cooperative access arrangements, such as use of alternative property access routes during wet weather, will be maintained where agreed by NPWS and neighbours.
- 5.2.4 NPWS and the Toorale Kurnu-Baakandji JMC will work in cooperation with the authority responsible for the administration and management of travelling stock routes in the ongoing management of these areas where required. Incorporation of travelling stock routes into the parks is desirable.
- 5.2.5 NPWS will support ongoing access to the trigonometric station as required. Any works to the site will be subject to environmental and cultural assessments.
- 5.2.6 NPWS will seek to work cooperatively with DPI – Fisheries to ensure that activities licensed under the Fisheries Management Act have minimal impact on park values. This includes fishing for recreational and commercial purposes.
- 5.2.7 Applications for mining or mineral exploration in the state conservation area will be subject to environmental and cultural impact assessment and approvals. The Kurnu-Baakandji JMC will be consulted as part of these assessments. In any assessment, both tangible and non-tangible cultural values such as artefacts, landscape values and cultural attachment will be included and recognised as fundamental park values.

## 6. Implementation

This plan of management establishes a scheme of operations for the park. Implementation of this plan will be undertaken within the NPWS annual operations program.

Identified activities for implementation are listed in Table 9. Relative priorities are allocated against each activity as follows:

- **High priority** activities are imperative to achieve the objectives and desired outcomes. They 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 in response to an issue that arises.
- **As required** activities are those that are actioned on an as needs basis.

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 9. List of management responses**

Action no.	Management response	Priority
<b>Landscape, catchment and geological significance</b>		
3.1.1	Maintain the visual amenity of Mount Talowla, Mount Burragurry and the surrounding landscape.	Ongoing
3.1.2	Where practical, reduce accelerated soil erosion by controlling unnatural factors that could cause erosion (e.g. pest animals, impacts from earthmoving works).	As required
3.1.3	Minimise erosion and/or impacts on the geomorphology and landscape features when constructing or maintaining roads, tracks, trails and facilities.	Ongoing
3.1.4	Plan and manage visitation to minimise impacts on Aboriginal cultural landscapes, megafauna fossil sites and significant geological and cultural features.	Medium
3.1.5	Investigate opportunities for further research on the megafauna fossil sites. Research will be undertaken in consultation with the Kurnu Baakandji community, relevant experts and universities. Opportunities exist to work with research groups and other agencies to develop appropriate site protection and recognition, and to undertake monitoring, fossil collection, storage and interpretation.	Low
3.1.6	Encourage or undertake a more detailed assessment of the scald rehabilitation areas. Where appropriate, scald reclamation techniques may be used in other parts of the park.	Low
3.1.7	Encourage research on geological and landscape values that will inform management decision making, education or interpretation.	Low

Action no.	Management response	Priority
<b>Rivers, wetlands and water for the environment</b>		
3.2.1	Operate water infrastructure in accordance with licence conditions, environmental water strategies, and, where required, CEWH instructions.	As required
3.2.2	Ensure any modifications to in-stream water infrastructure maintain or improve the conservation values for which the property was reserved; are subject to environmental impact assessment and approvals; and are conducted in accordance with legislative requirements, including consideration of cultural values.	As required
3.2.3	In making any changes to the watering frequency of the western floodplain or modifications to in-stream storages, consider the effect on habitat availability for wetland-dependent fauna, in-stream refugia and other habitat values, in particular the habitat values and plant communities of the western floodplain, threatened ecological communities, threatened plants and animals, and the maintenance of populations of culturally significant plants.	As required
3.2.4	Work cooperatively with CEWO to facilitate delivery of the Australian Government's water entitlements to environmental assets and make representations to CEWO and DPI – Water regarding the delivery of CEWH's environmental water entitlements to environmental assets on Toorale.	Ongoing
3.2.5	Work with CEWH, DPI – Water, Kurnu-Baakandji JMC, neighbours and other interested parties to maintain or improve the condition and extent of Toorale's wetlands, floodplains and riparian zones.	Ongoing
3.2.6	Once CEWH has claimed its water allocation, operate water infrastructure to maximise park management and environmental outcomes (both within the boundaries of Toorale and further downstream) subject to licence conditions.	High
3.2.7	NPWS will seek to formalise agreements with Nulty Station and Booka Station owners to ensure staff and vehicle access to Boera and Booka dams is maintained for management purposes.	High
3.2.8	Maintain stock and domestic water entitlements.	Ongoing
3.2.9	Maintain and refurbish water infrastructure associated with surface and groundwater where appropriate.	Ongoing
3.2.10	Utilise water sourced from stock and domestic entitlements, including from the network of polyethylene pipe lines and tanks, to conduct pest control and fire management programs and to service visitor precincts and associated infrastructure as appropriate.	As required
3.2.11	Review all existing off-stream ground tanks and rationalise them as appropriate to benefit effective park management.	Medium
3.2.12	Gather knowledge about water-dependent conservation values and the water requirements needed to maintain and improve these values.	Medium
3.2.13	Monitor native revegetation of the former irrigated cropping area, and supplement with native species plantings if required.	Low
3.2.14	If needed, restore a more natural flow regime in areas modified by irrigated cropping infrastructure by modifying irrigation channel structures and/or their layout (see Section 3.3).	Low
3.2.15	Where possible, ensure that any modifications to water infrastructure will improve fish passage.	As required

Action no.	Management response	Priority
<b>Native plants and communities</b>		
3.3.1	Implement relevant strategies in the <i>Biodiversity Conservation Program</i> and recovery plans for any threatened species, populations or ecological communities that occur in the parks. Ensure threatened plant populations are appropriately considered in the planning for any construction works in and around existing irrigation infrastructure.	Ongoing
3.3.2	Support research into the watering requirements for vegetation communities, particularly on Toorale's western floodplain.	Medium
3.3.3	Monitor changes to vegetation (including vegetation condition). Prioritise vegetation surveys of previously unsurveyed areas.	Medium
3.3.4	Monitor the response of native vegetation to hydrological changes. The results will guide water management, including maintaining conservation values.	Medium
3.3.5	Allow degraded native vegetation to regenerate and intervene where necessary and practical.	Ongoing
3.3.6	Monitor the return of the former irrigated cropping area to a natural ecosystem.	Ongoing
3.3.7	Encourage research into native plant populations on Toorale.	Low
<b>Native animals</b>		
3.4.1	Implement relevant strategies in the <i>Biodiversity Conservation Program</i> and recovery plans for threatened animal species and populations in the park.	Ongoing
3.4.2	Encourage research into native animal distribution, abundance and interactions.	Low
3.4.3	Ensure environmental assessments are conducted for any development activities, including any proposed modifications to Toorale's water infrastructure.	As required
3.4.4	Management of riverine habitats will support the maintenance and recovery of the lowland Darling River Aquatic EEC and its associated values. Where appropriate, consider reinstating large woody debris, removing artificial barriers and use of effective erosion control methods.	Ongoing
<b>Aboriginal cultural heritage &amp; Shared heritage</b>		
3.6.1	The <i>Toorale Conservation Management Plan</i> will guide essential works required to maintain and enhance significant heritage values.	Ongoing
3.6.2	Actively involve the Kurnu-Baakandji and other Aboriginal people in conservation management and interpretation of Toorale's shared historic heritage.	Medium
3.6.3	Actively promote opportunities for people to tell their stories about Toorale and to appreciate other people's stories (past and present) through appropriate promotion and curation.	Medium
3.6.4	Undertake a heritage assessment prior to any works that have the potential to impact historic sites and places.	As required
3.6.5	Regularly monitor and conduct works on Toorale Homestead and the Old Toorale Woolshed, as necessary, to ensure they are weatherproof and stable.	As required
3.6.6	Ensure a photographic record of Toorale Homestead and the Old Toorale Woolshed complexes is maintained.	Low
3.6.7	Relocate or remove buildings with low/no heritage value from the Toorale Homestead Precinct.	Low

Action no.	Management response	Priority
3.6.8	Manage buildings on Toorale in accordance with Appendix G.	Medium
3.6.9	Sell or dispose of items that have low or no heritage value or are not needed for future use.	Low
3.6.10	Views to and from significant buildings, landmarks and aesthetically pleasing items of movable heritage will be retained and where practical enhanced. This may involve clearing vegetation.	Ongoing
3.6.11	In accordance with relevant policy and legislation, place items or locations that pose a risk to human health or the environment on a risk register, and manage them appropriately or remove them.	High
3.6.12	In consultation with relevant stakeholders, investigate opportunities to have relevant heritage values in the park recognised on statutory heritage lists such as the NSW State Heritage Register and Commonwealth National Heritage List.	Low
<b>Visitor use</b>		
3.7.1	Provide and maintain visitor facilities at <i>Yuthuru Paaka Thuru</i> Darling River Drive <i>Karnu Yalpa</i> Many Big Rocks Picnic Area, <i>Yapara Paaka Thuru</i> Darling River Camp, <i>Withawithalaana</i> Mount Talowla Lookout and the Warrego Wetlands Picnic Area.	Ongoing
3.7.2	Subject to demand, feasibility, environmental and cultural heritage assessments, construct, upgrade or realign the existing roads/tracks to the proposed Boera Camp and Picnic Area to provide visitor access and establish picnic and camping facilities.	Low
3.7.3	Investigate, in conjunction with Bourke Shire Council, options to develop a picnic area at Dicks Dam.	Low
3.7.4	Permit campfires within designated fire pits in camps. Fires are permitted in other locations with NPWS consent. Firewood collection is not allowed in the parks and visitor will be encouraged to bring their own firewood.	Ongoing
3.7.5	Allow remote, walk-in camping in areas more than 500 metres from precincts, park roads, management trails and facilities.	Ongoing
3.7.6	Maintain the Toorale Homestead Precinct for day use by independent travellers, subject to cultural, environmental and safety assessments.	Ongoing
3.7.7	Use of the area surrounding the Toorale Homestead Precinct by visitors must consider the potential for different user groups to have divergent needs, the management requirements for the site, and the need to maintain the security of heritage items and the safety of visitors.	Ongoing
3.7.8	Use Homestead Dam Shearing Precinct for tours and cultural activities, and consider adaptive re-use of heritage and other buildings.	Ongoing
3.7.9	Support opportunities for guided visitor access to Toorale Homestead and the Old Toorale Woolshed.	Low
3.7.10	Investigate options for provision of safe access for independent travellers to the Old Toorale Woolshed.	Low
3.7.11	Maintain park roads shown on Figure 2.	Ongoing
3.7.12	Consider the maintenance of views, the location of flood prone areas and the maintenance of heritage values in heritage precincts when designing and placing facilities and signage. Separate all day use and camping facilities.	As required

Action no.	Management response	Priority
3.7.13	Walking tracks will be developed in Toorale. Short loop trails in association with the Toorale Homestead Precinct or in association with visitor nodes may be developed, subject to environmental and cultural impact assessment.	Low
3.7.14	Cycling is permitted on park roads.	Ongoing
3.7.15	Horse riding may be undertaken on park roads and management trails subject to consent and any necessary conditions. Consultation with the Kurnu-Baakandji JMC will be undertaken prior to a consent being issued by NPWS.	Ongoing
3.7.16	Opportunities for recreational fishing will be facilitated on both the Darling and Warrego rivers (see Section 5.2).	Ongoing
3.7.17	Use of Toorale by groups, including commercial and special interest groups, will be supported; in particular where a group's expertise provides mutual benefit in the improvement of knowledge, understanding or management of the park.	Ongoing
3.7.18	Group cycling and walking events/activities will only be allowed on management trails with prior consent. Limits on group size and timing of operations may be imposed to limit impacts on natural or cultural values, other visitors or park operations.	Ongoing
3.7.19	Employment of Kurnu-Baakandji and other Aboriginal people in the delivery of or support for group or commercial activities in the park will be encouraged.	Ongoing
3.7.20	Allow the Kurnu-Baakandji Cultural Camp toilets and kitchen to be used by groups.	As required
<b>Research, education and information</b>		
3.8.1	The Kurnu-Baakandji JMC and the local Aboriginal community will continue to be consulted in the development of material and programs for the interpretation of Toorale.	Ongoing
3.8.2	Partnerships will be pursued to provide interpretive materials (e.g. photographic essays), either off-park or on-park, for values that are sensitive to visitor impacts or are in sensitive locations.	Low
3.8.3	Physical interpretation in the park, such as displays and signage, will be developed to require minimal maintenance and to maximise longevity.	Medium
3.8.4	Signage to provide directional, regulatory, reassurance and safety functions will be designed to minimise visual impacts on the environment.	Ongoing
3.8.5	Interpretation of Toorale's values will be undertaken in a staged manner and will be linked with the development of visitor sites.	Low
3.8.6	NPWS will work with peak bodies in the promotion and communication of park values. Visitor opportunities in Toorale will be linked with broader community and tourism initiatives and, wherever possible, include partnerships with business, local government and special interest groups.	Low
<b>Pests</b>		
4.1.1	Manage pest species in accordance with pest management strategies relevant to the park. Undertake additional control of pest animals and weeds in accordance with emerging threats, seasonal conditions and identified impacts on natural and cultural values.	High



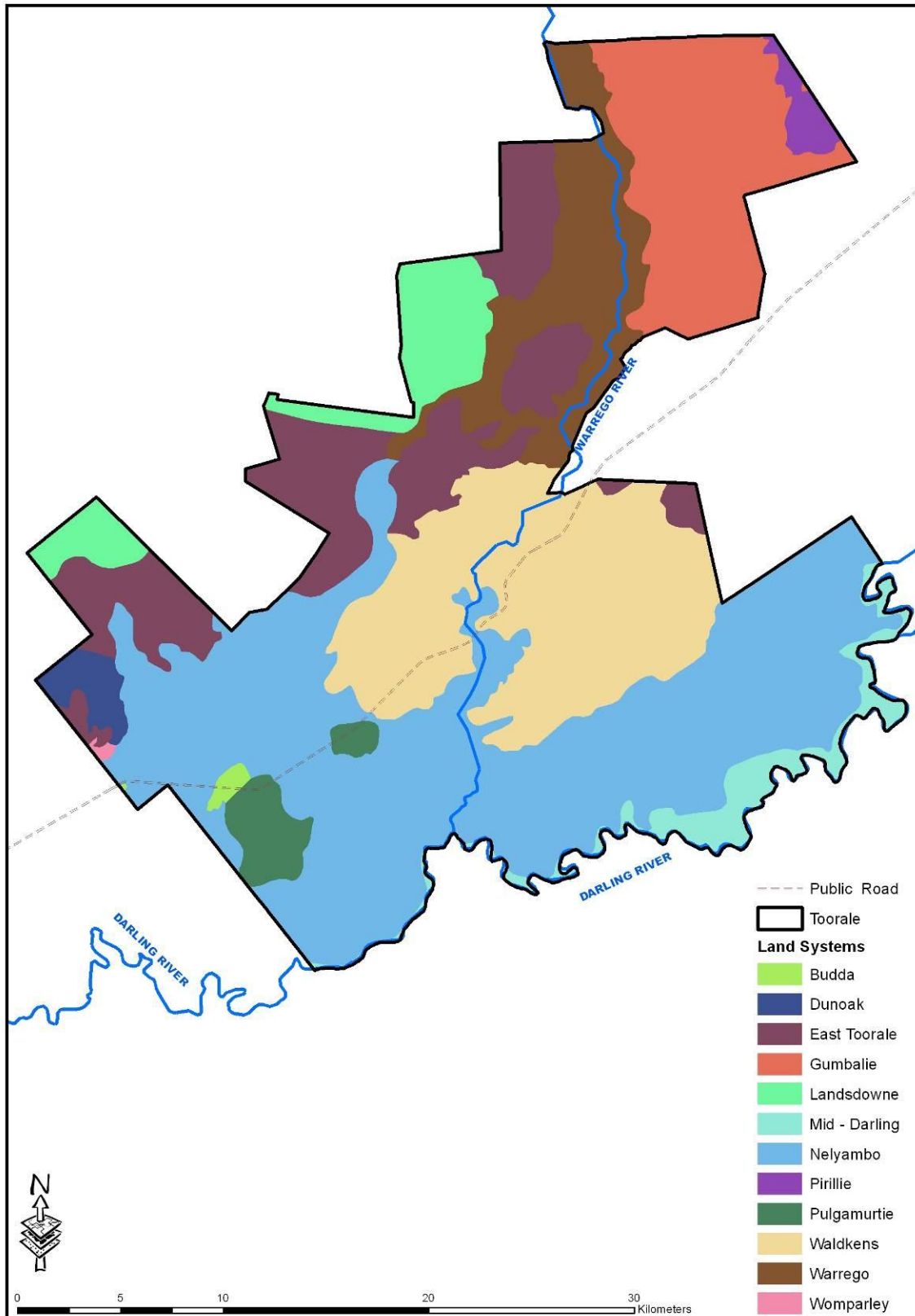
Action no.	Management response	Priority
4.1.2	Where appropriate, seek the cooperation of neighbours, Western Local Land Services and Bourke Shire Council in implementing weed and pest control programs.	As required
4.1.3	Monitor priority weeds and their impacts. Treat any new outbreaks of pests or weed species where possible and update the relevant pest management strategies accordingly to reflect new information.	High
4.1.4	Prioritise the control of weeds and pest animals that negatively impact cultural values and resources.	Medium
4.1.5	Manage Australian plague locusts under the direction of Western Local Land Services as lead agency and the Australian Plague Locust Commission.	As required
4.1.6	Where required, work with the DPI – Fisheries to monitor aquatic weeds.	As required
4.1.7	Allow professional pest management contractors to use dogs and motor bikes off park roads and management trails to muster feral goats, subject to the terms and conditions of any contract issued by NPWS.	As required
<b>Fire</b>		
4.2.1	Implement the park's fire management strategy.	Ongoing
4.2.2	Maintain involvement with and membership of the Barwon Darling Zone Bush Fire Management Committee and maintain cooperative arrangements with local Rural Fire Service brigades and other fire authorities and surrounding landowners regarding fuel management and fire suppression.	Ongoing
4.2.3	Manage the park to protect biodiversity in accordance with fire regimes identified in the fire management strategy.	Ongoing
4.2.4	Consider the fire needs of threatened species and culturally important plants and animals (see Sections 3.3, 3.4 and 3.5, and Appendix E and Appendix F) when undertaking fire planning.	Medium
<b>Climate change</b>		
4.3.1	Continue existing fire, pest and weed management programs to increase Toorale's ability to cope with future disturbances, including climate change, and encourage research into appropriate indicators to monitor the effects of climate change.	Ongoing
4.3.2	Maintain and seek to improve Toorale's connectivity with its surrounding landscapes particularly through water management.	Low
4.3.3	Align park management with relevant climate change strategies where appropriate.	As required
4.3.4	Undertake strategies to minimise carbon emissions from activities in the parks, such as through the installation of solar panels.	Low
<b>Management facilities and operations</b>		
5.1.1	Allow the Kurnu-Baakandji JMC preferential use of the Kurnu-Baakandji Cultural Camp for their meetings, culture camps and family bookings. Allow the Cultural Camp to be used to accommodate school groups, visiting researchers, birdwatching groups etc. at other times.	Ongoing
5.1.2	Allow the Kurnu-Baakandji JMC opportunities to camp in the park in isolation from other groups or management operations, subject to prior consent.	As required

Action no.	Management response	Priority
5.1.3	Assess the feasibility of upgrading the existing shooting range to meet Firearms Registry specifications as an approved shooting range for use as a training facility for local staff and agency firearm specialists.	Low
5.1.4	Establish stock-proof boundary fences in cooperation with neighbours and in accordance with NPWS policy.	Medium
5.1.5	Undertake environmental assessments prior to any works with the potential to impact natural or cultural values, such as fencing, trail maintenance, road works or quarrying activities.	As required
5.1.6	Maintain management trails as category 1 fire management trails. Maintain all park roads and management trails shown on Figure 2. Park roads may be temporarily closed to reduce impacts, maintenance costs or because of park operations.	Ongoing
5.1.7	Maintain cooperative relationships with owners of the neighbouring properties to ensure access to the park for management operations.	Ongoing
5.1.8	Adaptive re-use of buildings will be guided by the <i>Toorale Conservation Management Plan</i> .	As required
5.1.9	Compile an asbestos register and management plan for structures in the park and carry out required risk management works.	High
5.1.10	Relocate, sell or donate surplus infrastructure and remove non-associated materials and rubbish.	Low
5.1.11	Where required, assess chemical contamination levels at sites such as sheep-dip sites, and manage them in accordance with policy and legislation where required.	As required
5.1.12	Maintain the airstrip west of the Irrigation Precinct to Royal Flying Doctor Service standards for use in management operations and emergencies.	Ongoing
5.1.13	NPWS will work cooperatively with the owners of Booka Station in the management of Booka Dam and its associated and dependent values.	Ongoing
5.1.14	Maintain structures used for management operations.	Ongoing
<b>Non-NPWS uses and operations</b>		
5.2.1	Leases, licences or other cooperative arrangements will be negotiated with relevant parties as required.	As required
5.2.2	NPWS will seek to work cooperatively with Bourke Shire Council in matters of mutual interest.	As required
5.2.3	Existing cooperative access arrangements, such as use of alternative property access routes during wet weather, will be maintained where agreed by NPWS and neighbours.	Medium
5.2.4	NPWS and the Toorale Kurnu-Baakandji JMC will work in cooperation with the authority responsible for the administration and management of travelling stock routes in the ongoing management of these areas where required. Incorporation of travelling stock routes into the parks is desirable.	As required
5.2.5	NPWS will support ongoing access to the trigonometric station as required. Any works to the site will be subject to environmental and cultural assessments.	As required

<b>Action no.</b>	<b>Management response</b>	<b>Priority</b>
5.2.6	NPWS will seek to work cooperatively with DPI – Fisheries to ensure that activities licensed under the Fisheries Management Act have minimal impact on park values. This includes fishing for recreational and commercial purposes.	Ongoing
5.2.7	Applications for mining or mineral exploration in the state conservation area will be subject to environmental and cultural impact assessment and approvals. The Kurnu-Baakandji JMC will be consulted as part of these assessments. In any assessment, both tangible and non-tangible cultural values such as artefacts, landscape values and cultural attachment will be included and recognised as fundamental park values.	As required

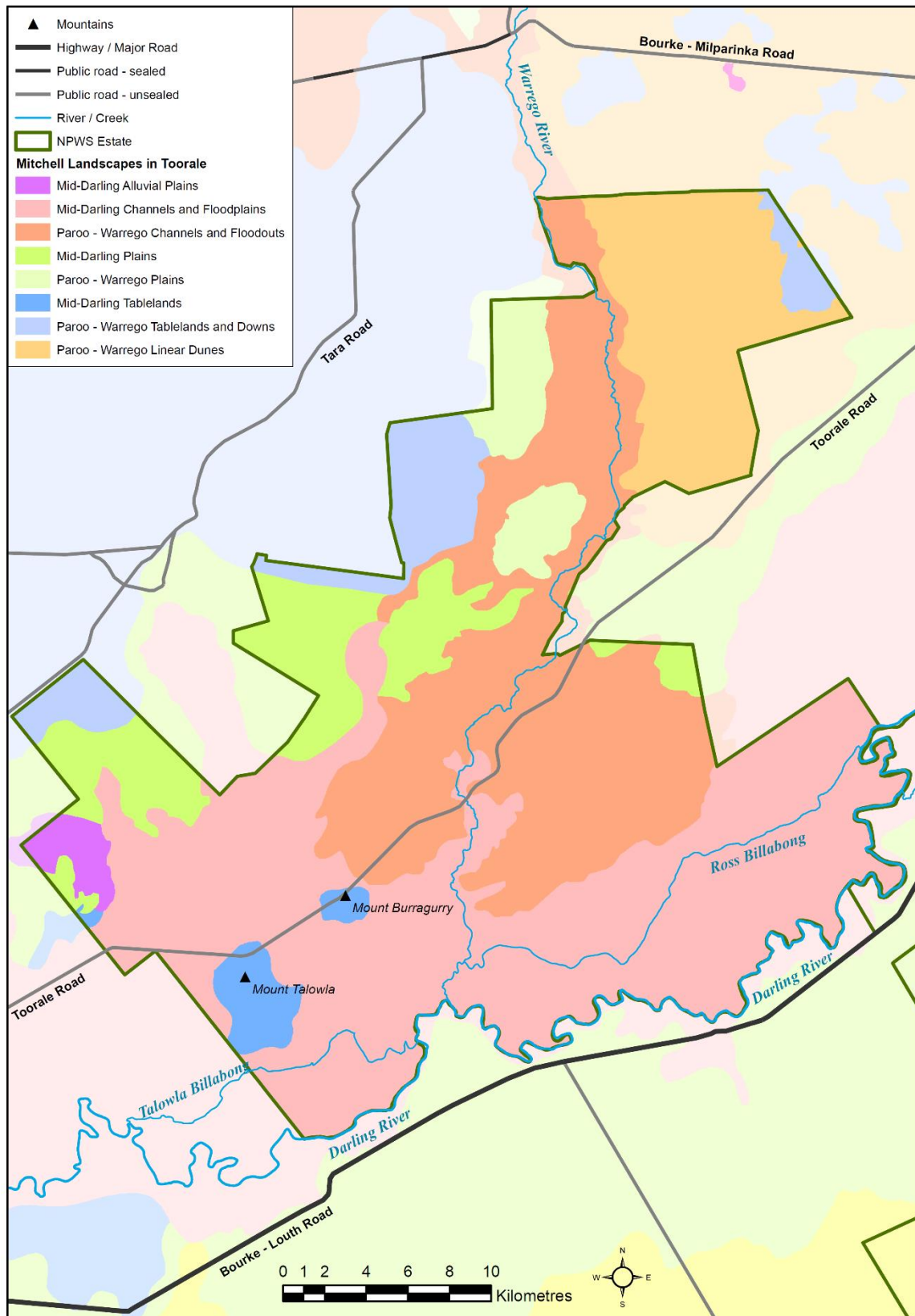
## Appendix A. Land systems

Land systems identified on Toorale (Walker 1991) (NOTE: map will be updated/improved post-exhibition)



## Appendix B. Mitchell Landscapes

Mitchell Landscapes identified on Toorale (Mitchell 2008)



## **Appendix C. Toorale dams**

### **Boera Dam**

- Boera Dam was constructed in the 1880s to store water and increase the frequency of water spilling to the western floodplain. Approximately 1500 megalitres (ML) can be stored in the dam before it bywashes to the western floodplain (P Terrill 2013, pers. comm.).
- Water passes through Boera Dam via two 1200-millimetre diameter gated pipes. The maximum pipe discharge is estimated to be 600 ML per day.
- Boera has two bywashes: a low-flow bywash on the western side of the storage and a high-flow bywash on the eastern side. A survey in 2013 indicates the eastern bywash is approximately 650 millimetres higher than the western bywash. The eastern bywash spills water back into the Warrego River downstream of Boera. The eastern bywash channel can cut off access to the regulator pipes from the eastern side during moderate flow events (P Terrill 2013, pers. comm.).
- The western bywash conveys water to the western floodplain. This bywash is a low-lying area, 50 to 100 metres wide, with several small braided channels running through it that shift the water pathway as the channels fill with silt. The western training embankment connects to the western side of the main Boera embankment.
- Boera Dam's irrigation licences (including a licence to extract 972 ML above Boera, and another to extract 1134 ML from Boera) are held by CEWH, along with Boera Dam's 9720-megalitre high-flow licence.
- The Minister administering the National Parks and Wildlife Act holds works approvals for Boera Dam and the associated embankments and Boera's stock water entitlement of 7ML.

### **Twelve Mile Dam**

- Twelve Mile Dam is located approximately 7 kilometres south of Boera. The dam was constructed in the 1880s to provide additional stock and domestic storage and originally consisted of an earth embankment crossing the Warrego River.
- Twelve Mile Dam central embankment wall was breached after 1973 and never reinstated.
- The dam now consists of left and right embankments and a gap of approximately 30 metres across the river channel. The right embankment has also been breached near its eastern end where it meets the natural ground level. It is no longer a viable storage, however, water does back up during high-flow events.
- The Minister administering the National Parks and Wildlife Act holds the works approval for Twelve Mile Dam and its stock and domestic water entitlement.

### **Booka Dam**

- Booka Dam is located approximately 6 kilometres south of Twelve Mile Dam and was constructed in the 1880s to provide additional water for stock use.
- Booka Dam stretches across the original Warrego River floodplain and consists of an earth embankment approximately 500 metres long that crosses Toorale's eastern boundary. Part of the dam wall sits on the neighbouring property, Booka Station.
- Two 1220-millimetre diameter pipes with regulator valves were installed beneath the embankment wall in 1965 to allow approximately 600 ML per day to be released downstream. The original outlet structure was replaced in the early 1990s by the cement pipes located west of the superseded structure.

- Two other smaller embankments (one with a small diameter pipe) and a small channel are further west of the main embankment and act as bywashes during high flows.
- The Minister administering the National Parks and Wildlife Act holds Booka Dam's works approval and stock water entitlement.
- The works approval for Booka Dam is issued to NPWS with a permissive occupancy granted by the owners of Booka Station to allow Toorale owners to have part of the dam on Booka Station.

#### **Homestead Dam (also known as Keernie Dam)**

- Homestead Dam is a 540-metre embankment located approximately 15 kilometres downstream of Booka Dam. Homestead Dam was breached during a large flow in 2010. The breach is located approximately 100 metres west of the regulator pipes. Repairing the breach would create an opportunity to address barriers to fish passage. When operational, the dam has a storage capacity of approximately 1500 ML.
- Homestead Dam was constructed in about 1876 and provided water to the main Toorale Homestead, gardens and associated outbuildings. A levee is also located along the high-water level of the storage to protect the homestead buildings and other infrastructure from elevated water levels caused by the main embankment. Sandbags have been used to reinforce the levee in several locations.
- Two 1200-millimetre diameter regulated pipes have been installed through the embankment at the original river bed level, allowing approximately 500 ML per day to flow downstream.
- A bywash is located on the eastern side of Homestead Dam.
- The Minister administering the National Parks and Wildlife Act holds the works approval for Homestead Dam and the stock and domestic water entitlement.

#### **Dicks Dam**

- Dicks Dam was originally constructed in the 1880s and is approximately 6 kilometres downstream of Homestead Dam.
- In October 1951, the then Department of Main Roads advised the owners of Toorale that a causeway crossing the Warrego River at Dicks Dam would be built, raising the level of the dam. The dam wall now forms an 800-metre long bituminised causeway as part of Toorale Road.
- Dicks Dam causeway contains one open 450-millimetre pipe, with a 60-metre wide concrete causeway to allow high flows to pass over the road.
- Dicks Dam stores water on Toorale, and the Minister administering the National Parks and Wildlife Act holds the works approval for Dicks Dam and the dam's stock water entitlement. As the dam wall sits within a public road administered by Bourke Shire Council (see Section 3.2), an agreement with Bourke Shire Council is needed to formalise arrangements for access, maintenance and any works to the structure.

#### **Peebles Dam (also known as Peoples Dam)**

- Peebles Dam is Toorale's southernmost Warrego dam and is approximately 9 kilometres downstream of Dicks Dam. A lower-level version of Peebles Dam was constructed in the 1870s to divert water into Ross Billabong and supply the woolshed and wool scour. The dam washed out in the 1950s and a higher version of the dam was constructed in 1983, as part of a 2840-metre embankment known as Duncan's Wall.

- Duncan's Wall continues south-east beyond Peebles Dam and creates the Ross Billabong and Peebles storage area that supported the former station's main irrigation area.
- Peebles Dam has two 1200-millimetre diameter regulated pipes within the main Warrego River channel (installed in 2002), and a 750-millimetre diameter regulated pipe within a smaller channel off the main river channel (this pipe was the dam's only outlet until 2002).
- The Peebles Dam bywash is located at the eastern end of Duncans Wall, beyond the Ross Billabong crossing.
- Peebles Dam's 6000 ML entitlement is held by CEWH.
- The Minister administering the National Parks and Wildlife Act holds the works approval for Peebles Dam and a stock and domestic water entitlement of 9ML.

### **Ross Billabong**

- Under previous ownership, a pumping station on the Darling River harvested flow and delivered it to Ross Billabong via a distribution channel. A second set of pumps extracted an equivalent volume of water from Ross Billabong and delivered it to Toorale's main irrigation channel for use in the irrigated cropping area. Darling River water was extracted under licence during the time of Toorale's irrigated cropping activities (1982 to 2008). These pumps have not been activated since Toorale was acquired and this has allowed the water that could have been extracted under the Darling River entitlements to pass downstream.
- Five licences to extract a total of 7672 megalitres from the Darling River are held by CEWH. The Minister administering the National Parks and Wildlife Act holds several works approvals for the Darling River pumps and the lift pumps in Ross Billabong.



## Appendix D. Vegetation classes and communities of Toorale

Statewide vegetation class (from Keith 2004)	Vegetation communities (from Gowans et al. 2012)	VIS PCT VCA ID	% of Toorale vegetation
Riverine Chenopod Shrublands	Chenopod Low Open Shrubland (floodplain)	212	40%
	Anthropogenic herbland/crop	212	3%
North-west Floodplain Woodlands	Coolibah Open Woodland Wetland with Chenopod/Grassy Ground Cover	40	20%
	Black Box Woodland Wetland	37	<1%
	Coolibah – River Cooba – Lignum Woodland Wetland	39	<1%
	<i>These three communities are all part of the Coolibah – Black Box Woodlands Endangered Ecological Community</i>		
	Poplar Box Grassy Low Woodland	207	9%
Inland Floodplain Shrublands	Canegrass Swamp Tall Grassland Wetland	24	<1%
	Eurah Shrubland	115	<1%
	Lignum Fuchsia Shrubland	n.d.	<1%
	Lignum Shrubland Wetland	25	6%
	River Cooba Swamp Wetland	241	<1%
Sand Plain Mulga Shrublands	Hooked Needlewood – Needlewood – Mulga – Turpentine Bush Open Shrubland	199	<1%
	Narrow-leaved Hopbush – Scrub Turpentine – Senna Shrubland	143	6%
	Sand Plain Mulga Tall Shrubland	119	2%
	White Cypress Pine – Mulga Shrubland	69	<1%
Western Peneplain Woodlands	Beefwood/Coolibah Woodland	n.d.	<1%
	Ironwood Woodland	134	7%
Gibber Transition Shrublands	Gidgee Chenopod Woodland	118	1%
	Whitewood – Western Rosewood Low Woodland	137	2%
Inland Floodplain Swamps	Shallow Freshwater Wetland Sedgeland	53	1%
Inland Rocky Hill Woodlands	Gum Coolibah Woodland	104	1%
Semi-arid Sand Plain Woodlands	Belah / Black Oak – Western Rosewood – Leopardwood Low Open Woodland	59	11%

<b>Statewide vegetation class (from Keith 2004)</b>	<b>Vegetation communities (from Gowans et al. 2012)</b>	<b>VIS PCT VCA ID</b>	<b>% of Toorale vegetation</b>
Stony Desert Mulga Shrublands	Chenopod Low Open Shrubland (stony rises)	120	1%
	Mulga Shrubland on Stony Rises	120	2%
North-west Plain Shrublands	Leopardwood Low Woodland	144	<1%
	Supplejack Woodland	264	<1%
Inland Riverine Forest	River Red Gum Tall to Very Tall Open Forest / Woodland Wetland	36	<1%

n.d. = not described in VIS

## Appendix E. Culturally significant plants

Adapted from culturally significant bush tucker and medicine plants found on Toorale (Martin et al. 2013). Note this is not an exhaustive list, many other culturally significant plants are likely to occur in Toorale.

Plant name	Aboriginal name (where known)	Description and where found (if documented)	Traditional use by Aboriginal people
Bush bean ( <i>Rhyncharrhena linearis</i> )		A vine that grows up trees, usually in rocky or sandy soils.	Elders remember gathering the fruit to eat, back in the 1950s. Fruit is thin, like a green bean.
Caustic weed ( <i>Chamaesyce drummondii</i> )		A small plant that grows flat on the ground, usually found in the red country of Toorale.	The milky sap is used to treat cuts, sores, warts and scabies.
Emu apple ( <i>Owenia acidula</i> )	<i>Gruei</i> or <i>Moalie</i>	Large numbers on the north-east sand plain to the north of Boera Dam.	The fruit is a dark colour, about the size of a small peach, with a large seed and acid flesh unless very ripe. Elders describe eating the fruit when very ripe, or rolling the fruit in sugar, or making cordial from it.
Wild banana ( <i>Marsdenia australis</i> )	<i>Karkalla</i>	A vine that grows up and over bushes and trees, on Toorale's red country. Found on the sand plain between the Warrego and western floodplain, in the Dara area, and in the north-east sand plain.	A green fruit, shaped like a small banana. A favourite food. Fruit is cooked in the ashes and tastes like artichoke or zucchini. The young green seeds taste like fresh peas. The plant also has starchy roots like yams that can be baked in ashes like potato. Leaves and flowers are also eaten.
Quandong ( <i>Santalum acuminatum</i> )	<i>Kulpaka</i>	Not known if this species is still present on Toorale. Not recorded in Gowans et al. (2012).	Fruit can be eaten when ripe or cooked as stewed fruit or in pies, etc. The nut is also edible and can be eaten fresh, although it is reportedly better dried and is similar to a macadamia.
Bignonia emubush or dogwood ( <i>Eremophila bignoniiflora</i> )	<i>Kulyumarra</i>	Grows on the floodplains of the Darling and Warrego rivers.	An important medicine plant. The tree's leaves are boiled up and used as a medicine for cuts, sores, rashes, etc. It can also be drunk in small amounts or heated up and the steam inhaled for colds, flu and chest infections.

Plant name	Aboriginal name (where known)	Description and where found (if documented)	Traditional use by Aboriginal people
Mistletoe ( <i>Amyema</i> and <i>Lysiana</i> species)	<i>Maathi</i> or <i>Snottygobbles</i>	<i>Maathi</i> are parasites that grow on different trees, including gum and box trees, coolibah and mulga. The leaves mimic the host tree's leaves.	The <i>maathi</i> flowers and fruits look different to other individuals, depending on the host tree, but taste similar. The fruit is sweet, perfumed and very sticky (which is why it is called ' <i>snottygobbles</i> ').
Wild orange ( <i>Capparis mitchellii</i> )	<i>Mukirli</i>	Found near the Kurnu-Baakandji Culture Camp and scattered through the central and north-east sand plain areas, and lower slopes of hills on Toorale.	The fruit is eaten when it is very ripe and when the tree's perfume is strong.
Old man weed ( <i>Centipeda</i> species)		Found on the Warrego floodplain upstream from Boera. It grows in damp hollows and along the Darling and Warrego rivers after floods and rain.	The plant is boiled and the steam inhaled or is drunk in small amounts to treat colds. Also used on skin rashes.
Pigface ( <i>Sarcozona praecox</i> / <i>Disphyma crassifolium</i> )	<i>Kaanpi</i>		The plant's fruit is eaten and the leaves are also eaten as a salad. The juice from the leaves is used to treat sore eyes.
River mint ( <i>Mentha australis</i> )	<i>Pukumburra</i>	Grows in black soils on Toorale's floodplains.	Contains many vitamins and is used to treat colds. It can be made into a tea to drink, or inhale the steam from boiled leaves. It is also eaten as a green in salads or stews.
Quinine ( <i>Alstonia constricta</i> )		A small to medium-sized tree that grows on the central and north-east sand plains at Toorale.	The Kurnu-Baakandji People and northern neighbours boil up the tree's bark and roots and use the liquid for skin rashes and other serious health problems.

Plant name	Aboriginal name (where known)	Description and where found (if documented)	Traditional use by Aboriginal people
Wild lime ( <i>Eremocitris glauca</i> )		Grows on low hills with a red-brown loam soil. Found on the low hills or rolling downs along the Dara area southern boundary of Toorale.	Leaves smell like lime leaves when crushed. Fruits are small limes than can be eaten raw but make good marmalade or chutney.
Wild plumbush ( <i>Santalum lanceolatum</i> )		Grows in sandier areas near creeks and is near Homestead Dam.	Fruit of this tree is eaten when it is dark red or dark purple and is sweet.
Wild tomato or bush tomato ( <i>Solanum esuriale</i> and similar species)	<i>Goomitj</i>	The Darling and Warrego floodplains, low hills near Darra and the sand plain.	Often plentiful after rain. The green to yellow fruit is like a small tomato with a thick skin. <i>Goomitj</i> need to be cooked before eaten – in the ashes, boiled in a billy or dried in the sun.
Wild currant ( <i>Psyrax latifolia</i> )		Small trees that are plentiful on sandplain areas around the bores on Toorale, and towards the Warrego River.	A small berry that can only be eaten when it is very ripe and shiny dark purple or black.
Water bush ( <i>Myoporum montanum</i> )		Small tree or shrub growing along creeks and near water (sometimes water is underground and the water bush will tell you where).	Has a small fruit, only edible when very dark purple.
Warrior bush ( <i>Apophyllum anomalum</i> )		Small bush with leaves like small twigs.	Small purple fruit can be eaten and the wood used for artefacts.
Wild cherry (or Cherry Ballarat) ( <i>Exocarpos cupressiformis</i> )		Bush with leaves like twigs. There is one in front of the Kurnu-Baakandji Cultural Camp.	Small pink to red berries that can be eaten.
Western rosewood ( <i>Alectryon oleifolius</i> )		Small tree growing on sand plains and lower slopes of hills.	Green fruit with a red section around the seed – can be eaten when the fruit splits open.

Plant name	Aboriginal name (where known)	Description and where found (if documented)	Traditional use by Aboriginal people
Ruby saltbush ( <i>Enchylaena tomentosa</i> and <i>Rhagodia spinescens</i> )		Both species are ground covers and grow in many parts of Toorale, usually under trees.	Both species have small juicy fruits. <i>R. spinescens</i> fruit is ruby coloured; <i>E. tomentosa</i> fruit can be red, yellow or ruby coloured.
Gitji (or Gidgee) gum ( <i>Acacia cambagei</i> )		Gitji grows on the red country, but only where there is a special kind of red-brown soil with clay underneath that often forms gilgais.	Gitji gum is a favourite food for Kurnu People. The gum is collected from the tree trunks and eaten as it is or soaked in water to make jellies. Elders would nick the bark with an axe so when they came back there would be gum oozing out.  Gitji flower smell marks a seasonal change and gets stronger when rain is coming.
Leopardwood gum ( <i>Flindersia maculosa</i> )		Leopardwood trees grow on the red country of Toorale.	The gum can be eaten straight from the tree or made into a jelly or a toffee (mixed with sugar and cooked).
Whitewood gum and seeds ( <i>Atalaya hemiglauca</i> )		A medium-sized tree that grows on the red country in Toorale but only in certain soils, such as sand islands on the floodplain.	The gum is eaten and the seeds, like small peanuts, are also eaten.
Mulga ( <i>Acacia aneura</i> ); gundabloui ( <i>A. victoriae</i> ); coobah ( <i>A. stenophylla</i> ) seeds	<i>Malka, Kathuru</i> and <i>Maapu</i>	Mulga is found on low stony ridges and sandplains; gundabloui are found along creeks, and coobah is on the banks of the Warrego and Darling rivers.	These seeds were roasted and made into a paste. Coobah was also roasted in the green pod and eaten like a pea. Roasted and roughly crushed wattle seed is added to damper and biscuits.
Crowfoot ( <i>Erodium crinitum</i> )		A herb that is found on the Darling River floodplain, particularly after winter rains.	All parts of the herb are edible, especially the taproot that is like a potato.

Plant name	Aboriginal name (where known)	Description and where found (if documented)	Traditional use by Aboriginal people
Tarvine ( <i>Boerhavia dominii</i> )		A herb that grows close to the ground and spreads out for about a metre. Grows in a variety of soils but particularly sandy topsoil with clay underneath. Grows mainly after winter rains. Pigs are known to dig up the taproot.	Starchy taproot is cooked and eaten like potato.
Pigweed or portulaca ( <i>Portulaca oleracea</i> )		A herb that grows close to the ground.	Soft succulent leaves and stalks and a taproot, all of which can be eaten. Tiny black seeds in the fruit are very nutritious. Plants are pulled up and left to dry on a skin rug or sheet of bark, and tiny seeds pop onto the rug or bark so they are easy to collect.
Milk thistle ( <i>Sonchus oleraceus</i> )	<i>Palumpa</i>	A herb that grows 30–50 cm high.	Leaves can be eaten raw, if they are young, steamed in a ground oven, or cooked in stews and curries. Stalks can be eaten raw like celery. Maori people call this plant <i>puha</i> .
Menindee clover ( <i>Trigonella suavissima</i> )	<i>Buntha</i>		A native clover with a very strong smell. Steamed in ground ovens and eaten like spinach.
Peppercress ( <i>Lepidium</i> and <i>Blennodia</i> species)			A leafy herb that is steamed in ground ovens and some species are eaten in salads.
Wild spinach (or Warrigal greens, native spinach) ( <i>Tetragonia tetragonioides</i> )		A herb that grows close to the ground.	Eaten raw or steamed in a ground oven, or added to stews or curries.
Grass seeds	<i>Paapa</i>		Grass pulled up and piled into heaps, seeds drop and are swept up. Seeds are then ground on grindstones into a porridge or baked into Johnny cakes.

Plant name	Aboriginal name (where known)	Description and where found (if documented)	Traditional use by Aboriginal people
Nardoo ( <i>Marsilea drummondii</i> )	<i>Ngartu</i>	A wetland fern that grows on Toorale's western floodplain, in shallow water and on wet ground.	Nardoo has a large seed that is swept up from dried-out ground and pounded up with a mortar and pestle then ground into a paste. The paste needs to be cooked to make it digestible.



## Appendix F. Culturally significant animals

Culturally significant animals found on Toorale (Martin et al. 2013).

Note this is not an exhaustive list, other culturally significant animals occur on Toorale.

Animal name	Aboriginal name (if known)	Traditional use by Aboriginal people
Brolga ( <i>Grus rubicunda</i> )		The brolga is considered very special by the Kurnu-Baakandji People and is never killed. Brolgas are considered to be Kurnu family because they dance like Aboriginal people at a ceremony.
Emu ( <i>Dromaius novaehollandiae</i> )	<i>Kalthi</i>	<p><i>Kalthi</i> is a favourite food of the Kurnu-Baakandji People who believe they need this food to stay healthy. Emu fat (along with fat from goanna, echidna and fish) is rich in omega-3 essential fatty acids. The fat is eaten and used on skin rashes and arthritic joints.</p> <p>A traditional method of cooking of <i>Kalthi</i> involves gutting and plucking the bird, rubbing it with blood and placing it in a <i>winthu</i> (ground oven) leaving its head out. When the steam comes out of the emu's mouth the bird should be cooked.</p> <p><i>Kalthi</i> eggs are a popular traditional food of the Kurnu-Baakandji. The egg is blown from the shell so the shell can be used for carving or painting on. Other traditional ways of cooking <i>Kalthi</i> eggs are rolling the egg in ashes slowly until it is cooked (like a boiled egg); or making a hole in the top of the egg, placing the egg on ashes and stirring the yolk and white with a stick as it cooks.</p> <p><i>Kalthi</i> were caught by the Kurnu-Baakandji using nets, snares, traps or were speared from hunting hides. A special short didgeridoo with gum or 'Johnny cake' on top, called a <i>mumpinyi yarra</i>, was blown to make a sound like an emu, bringing the birds down towards the hunters. This method was still used when hunters had guns (in the 1950s).</p>
Fish	<i>Kuyu</i>	Favourite fish include cod ( <i>parntu</i> ), yellow belly or perch ( <i>kunpali</i> ), black bream ( <i>pangala</i> ), catfish ( <i>yamaka</i> ) and bony bream ( <i>nhaampa</i> ).
Freshwater mussels: river mussel ( <i>Alathyria jacksoni</i> ) and lake mussel ( <i>Velesunio ambiguus</i> )		River mussels are usually found in the river channel where the water usually flows strongly. Lake mussels are only found in the still or slow-moving water of lakes, swamps and sometimes billabongs. Mussels were used for food and shell middens are found on the Darling and Warrego rivers and their wetlands. However, the Kurnu report that water quality changes in more recent times have made the mussels less tasty. Mussels are frequently used as bait.

Animal name	Aboriginal name (if known)	Traditional use by Aboriginal people
Freshwater snails ( <i>Notopala sublineata</i> )		Clusters of whole shells are found in some of the middens along rivers, creeks and lakes. Kurnu People report the snails are now 'virtually extinct' throughout their natural range. Traditionally cooked and eaten but mostly used as bait.
Goannas and lizards		<p>Goannas are very popular foods among the Kurnu-Baakandji and several species are found on Toorale: sand goanna is preferred, but the Kurnu also eat river goannas. Kurnu oral history indicates the Darling River has had many water monitors or small goannas living in and on the edge of the water.</p> <p>Goannas are cooked in a <i>winthu</i> or in a shallow hole and covered with ashes (the legs must be dislocated before cooking this way). Smaller lizards such as the <i>kaltu</i> (bog-eye, <i>Tiliqua rugosa</i>) and <i>kaani</i> (frilled lizard, <i>Chlamydosaurus kingii</i>) are also cooked this way. Goanna eggs are also found buried in sandy areas on Toorale.</p>
Grubs and grub galls		<p>A range of different grubs are traditional foods for the Kurnu People. The <i>piityala</i> or large witchetty grub (<i>Endoxyla leucomochla</i>) is found in the trunk of the river red gum. The <i>parti</i> is found in the roots of the river red gum. Other popular grubs are found in the roots of the rolypoly bush.</p> <p>Other small grubs form galls on plants that can be eaten like a fruit. The mulga apple is like a small starchy apple and has a grub in the centre. The gooey pipe is another insect gall that is hard and can be used to make pipes and the insect eaten.</p>
Lerp		Made by insects and are edible sticky droplets or white sticky fluff on leaves and branches. Mainly formed on river red gums and coolibah trees.
Red kangaroo ( <i>Macropus rufus</i> )	<i>Thaltha</i>	<p>The Kurnu-Baakandji eat red kangaroo meat and attribute numerous health benefits to this food source. Western grey kangaroo (<i>kilpatja</i>) and Euro (<i>yuurruru</i>) are only eaten by the Kurnu-Baakandji if very hungry or when travelling to another group's country.</p> <p>Red kangaroo meat is traditionally cooked in a ground oven (<i>winthu</i>) when a large group come together to eat, or grilled on coals.</p>
Shrimp		Found in rivers, billabongs and swamps and are eaten and used for bait. Caught in shrimp tins (a container with holes and some meat in it).

Animal name	Aboriginal name (if known)	Traditional use by Aboriginal people
Black swans ( <i>Cygnus atratus</i> )		Considered special by the Kurnu because they mate for life and the remaining swan would cry for the other. Swans are only killed if people are very hungry.
Turtles		Turtles are a traditional bush-tucker food. Short-necked turtle ( <i>Emydura macquarii</i> ) is preferred over the long-necked turtle ( <i>Chelodina longicollis</i> ). Turtles are cooked in the shell upside-down on the ashes so the juices collect in the shell. Turtle eggs are also eaten (found buried in sandy areas near the water edges).
Waterbirds		Smaller waterbirds have been traditionally eaten in large numbers, especially ducks that were caught with long nets. Ducks can be wrapped in clay and cooked in the ashes, the feathers coming off when the clay is broken away. Duck hunting in the early 1900s at Toorale has been recorded. The Aboriginal women used to make a kind of string from the river weeds and then weave it into large nets that were stretched across the Warrego – they would throw special boomerangs, with holes drilled in them, and that made a noise like the call of a hawk. The ducks would become frightened and dive low into the net and become entangled in the net. The supporting ropes would be immediately [cut] with knives by the hunters in a concealed position. The snared ducks would then be caught by the menfolk and then roasted on an open fire.
Yabbies ( <i>Cherax destructor</i> )	Wiithi	Common in billabongs and man-made dams. The Warrego River has more yabbies than the Darling.

## Appendix G. Toorale's built heritage

Group of buildings Building name (plan of management)	Heritage value (as per CMP)	CMP/HHI number
<b>Toorale Homestead Precinct</b>		
Toorale Homestead	State/National	BT016
Toorale Homestead meat house <sup>a</sup>	State/National	BT017
Blacksmith & carpenters' workshop	State	BT022
Stables	State	BT023
Motor garage	State	BT021
Elevated water tanks	State	BT020
Boera Homestead (removed from the park in 2016)	Moderate local	BT027
Demountable (red)	Low local	BT029
White cottage	Low local	BT030
<b>Other buildings in the Toorale Homestead area</b>		
Station Manager's House	Moderate local	BT031
Toorale Homestead sheds, yards and other built items	Low local	BT018
Fuel store shed & pump	Low local	BT019
Round horse yard	High local	BT024
Poultry run	Low local	BT025
Fuel drum store & concrete slab	Low local	BT026
Carport	No value	BT028
Cattle yards (west of Culture Camp)	Low local	BY032
Skin shed (west of Culture Camp)	Moderate local	BY033
<b>Old Toorale Woolshed and sheep yards</b>		
Old Toorale Woolshed	State/National	BS001
Old Toorale Woolshed sheep yards	State/National	BS002
Pumping Station 2	Low local	BS0015
Accommodation Hut 1	Moderate local	BS003
Shearers Accommodation Hut 2	Moderate local	BS004
Ablution Block (Brick)	Moderate local	BS005
Cook's Hut	Moderate local	BS006
Shearer's Dining Room & Kitchen	High local	BS007
Old Shearers Quarters Meat House	Moderate local	BS008
Shed possibly a toilet	Low local	BS009
Old shower block	Low local	BS010
Overseers Quarters Toilet	High local	BS011

<b>Group of buildings Building name (plan of management)</b>	<b>Heritage value (as per CMP)</b>	<b>CMP/HHI number</b>
Generator shed	Moderate local	BS012
Crutching shed & yards	Moderate local	BS013
Pumping equipment & shed	Low local	BS014
<b>Kurnu-Baakandji Cultural Camp (Toorale shearers' quarters)</b>		
Toorale shearers' quarters	Low local	BN044
Toorale shearers' quarters kitchen and dining room	Low local	BN045
Toorale shearers' quarters meat house	State	BN040
Barbeque shelter	No value	BN041
Cook's room	Low local	BN042
Ablutions & toilet block	Low local	BN043
<b>Akuna Homestead <sup>a</sup></b>		
Akuna Homestead	Low local	BA046
Polly's Studio	Low local	BA047
Akuna storage shed	Low local	BA048
Akuna dog run & kennel	Low local	BA049
Skillion Shed	Low local	BA050
Meat house	Low local	BA051
Poultry yard	Low local	BA052
Stock yards	Low local	BA053
Vehicle shed	Low local	BA054
Workshop/garage	Low local	BA055
Akuna sheep yards	Low local	BA056
Pontoon & steps	No value	BA057
<b>Original Boera Homestead site</b>		
Boera shed remnant	Moderate local	BB070
<b>Dara Homestead ruins <sup>a</sup></b>		
Dara shearing shed <sup>b</sup>	Moderate local	BD058
Dara sheep yards	Moderate local	BD059
Shearers amenities	Low local	BD060
Dara cattle yards	Low local	BD061
Dara Homestead <sup>b</sup>	Low local	BD062
3 room wing	Low local	BD063
Dara sheep yards (south)	Low local	BD064

<b>Group of buildings Building name (plan of management)</b>	<b>Heritage value (as per CMP)</b>	<b>CMP/HHI number</b>
<b>Acton Hill complex <sup>a</sup></b>		
Acton Hill shearing shed	Moderate local	BD065
Acton Hill sheep yards	Moderate local	BD066
Acton Hill shearers toilet	Moderate local	BD067
Acton Hill outbuilding complex	Moderate local	BD068
Acton Hill cattle yards	Moderate local	BD069
<b>Homestead Dam Shearing Precinct</b>		
Quonset hut	Moderate local	BN034
Nissen hut	Moderate local	BN035
Homestead Dam shearing shed	Moderate local	BN038
Homestead Dam hangar	Moderate local	BN039
Sheep yards	Moderate local	BN036
Shearer's toilet (Nissen hut)	Low local	BN037
<b>Irrigation Precinct</b>		
Irrigation Precinct Buildings	All low local	BI071

Notes:

<sup>a</sup> The significance of some items, such as the Toorale Homestead meat house (BT017) has been elevated because of its association with and proximity to Toorale Homestead. Assessed as an individual building it is of local significance. In the same way, items of low/no significance in the Akuna, Dara and Acton Hill groups have an elevated level of significance because they are part of a group of related items with a shared history.

<sup>a</sup> Dara shearing shed was damaged beyond repair during a wind storm. It has been decommissioned and made safe. Dara Homestead has also been badly damaged.

CMP = Toorale Conservation Management Plan.

HHI = Toorale Historic Heritage Inventory Study – inventory sheet number.

## References

- ALA 2013, Atlas of Living Australia, accessed 28 February 2013, <http://biocache.ala.org.au/occurrences/search?q=lsid:urn:lsid:biodiversity.org.au:apni.taxon:55936#>.
- ArtStation 2016, *Pallimnarchus*, model for Lost Creatures exhibition at Queensland Museum, illustration by Vlad Konstantinov, [www.artstation.com/artwork/Lga0r](http://www.artstation.com/artwork/Lga0r).
- Aurecon 2009, *Toorale Station Decommissioning Plan*, report prepared for the Department of Environment, Water, Heritage and the Arts, Canberra.
- Australian Government 2012, Toorale Environmental Watering Plan, unpublished report, Australian Government.
- Bates B & Martin S 2000, Badger Bates' Oral History Project, for the Western Cultural Heritage Unit, NSW National Parks and Wildlife Service, Dubbo.
- Benson JS 2006, New South Wales Vegetation Classification and Assessment: Introduction – the classification, database, assessment of protected areas and threat status of plant communities, *Cunninghamia*, vol. 9, no. 3, pp. 331–382.
- Benson JS 2008, New South Wales Vegetation Classification and Assessment: Part 2 Plant communities of the NSW South-western Slopes Bioregion and update of NSW Western Plains plant communities, Version 2 of the NSWVCA database, *Cunninghamia*, vol. 10, no. 4, pp. 599–673.
- Benson JS, Allen CS, Togher C & Lemmon J 2006, New South Wales Vegetation Classification and Assessment: Part 1 Plant communities of the NSW Western Plains, *Cunninghamia*, vol. 9, no. 3, pp. 383–450.
- 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, no. 4, pp. 457–579.
- Bourke Shire Council 2012, Bourke Local Environmental Plan 2012, [www.bourke.nsw.gov.au/planning-and-environment/local-environmental-plan-lep](http://www.bourke.nsw.gov.au/planning-and-environment/local-environmental-plan-lep).
- Cox SJ, Thomas RF & Lu Y 2012, Flooding Patterns of Toorale: the confluence of the Warrego and Darling rivers, unpublished report to Office of Environment and Heritage, Sydney.
- Cunningham GM 1970, Waterponding on scalds, *Journal of the Soil Conservation Service of NSW*, vol. 26, pp. 146–171.
- Cunningham GM, Walker PJ & Green DR 1976, *Rehabilitation of Arid Lands – 10 years of Research at Cobar, New South Wales*, Soil Conservation Service of NSW, Sydney.
- DECC 2007, *Introducing the NSW Threatened Species Priorities Action Statement (PAS)*, Department of Environment and Climate Change, Sydney, NSW, [www.environment.nsw.gov.au/resources/threatenedspecies/threatspepcpas07168.pdf](http://www.environment.nsw.gov.au/resources/threatenedspecies/threatspepcpas07168.pdf).
- DECCW 2010a, *Aboriginal Partnerships Policy*, Final draft 26 October 2010, NSW Department of Environment, Climate Change and Water, Hurstville.
- DECCW 2010b, *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, <http://climatechange.environment.nsw.gov.au/Impacts-of-climate-change/2010-NSW-climate-impact-reporting>.

- DEH 2005, *Threat Abatement Plan for Predation, Habitat Degradation, Competition and Disease Transmission by Feral Pigs*, Department of Environment and Heritage, Canberra, [www.environment.gov.au/cgi-bin/sprat/public/publicshowkeythreat.pl?id=11](http://www.environment.gov.au/cgi-bin/sprat/public/publicshowkeythreat.pl?id=11).
- Department of Environment 2015, Australian Government, Canberra, National Heritage Database, accessed 29 July 2015, [www.environment.gov.au/cgi-bin/ahdb/search.pl](http://www.environment.gov.au/cgi-bin/ahdb/search.pl).
- DEWHA 2008a, *Threat Abatement Plan for Competition and Land Degradation by Rabbits*, Department of the Environment, Water, Heritage and the Arts, Canberra, [www.environment.gov.au/biodiversity/threatened/publications/tap/competition-and-land-degradation-rabbit](http://www.environment.gov.au/biodiversity/threatened/publications/tap/competition-and-land-degradation-rabbit).
- DEWHA 2008b, *Threat Abatement Plan for Predation by the European Red Fox*, Department of Environment, Water, Heritage and the Arts, Canberra, [www.environment.gov.au/resource/predation-european-red-fox](http://www.environment.gov.au/resource/predation-european-red-fox).
- DoE no date, National Reserve System, Commonwealth Department of Environment, Canberra, accessed March 2016 at [www.environment.gov.au/land/nrs](http://www.environment.gov.au/land/nrs).
- DoE 2009, *Listed Key Threatening Processes*, Department of the Environment, [www.environment.gov.au/cgi-bin/sprat/public/publicgetkeythreats.pl](http://www.environment.gov.au/cgi-bin/sprat/public/publicgetkeythreats.pl).
- DPI 2007, Primefact Number: 173, second edition, released/reviewed 11 Oct 2007, Department of Primary Industries, [http://www.dpi.nsw.gov.au/data/assets/pdf\\_file/0006/171573/Lowland-Darling-River-aquatic-ecological-community.pdf](http://www.dpi.nsw.gov.au/data/assets/pdf_file/0006/171573/Lowland-Darling-River-aquatic-ecological-community.pdf)
- DPI 2013, *NSW Biosecurity Strategy 2013–2021*, NSW Department of Primary Industries, NSW Trade and Investment, Orange, [www.dpi.nsw.gov.au/data/assets/pdf\\_file/0005/467699/NSW-biosecurity-strategy-2013-2021.pdf](http://www.dpi.nsw.gov.au/data/assets/pdf_file/0005/467699/NSW-biosecurity-strategy-2013-2021.pdf).
- DPI Water 2015a, *Barwon–Darling Catchment*, accessed March 2016 at: [www.water.nsw.gov.au/water-management/catchments/barwon-darling-catchment](http://www.water.nsw.gov.au/water-management/catchments/barwon-darling-catchment).
- DPI Water 2015b, *Warrego River Catchment*, accessed March 2016 at: [www.water.nsw.gov.au/water-management/catchments/warrego-catchment](http://www.water.nsw.gov.au/water-management/catchments/warrego-catchment).
- DSEWPaC 2013, *Advice to the Minister for Sustainability, Environment, Water, Population and Communities from the Threatened Species Scientific Committee (the Committee) on an Amendment to the List of Threatened Ecological Communities under the Environment Protection and Biodiversity Conservation Act 1999*, [www.environment.gov.au/biodiversity/threatened/communities/pubs/66-listing-advice.pdf](http://www.environment.gov.au/biodiversity/threatened/communities/pubs/66-listing-advice.pdf).
- FSC 2003, *Final Determination to List the Aquatic Ecological Community in the Natural Drainage System of the Lowland Catchment of the Darling River as an Endangered Ecological Community on Schedule 4 of the Fisheries Management Act*, Fisheries Scientific Committee, [www.dpi.nsw.gov.au/fisheries/species-protection/fsc/final](http://www.dpi.nsw.gov.au/fisheries/species-protection/fsc/final).
- Geoscience Australia 2012, *Australia's Longest Rivers*, accessed 16 December 2013, [www.ga.gov.au/education/geoscience-basics/landforms/longest-rivers.html](http://www.ga.gov.au/education/geoscience-basics/landforms/longest-rivers.html).
- Godden Mackay Logan Heritage Consultants & Trigger 2013, Toorale Interpretation Strategy, report produced for NSW National Parks and Wildlife Service.
- Gowans S, Milne R, Westbrooke M & Palmer G 2012, Survey of Vegetation and Vegetation Condition of Toorale, Version 1-1, unpublished report to Office of Environment and Heritage, Centre for Environmental Management, University of Ballarat, Mt Helen.
- Hercus LA 1993, *Baakandji Dictionary*, Australian Institute of Aboriginal and Torres Strait Islander Studies, Canberra.
- Keith D 2004, *Ocean Shores to Desert Dunes, The native vegetation of NSW and the ACT*, Department of Environment and Conservation, Sydney.



- Kelly L 2004, 'Toorale' Wildlife Refuge: Results of a Biodiversity Assessment on the 'Toorale' Wildlife Refuge, unpublished report prepared by Parks and Wildlife Division, New South Wales Department of Environment and Conservation.
- Martin S 2010, Preliminary Aboriginal Cultural Heritage Assessment of Toorale Station, unpublished report prepared for Far West Region, Culture & Heritage Division, DECCW.
- Martin S 2012, Toorale Boundary Fence Line & Fire Trail Archaeological & Cultural Heritage Survey, unpublished report prepared for Bourke Area, National Parks Division, Office of Environment and Heritage.
- Martin S 2013, Summary Report on Cultural Heritage Survey of Hell's Gate Tourist Campsite Area and Talowla Hill Road, Carpark & Walktrail, unpublished report prepared for Bourke Area, NPWS, Office of Environment and Heritage.
- Martin S and the Kurnu-Baakandji Elders 2013a, *Ngayi, Kiira Kiir-inana* Toorale Kurnu Baakandji Discovery Tours Manual, unpublished report compiled by Sarah Martin and the Kurnu-Baakandji Elders for National Parks and Wildlife Service.
- MDBA 2016, *Warrego*, Murray Darling Basin Authority, [www.mdba.gov.au/discover-basin/catchments/warrego](http://www.mdba.gov.au/discover-basin/catchments/warrego)
- Mitchell P 2008, *NSW Landscapes*, version 3, based on original mapping undertaken for NPWS in 2002. updated in 2008.
- Murray Darling Basin Authority 2012, *Basin Plan*, the plan prepared under subparagraph 44(2)(c)(ii) of the *Water Act 2007*, Commonwealth of Australia, Canberra, [www.comlaw.gov.au/Details/F2012L02240](http://www.comlaw.gov.au/Details/F2012L02240).
- NCFRP 2010, National Cultural Flows Research Project, accessed 11 December 2017, [www.culturalflows.com.au/~culturalflowscom/index.php?option=com\\_content&view=article&id=8&Itemid=122](http://www.culturalflows.com.au/~culturalflowscom/index.php?option=com_content&view=article&id=8&Itemid=122)
- NPWS 2003, *The Bioregions of NSW – Their biodiversity conservation and history*, NSW National Parks & Wildlife Service, Hurstville.
- NPWS 2012, *Toorale and Gundabooka Nature Tourism Action Plan*, NSW National Parks and Wildlife Service, Office of Environment and Heritage, Hurstville, [www.environment.nsw.gov.au/resources/parks/tourism/120271TooraleNTAP.pdf](http://www.environment.nsw.gov.au/resources/parks/tourism/120271TooraleNTAP.pdf).
- NRC 2009, *Riverina Bioregion Regional Forest Assessment: River Red Gums and Woodland Forests – Final Assessment Report*, Natural Resources Commission, Sydney.
- NSW DPI & OEH 2011, *Biodiversity Priorities for Widespread Weeds*, report prepared for the 13 Catchment Management Authorities by NSW Department of Primary Industries and Office of Environment & Heritage, Orange.
- 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](http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=20015).
- NSW SC 2000a, *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](http://www.environment.nsw.gov.au/threatenedspecies/HumanClimateChangeKTPListing.htm).
- 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](http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=20014).

- NSW SC 2000c, *Final Determination to List Predation by the Feral Cat Felis catus (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=20008](http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=20008).
- NSW SC 2002, *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](http://www.environment.nsw.gov.au/determinations/FeralEuropeanRabbitKTPListing.htm).
- NSW SC 2003, *Final Determination to List Invasion of Native Plant Communities by Exotic Perennial Grasses as a Key Threatening Process on Schedule 3 of the Threatened Species Conservation Act*, NSW Scientific Committee, [www.environment.nsw.gov.au/determinations/ExoticPerennialGrassesKTPListing.htm](http://www.environment.nsw.gov.au/determinations/ExoticPerennialGrassesKTPListing.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](http://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](http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=20020).
- NSW SC 2009, *Coolibah – Black Box Woodland of the Northern Riverine Plains in the Darling Riverine Plains and Brigalow Belt South Bioregions – reject delisting of ecological community*, NSW Scientific Committee, [www.environment.nsw.gov.au/determinations/coolibahblackboxrejectdelistfd.htm](http://www.environment.nsw.gov.au/determinations/coolibahblackboxrejectdelistfd.htm).
- NSW SC 2012, *Final Determination to List Coolibah – Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions as an Endangered Ecological Community on Schedule 1 of the Threatened Species Conservation Act*, NSW Scientific Committee, [www.environment.nsw.gov.au/determinations/coolibahblackboxdrpbbscpmlbiofd.htm](http://www.environment.nsw.gov.au/determinations/coolibahblackboxdrpbbscpmlbiofd.htm).
- OEH 2010, *NSW Climate Impact Profile*, Office of Environment and Heritage, Sydney, <http://climatechange.environment.nsw.gov.au/Impacts-of-climate-change/2010-NSW-climate-impact-reporting>.
- OEH 2011a, *NSW Threat Abatement Plan for Predation by the Red Fox (Vulpes vulpes)*, Office of Environment and Heritage, Sydney, [www.environment.nsw.gov.au/threatenedspecies/ThreatAbatementPlans.htm](http://www.environment.nsw.gov.au/threatenedspecies/ThreatAbatementPlans.htm).
- OEH 2011b, *Sustainable Mountain Biking Strategy*, Office of Environment and Heritage, Sydney, [www.environment.nsw.gov.au/parkmanagement/SustainableMtBStrategy.htm](http://www.environment.nsw.gov.au/parkmanagement/SustainableMtBStrategy.htm).
- OEH 2012a, *Strategic Directions for Horse Riding in NSW National Parks*, Office of Environment and Heritage, Sydney, [www.environment.nsw.gov.au/policies/HorseRideStrat.htm](http://www.environment.nsw.gov.au/policies/HorseRideStrat.htm).
- OEH 2012b, *Threatened species profiles*, Office of Environment and Heritage, Sydney, [www.environment.nsw.gov.au/threatenedSpeciesApp/](http://www.environment.nsw.gov.au/threatenedSpeciesApp/).
- OEH 2012c, *Toorale National Park Fire Management Strategy*, accessed 20 November 2013, [www.environment.nsw.gov.au/resources/firemanagement/final/120909TooraleNPFMS.pdf](http://www.environment.nsw.gov.au/resources/firemanagement/final/120909TooraleNPFMS.pdf).
- 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/fire/120690livfire.htm](http://www.environment.nsw.gov.au/fire/120690livfire.htm).

- OEH 2013b, *Regional Pest Management Strategy 2012–17, Far West Region: A new approach for reducing impacts on native species and park neighbours*, Office of Environment and Heritage, Sydney, [www.environment.nsw.gov.au/pestsweeds/RegionPestManagement.htm](http://www.environment.nsw.gov.au/pestsweeds/RegionPestManagement.htm).
- OEH 2013c, *Saving our Species*, Office of Environment and Heritage, Sydney, [www.environment.nsw.gov.au/savingourspecies/about.htm](http://www.environment.nsw.gov.au/savingourspecies/about.htm).
- OEH 2013d, Vegetation Information System Classification (VCA Web 2.0) database, Office of Environment and Heritage, NSW, accessed 28 February 2013, [www.environment.nsw.gov.au/NSWVCA20PRapp/LoginPR.aspx](http://www.environment.nsw.gov.au/NSWVCA20PRapp/LoginPR.aspx).
- OEH 2014a, *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](http://www.climatechange.environment.nsw.gov.au/Climate-projections-for-NSW/Climate-projections-for-your-region/Far-West-Climate-Change-Downloads).
- OEH 2014b, *NSW BioNet, Atlas of NSW Wildlife*, Office of Environment and Heritage, Sydney, [www.bionet.nsw.gov.au/](http://www.bionet.nsw.gov.au/).
- OEH 2016, *Squash Bush (Osteocarpum scleropterum)*, Office of Environment and Heritage, Sydney, [www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10578](http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10578)
- OEH 2017a, *Biodiversity Conservation Program*, Office of Environment and Heritage, Sydney, [www.environment.nsw.gov.au/threatenedspecies/pas.htm](http://www.environment.nsw.gov.au/threatenedspecies/pas.htm).
- OEH 2017b, Fossicking Policy, Office of Environment and Heritage, Sydney, accessed 11 December 2017, [www.environment.nsw.gov.au/topics/parks-reserves-and-protected-areas/park-policies/fossicking](http://www.environment.nsw.gov.au/topics/parks-reserves-and-protected-areas/park-policies/fossicking).
- OzArk Environmental & Heritage Management 2016, *Aboriginal Cultural Heritage Assessment Report: Toorale Homestead, south-west of Bourke NSW*, unpublished report OzArk, Dubbo.
- Porteners M & Robertson G 2003, *Threatened Plants in Western New South Wales: Information Review*. NSW National Parks & Wildlife Service, Hurstville.
- Roberts J & Marston F 2000, *Water Regime of Wetland and Floodplain Plants in the Murray–Darling Basin: A Source Book of Ecological Knowledge*, CSIRO Land and Water, Technical Report 30/00, Canberra.
- RFS 2013, *Policy 2/2007 Fire Trails*, accessed 25 November 2013, [www.rfs.nsw.gov.au/.../9596/BFCC-Policy-2-2007-Fire-Trails-amended.pdf](http://www.rfs.nsw.gov.au/.../9596/BFCC-Policy-2-2007-Fire-Trails-amended.pdf)
- Shelly D, Baun R, Beretta M, Mazzer T, Kidd S & Shelly C 2003, *Fauna Survey 'Toorale' Bourke NSW*, unpublished report for Department of Infrastructure, Planning & Natural Resources, Dubbo.
- Sheppard J 2013, *Toorale National Park and State Conservation Area Draft Conservation Management Plan*, report prepared for the NSW Office of Environment and Heritage, Sydney.
- Sheppard J, Tuck D, Lembit R & Janssen G 2013, *Toorale Station Historic Heritage Inventory Recording*, report prepared for NSW Office of Environment and Heritage.
- Thackway R & Cresswell I 1995, *An interim biogeographic regionalisation for Australia: a framework for setting priorities in the National Reserves System Cooperative Program*, Version 4.0, Australian Nature Conservation Agency, Canberra.
- TSSC 2001a, *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](http://www.environment.gov.au/cgi-bin/sprat/public/publicshowkeythreat.pl?id=7).

- TSSC 2001b, *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](http://www.environment.gov.au/cgi-bin/sprat/public/publicshowkeythreat.pl?id=11).
- TSSC 2011a, *Commonwealth Listing Advice on Coolibah – Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions*, Threatened Species Scientific Committee, [www.environment.gov.au/cgi-bin/sprat/public/publicshowcommunity.pl?id=66&status=Endangered](http://www.environment.gov.au/cgi-bin/sprat/public/publicshowcommunity.pl?id=66&status=Endangered).
- TSSC 2011b, *Advice to the Minister for Sustainability, Environment, Water, Population and Communities from the Threatened Species Scientific Committee on an Amendment to the List of Threatened Ecological Communities under the Environment Protection and Biodiversity Conservation Act 1999*, Threatened Species Scientific Committee, Canberra. <http://www.environment.gov.au/biodiversity/threatened/communities/pubs/66-listing-advice.pdf>
- URS 2008, *Compendium of Data, Rural Flood Study Darling River Floodplain (Bogan River Confluence to Louth)*, URS with DHI Water and Environment, Woodlots & Wetlands Pty Ltd, and Suzanne R Hudson Consulting, prepared for Department of Environment and Climate Change NSW.
- Walker PJ 1991, *Land systems of Western New South Wales*, Technical Report no. 25, Soil Conservation Service of New South Wales, Sydney.
- Westaway M & Hiscock P 2005, *The Extinction of Rigour: A comment on 'The extinction of the Australian Pygmies' by Keith Windshuttle and Tim Gillin*, *Aboriginal History*, vol. 29, pp. 142–148.
- Westaway M, Kemp A, Cramb J, Fogel A & Grün R 2016, *Draft Report on the Redbank Megafauna Site*, Australian Research Centre for Human Evolution, Griffith University team, Queensland, unpublished.
- Western LLS 2016, *Western Local Strategic Plan 2016-2021*, Western Local Land Services, NSW Government, [http://western.lls.nsw.gov.au/\\_data/assets/pdf\\_file/0005/657986/Western\\_local\\_strategic\\_plan.pdf](http://western.lls.nsw.gov.au/_data/assets/pdf_file/0005/657986/Western_local_strategic_plan.pdf)
- 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](http://western.lls.nsw.gov.au/_data/assets/pdf_file/0006/722391/Western-RSWMP-web.pdf)



