



# Ramsar Information Sheet

Published on 1 January 2012

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## Australia Lake Pinaroo



Designation date	17 March 1996
Site number	799
Coordinates	29°05'54"S 141°13'29"E
Area	719,00 ha

## Color codes

Fields back-shaded in light blue relate to data and information required only for RIS updates.

Note that some fields concerning aspects of Part 3, the Ecological Character Description of the RIS (tinted in purple), are not expected to be completed as part of a standard RIS, but are included for completeness so as to provide the requested consistency between the RIS and the format of a 'full' Ecological Character Description, as adopted in Resolution X.15 (2008). If a Contracting Party does have information available that is relevant to these fields (for example from a national format Ecological Character Description) it may, if it wishes to, include information in these additional fields.

## 1 - Summary

### 1.1 - Summary description

*Please provide a short descriptive text summarising the key characteristics and internationally important aspects of the site. You may prefer to complete the four following sections before returning to draft this summary.*

#### Summary

*(This field is limited to 2500 characters)*

Lake Pinaroo is one of the largest terminal basins in the Simpson-Strzelecki Dunefields biogeographic region within New South Wales (NSW) and is located within Sturt National Park in the remote arid north-west corner of NSW. It is in the Lake Eyre drainage division, which is one of the largest systems in the world and is characterised by extreme climatic variability. Lake Pinaroo is an episodic lake which is dry most of the time with rare and very irregular wet phases.

The lake's large size and its capacity to retain water for extended periods when filled provides valuable habitat in the region, particularly for endangered bird species, and supports a substantial number of waterbirds when full. When dry the lake is generally sparsely vegetated, but this is highly variable and dependent on time since flooding. Due to its ability to hold water for relatively long periods, this makes it an important drought refuge for waterbirds and other fauna.

The lake bed has a dense seedbank of aquatic species such as the fern *Marsilea drummondii* and the sedge *Schenoplectus dissachanthus* which respond to flooding. The lake margins are dominated by low shrubs, forbs and grasses.

The Ramsar site supports threatened species under the EPBC Act 1999, including the following; the Red Necked Stint, Black-Tailed Godwit, Freckled Duck, Common Greenshank, Marsh Sandpiper, Interior Blind Snake, Forests Mouse, Eastern Long-Eared Bat and the Striped Faced Dunnart.

In the Far West Region where Lake Pinaroo is located maximum temperatures are predicted to increase by 0.3-1.0°C during the period 2020–39; the number of hot days (i.e. >35°C) will increase; and rainfall is projected to decrease in spring and increase in summer and autumn (OEH 2018). North-west NSW already has a harsh hot climate which is predicted to become hotter and drier under climate change. Rainfall is predicted to increase slightly, however there is no clear evidence that droughts will become more or less severe. Consequently, wetlands such as Lake Pinaroo are likely to be under increased pressure to support waterbirds and other native animals in dry times. In addition, climate change is likely to exacerbate existing threats to the natural and cultural values of the habitat in which this wetland is found (OEH 2018).

## 2 - Data & location

### 2.1 - Formal data

#### 2.1.1 - Name and address of the compiler of this RIS

##### Compiler 1

Name	<input type="text" value="Programs Officer, Environmental Water Governance"/>
Institution/agency	<input type="text" value="NSW Office of Environment and Heritage"/>
Postal address <small>(This field is limited to 254 characters)</small>	<input type="text" value="PO Box A290&lt;br/&gt;Sydney South, NSW, 1232&lt;br/&gt;Australia"/>
E-mail	<input type="text" value="ramsar.wetlands@environment.nsw.gov.au"/>
Phone	<input type="text" value="+61 2 6229 7053"/>
Fax	<input type="text" value="+61 2 6229 7005"/>

##### Compiler 2

Name	<input type="text"/>
Institution/agency	<input type="text"/>
Postal address <small>(This field is limited to 254 characters)</small>	<input type="text"/>
E-mail	<input type="text"/>
Phone	<input type="text"/>
Fax	<input type="text"/>

#### 2.1.2 - Period of collection of data and information used to compile the RIS

From year	<input type="text" value="1996"/>
To year	<input type="text" value="2019"/>

#### 2.1.3 - Name of the Ramsar Site

Official name (in English, French or Spanish)	<input type="text" value="Lake Pinaroo"/>
Unofficial name (optional)	<input type="text" value="Fort Grey Basin"/>

#### 2.1.4 - Changes to the boundaries and area of the Site since its designation or earlier update

(Update) A. Changes to Site boundary	Yes <input type="radio"/> No <input checked="" type="radio"/>
(Update) The boundary has been delineated more accurately	<input type="checkbox"/>
(Update) The boundary has been extended	<input type="checkbox"/>
(Update) The boundary has been restricted	<input type="checkbox"/>
(Update) B. Changes to Site area	No change to area
(Update) The Site area has been calculated more accurately	<input type="checkbox"/>
(Update) The Site has been delineated more accurately	<input type="checkbox"/>
(Update) The Site area has increased because of a boundary extension	<input type="checkbox"/>
(Update) The Site area has decreased because of a boundary restriction	<input type="checkbox"/>

*Important note: If the boundary of the designated site is being restricted/reduced, before submitting this updated RIS to the Secretariat the Contracting Party should have followed:*

- the requirements in Article 2.5 of the Convention; or
- the procedures established by the Conference of the Parties in the annex to Resolution VIII.20 (2002); or
- where appropriate instead, the procedures in the annex to Resolution IX.6 (2005). Contracting Parties should also have provided to the Secretariat a report on changes prior to the submission of an updated RIS.

#### 2.1.5 - Changes to the ecological character of the Site

(Update) 6b i. Has the ecological character of the Ramsar Site (including applicable Criteria) changed since the previous RIS?	Not evaluated
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(Update) Are the changes Positive  Negative  Positive & Negative

What extent of the Ramsar site is affected (%)

(Update) Positive %

(Update) Negative %

(Update) No information available

(Update) Optional text box to provide further information

(This field is limited to 2000 characters)

Are changes the result of (tick each category which applies):

(Update) Changes resulting from causes operating within the existing boundaries?

(Update) Changes resulting from causes operating beyond the site's boundaries?

(Update) Changes consequent upon site boundary reduction alone (e.g., the exclusion of some wetland types formerly included within the site)?

(Update) Changes consequent upon site boundary increase alone (e.g., the inclusion of different wetland types in the site)?

(Update) Please describe any changes to the ecological character of the Ramsar Site, including in the application of the Criteria, since the previous RIS for the site.

(This field is limited to characters)

(Update) Is the change in ecological character negative, human-induced AND a significant change (above the limit of acceptable change) Yes  No

(Update) Has an Article 3.2 report been submitted to the Secretariat? Yes  No

## 2.2 - Site location

### 2.2.1 - Defining the Site boundaries

a) GIS boundaries [link](#)

*Materials presented on this website, particularly maps and territorial information, are as-is and as-available based on available data and do not imply the expression of any opinion whatsoever on the part of the Secretariat of the Ramsar Convention concerning the legal status of any country, territory, city or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.*

b) Digital map/image

 [AJ799map.pdf](#)

 [AJ799\\_map171220\\_Pinaroo\\_Map\\_2017.pdf](#)

Former maps

<no file available>

Boundaries description

(This field is limited to 2500 characters)

The boundary for the Ramsar site is the 120m contour around Lake Pinaroo. The boundary was digitised using 1:100 000 topographic map Fort Grey 7139. The travelling stock reserve that is excluded from the National Park is included in the Ramsar site.

*Coordinates of the centre of the site, as automatically estimated from the GIS boundaries (for information only)*

### 2.2.2 - General location

a) In which large administrative region does the site lie?

b) What is the nearest town or population centre?

### 2.2.3 - For wetlands on national boundaries only

a) Does the wetland extend onto the territory of one or more other countries? Yes  No

b) Is the site adjacent to another designated Ramsar Site on the territory of another Contracting Party? Yes  No

c) Is the site part of a formal transboundary designation with another Contracting Party? Yes  No

d) Transboundary Ramsar Site name:

### 2.2.4 - Area of the Site

If you have not established an official area by other means, you can copy the area calculated from the GIS boundaries into the 'official area' box.

Official area, in hectares (ha):

Area, in hectares (ha) as calculated from GIS boundaries

### 2.2.5 - Biogeography

Please provide the biogeographic region(s) encompassing the site and the biogeographic regionalization scheme applied:

Biogeographic regions

Regionalisation scheme(s)	Biogeographic region
Marine Ecoregions of the World (MEOW)	Australasia, South Pacific
Other scheme (provide name below)	Lake Eyre Basin: Cooper Creek-Bulloo River

Other biogeographic regionalisation scheme

(This field is limited to 2500 characters)

Australian Hydrological Geospatial Fabric (Geofabric): Topographic Drainage Divisions and River Regions (BOM 2012) - Lake Eyre Basin: Cooper Creek-Bulloo River

### 3 - Why is the Site important?

#### 3.1 - Ramsar Criteria and their justification

*Tick the box against each criterion applied to the designation of the Ramsar Site. All criteria which apply should be ticked. Please explain why you selected a criterion by filling in the relevant fields on this page, on the three other pages of this section 'Criteria & justification' and on the 'Wetland types' page of the section 'What is the site like?'. More guidance on how to justify a criterion will appear when you tick it as well as in the help box.*

**Criterion 1: Representative, rare or unique natural or near-natural wetland types**

To justify this Criterion, please select at least one wetland type as representative, rare or unique in the section What is the site like? > Wetland types and provide further details in at least one of the three boxes below.

Hydrological services provided

*(This field is limited to 3000 characters)*

Other ecosystem services provided

*(This field is limited to 3000 characters)*

Other reasons

*(This field is limited to 3000 characters)*

Lake Pinaroo is located in the Lake Eyre drainage division which is characterized by extreme climatic variability including high rates of evaporation, erratic flood periods and extended dry periods. Lake Pinaroo only fills when Frome Swamp overflows during intense local rainfall events. However, once full the lake can take up to seven years to become dry again. This longevity between rainfall and ephemeral nature of the system make it unique. Lake Pinaroo is the largest terminal basin found within NSW within the Simpson-Strzelecki Dunefields bioregion, which is thought to be the largest example of a linear sand dune environment in the world. Only a small portion of this region is found in NSW.

**Criterion 2 : Rare species and threatened ecological communities**

Justification, see: - relevant plant species in the section Criteria & justification > Plant species (3.2) - relevant animal species in the section Criteria & justification > Animal species (3.3) - relevant ecological communities in the section Criteria & justification > Ecological communities (3.4)

Optional text box to provide further information

*(This field is limited to 3000 characters)*

Lake Pinaroo provides valuable habitat in the region, particularly for threatened species. The size of the lake and its capacity to retain water are thought to play a crucial role in the survival of many species of plants and animals in the immediate and surrounding areas. Nine threatened fauna species under the EPBC Act have been recorded at Lake Pinaroo Ramsar site.

The eastern long-eared bat (*Nyctophilus timoriensis*), listed as data deficient on the IUCN Red List, (although the population trend is noted as decreasing) and as vulnerable under the Environment Protection and Biodiversity Conservation (EPBC) Act 1999 (Cwth), have been recorded in Sturt National Park and would likely occur within the Ramsar site.

Lake Pinaroo supports migratory shorebird species which are listed under international migratory bird agreements (JAMBA, CAMBA and ROKAMBA), the Bonn Convention and under the EPBC Act. These migratory shorebirds include the Red-Necked Stint (*Calidris ruficollis*), Freckled Duck (*Stictonetta naevosa*), Common Greenshank (*Tringa nebularia*), Marsh Sandpiper (*Tringa stagnatilis*) and the Black Tailed Godwit (*Limosa limosa*). Migratory shorebirds visit Australia during their non-breeding season (August–April) and have breeding sites in Siberia and Alaska.

**Criterion 3 : Biological diversity**

Justification, see: - relevant plant species in the section Criteria & justification> Plant species (3.2) - relevant animal species in the section Criteria & justification> Animal species (3.3)

A total of 195 bird species and subspecies have been reported from Sturt National Park, 61 of these are waterbird species. When filled to capacity, Lake Pinaroo holds water much longer than any other wetland within the region, providing a reliable breeding area for substantial numbers of waterbirds. Briggs in 1980 describes 'hundreds to thousands of duck, coot and grebe' being seen in November 1979, 'with probably 200-400 freckled duck', a threatened species in NSW. Lake Pinaroo also provides an important non-breeding refuge for birds that may have bred on other wetlands, particularly interdune swamps that hold water for relatively short periods (4-6 months). These include, for example, black swan (*Cygnus atratus*), pink-eared duck (*Malacorhynchus membranaceus*), grey teal (*Anas gracilis*), black-tailed native hen (*Gallinula ventralis*), banded lapwing (*Vanellus tricolor*), masked lapwing (*Vanellus miles*), red-kneed dotterel (*Erythrogonys cinctus*) and brolga (*Grus rubicunda*).

The striped-faced dunnart (*Sminthopsis macroura*) and Forrest's mouse (*Leggadina forresti*), are listed vulnerable under the NSW Biodiversity Conservation (BCA) Act 2016 (NSW) and occur at this site. In January 1980, 153 Freckled Duck (*Stictonetta naevosa*) and 16 Blue-billed Duck (*Oxyura australis*) were recorded at Lake Pinaroo (Briggs 1980). Both of these species are threatened in NSW (TSC Act). Five threatened reptile species have been recorded at Lake Pinaroo including the endangered Interior Blind Snake (*Ramphotyphlops endoterus*) and Slender blue-tongue (*Cyclodomorphus venustus*).

Justification

(This field is limited to 3000 characters)

The Long-haired Rat was seen in large numbers near Lake Pinaroo after heavy rains in 1974 and 1976. This species is known to undergo rapid increases in populations, primarily as a result of immigration after large rainfall events. This species of rat is listed as vulnerable in NSW (BCA) and further monitoring is required to determine whether the wetland could support greater than 1% of this species during flood periods. This would qualify Lake Pinaroo under Criterion 9 of the Ramsar Convention.

There are four threatened plant species known to occur in Sturt National Park including the Desert carpet weed (*Glinus orygioides*) and water weed (*Osteocarpum pentapterum*) which are presumed to be extinct. The blue trumpet (yam) (*Dipteracanthus australasicus* ssp. *corynothecus*) and crumbweed (*Dysphania platycarpa*), are both listed as endangered under the BC Act (NSW) and may occur at Lake Pinaroo and Frome Swamp.

The blue trumpet (yam) (*Dipteracanthus australasicus* ssp. *corynothecus*) and crumbweed (*Dysphania platycarpa*), are both listed as endangered under the BC Act (NSW) and may occur at Lake Pinaroo and Fromes Swamp.

**Criterion 4 : Support during critical life cycle stage or in adverse conditions**

Justification, see: - relevant plant species in the section Criteria & justification> Plant species (3.2) - relevant animal species in the section Criteria & justification> Animal species (3.3) and explain the life cycle stage or nature of adverse conditions in the accompanying 'justification' box.

The size of Lake Pinaroo and its capacity to retain water plays a crucial role for the survival of many species of plants and animals in the immediate and surrounding areas. Species known for their long distance movements such as the grey teal (*Anas gracilis*) and the pink-eared duck (*Malacorhynchus membranaceus*) have been recorded at Lake Pinaroo. It is likely that they migrate there to survive periods of drought. Lake Pinaroo supports up to 40 waterbird species, including the Australian pelican (*Pelecanus conspicillatus*), pied cormorant (*Phalacrocorax varius*), Australian wood duck (*Chenonettas jubata*), Pacific heron (*Ardea pacifica*), yellow-billed spoonbill (*Platalea flavipes*) and red-necked avocet (*Recurvirostra novaehollandiae*).

Lake Pinaroo acts as an important 'stop-over' site for migratory waterbirds such as black-tailed godwit (*Limosa limosa*), common greenshank (*Tringa nebularia*), marsh sandpiper (*Tringa stagnatilis*) and red-necked stint (*Calidris ruficollis*), that are listed under international migratory bird agreements, including the Japan-Australia Migratory Bird Agreement (JAMBA) and the China-Australia Migratory Bird Agreement (CAMBA).

Optional text box to provide further information  
(This field is limited to 3000 characters)

In general, inland wetlands in Australia are only suitable for brief periods every few years, depending on the annual flooding and rainfall cycles. However, they are still thought to be of major importance to migratory shorebirds, which need to refuel at these sites along their migratory route. Despite this fact, there is generally a poor representation of inland wetlands for shorebirds in the NSW reserve system.

Lake Pinaroo acts as a drought refuge for waterbirds and other fauna. Waterbirds tend to congregate at inland wetlands, often in response to a flood. As these areas dry out waterbirds and other wetland dependent species will move to areas which hold water for the longest period of time. As Lake Pinaroo is a terminal basin and the largest wetland in Sturt National Park, it acts as a drought refuge for these wetland species – when water is present it can support large numbers of waterbirds. Lake Pinaroo only fills when Frome Swamp overflows during intense local rainfall events. Once full the lake can take up to seven years to become dry again.

Many waterbirds in western NSW, particularly ducks, breed on temporary waters and then move to more permanent waters to survive dry periods.

Lake Pinaroo is also an important source of water for other fauna species such as arid desert birds. An estimated 40% of Australian desert land birds are thought to be water dependent.

Criterion 5 : >20,000 waterbirds

Justification, see:- the total number of waterbirds and the period of data collection - relevant waterbird species, and if possible their population size, in the section Criteria & justification> Animal species (3.3)

Overall waterbird numbers

Start year

End year

Source of data:

Optional text box to provide further information  
(This field is limited to 3000 characters)

Criterion 6 : >1% waterbird population

Justification, see: Criteria & justification> Animal species (3.3)

Optional text box to provide further information  
(This field is limited to 3000 characters)

**Criterion 7 : Significant and representative fish**

Justification, see: Criteria & justification > Animal species (3.3)

Justification  
(This field is limited to 3000 characters)

**Criterion 8 : Fish spawning grounds, etc.**

To justify this Criterion, please give information in the box below. Completion of details on relevant fish species in the section Criteria & justification > Animal species (3.3) is optional.

Justification  
(This field is limited to 3000 characters)

**Criterion 9 : >1% non-avian animal population**

To justify this Criterion, please give details on relevant non-avian species and their population size in the section Criteria & justification > Animal species (3.3)

Optional text box to provide further information  
(This field is limited to 3000 characters)

### 3.2 - Plant species whose presence relates to the international importance of the site

Scientific name	Common name	Criterion 2	Criterion 3	Criterion 4	IUCN Red List	CITES Appendix I	Other status	Justification
<i>Glinus orygioides</i> 	Desert carpet weed	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	Threatened species, presumed to be extinct in NSW under the BCA	
<i>Ruellia australasica carynothecus</i> 	Blue trumpet	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	Nationally endangered under the EPBC.	

Optional text box to provide further information on plant species of international importance:

(This field is limited to 3000 characters)

The BCA threatened plant species water weed (*Osteocarpum pentapterum*) known to occur in Sturt National Park is presumed to be extinct in NSW. The crumbweed (*Dysphania platycarpa*), is listed as endangered under the BC Act (NSW) and may occur at Lake Pinaroo and Fromes Swamp. They contribute to the biological diversity of the site (criteria 3).

Plant community diversity and species abundance varies considerably depending on water levels and soil moisture. The plant species that occur at Lake Pinaroo are bioregionally significant due to the scarcity of water and suitable habitat in the region. The surrounding sand dune country is vegetated with Sandhill Wattle (*Acacia ligulata*), Hopbush (*Dodonea viscosa* ssp. *angustissima*), Turpentine (*Eremophila sturtii*), Saltbush (*Atriplex* spp.), Budda (*Eremophila mitchellii*), *Myoporum montanum*, *Senna filifolia*, *Senna pleurocarpa* var. *pleurocarp.* and Whitewood (*Atalaya hemiglauca*). Coolibah (*Eucalyptus coolabah* ssp. *arida*) regrowth is found on the high ground of the lake margins. Forbs and groundcover species in this habitat included Silky glycine (*Glycine canescens*), Goathead Burr (*Sclerolaena bicornis* var. *bicornis*), Corrugated Side (*Sida corrugate*) and Grey Germander (*Teucrium racemosum*).

The lake margins support a relatively diverse mix of low shrubs (< 1 m), forbs and grasses dominated by Bitter Saltbush (*Atriplex stipitata*), Ruby Saltbush (*Enchylaena tomentosum*), Grey Copperburr (*Sclerolaena diacantha*), Pale Poverty Bush (*Sclerolaena divaricata*), Tangled Poverty Bush (*Sclerolaena intricata*), Spear Fruit Copperburr (*Sclerolaena patenticuspis*), Mueller's Daisy Bush (*Olearia meulleri*), Bushy Starwort (*Aster subulatus*), Loose Flowered Rattlepod (*Crotalaria eremea* ssp. *eremea*), Variable Daisy (*Brachycomb ciliaris* var. *lanuginose*), Yellow Pea Bush (*Sesbania cannabina* var. *cannabina*), Spreading Scurf Pea (*Psoralea australasica*), Pigweed (*Portulacca oleracea*), Desert Cucumber (*Zehneria micrantha*), Fruit salad plant (*Pterocaulon sphacelatum*), Shrubby Groundsel (*Senecio cunninghamii* var. *cunninghamii*), Spreading Heliotrope (*Heliotropium supinum*), Hairy Carpet Weed (*Glinus lotoides*), Common Sneezeweed (*Centipeda cunninghamii*), Bogan Flea (*Calotis hispidula*), , Spreading Nutheads (*Epaltes australis*), Rat's Tail Couch (*Sporobolus mitchelii*) and the introduced species Stinkwort (*Ditrichia graveoloens*).

When dry, the lake bed may be colonised by Neverfail (*Eragrostis setifolia*), Native liquorice (*Glycyrrhiza acanthocarpa*), Purselane (*Portulacca oleracea*), *Zehneria micrantha*, Bitter Saltbush (*Atriplex stipitata*), Desert Nightshade (*Solanum oligacanthum*), Ruby Saltbush (*Enchylaena tomentosum*) and Rats Tail Couch (*Sporobolus mitchelii*). Aquatic and semi-aquatic plants survive the long dry periods as drought resistant seeds or spores within the dry sediments. The sediment seed bank of Lake Pinaroo supports 14 species including Red Milfoil (*Myriophyllum verrucosum*) and charophyte algae.

### 3.3 - Animal species whose presence relates to the international importance of the site

Phylum	Scientific name	Common name	Species qualifies under criterion			Species contributes under criterion					Pop. Size	Period of pop. Est.	% occurrence 1)	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
			2	4	6	9	3	5	7	8								
<b>Birds</b>																		
CHORDATA / AVES	<i>Anas gracilis</i>	Grey Teal	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC ●●●	<input type="checkbox"/>	<input type="checkbox"/>		Migration
CHORDATA / AVES	<i>Anas rhynchotis</i>	Australasian Shoveler	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					<input type="checkbox"/>	<input type="checkbox"/>		Drought refuge
CHORDATA / AVES	<i>Anas superciliosa</i>	Pacific Black Duck; Gray Duck	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC ●●●	<input type="checkbox"/>	<input type="checkbox"/>		Drought refuge
CHORDATA / AVES	<i>Anhinga novaehollandiae</i>	Australasian Darter	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC ●●●	<input type="checkbox"/>	<input type="checkbox"/>		Drought refuge
CHORDATA / AVES	<i>Ardea modesta</i>	Eastern Great Egret	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					<input type="checkbox"/>	<input type="checkbox"/>		Drought refuge
CHORDATA / AVES	<i>Ardea pacifica</i>	Pacific Heron	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC ●●●	<input type="checkbox"/>	<input type="checkbox"/>		Refuge
CHORDATA / AVES	<i>Ardeotis australis</i>	Australian Bustard	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC ●●●	<input type="checkbox"/>	<input type="checkbox"/>	Endangered in NSW (BCA)	
CHORDATA / AVES	<i>Aythya australis</i>	Hardhead	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC ●●●	<input type="checkbox"/>	<input type="checkbox"/>		Drought refuge

Phylum	Scientific name	Common name	Species qualifies under criterion				Species contributes under criterion				Pop. Size	Period of pop. Est.	% occurrence <sup>1)</sup>	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
			2	4	6	9	3	5	7	8								
CHORDATA / AVES	<i>Biziura lobata</i>	Musk Duck	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>		Drought refuge
CHORDATA / AVES	<i>Calidris ruficollis</i>	Red-necked Stint	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				NT 	<input type="checkbox"/>	<input type="checkbox"/>	JAMBA and CAMBA agreements, migratory (EPBC)	Stop-over site
CHORDATA / AVES	<i>Certhionyx variegatus</i>	Pied Honeyeater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>	Vulnerable in NSW (BCA)	
CHORDATA / AVES	<i>Charadrius ruficapillus</i>	Red-capped Plover	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>		Drought refuge
CHORDATA / AVES	<i>Chenonetta jubata</i>	Australian wood duck	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>		Refuge
CHORDATA / AVES	<i>Chlidonias hybrida</i>	Whiskered Tern	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>		Drought refuge
CHORDATA / AVES	<i>Circus assimilis</i>	Spotted Harrier	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>	Vulnerable in NSW (BCA)	
CHORDATA / AVES	<i>Cygnus atratus</i>	Black Swan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>		
CHORDATA / AVES	<i>Dendrocygna eytoni</i>	Plumed Whistling Duck	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>		Drought refuge
CHORDATA / AVES	<i>Egretta novaehollandiae</i>	White-faced Heron	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>		Drought refuge
CHORDATA / AVES	<i>Epthianura albifrons</i>	White-fronted Chat	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>	Vulnerable in NSW (BCA)	
CHORDATA / AVES	<i>Erythrogonys cinctus</i>	Red-kneed Dotterel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>		
CHORDATA / AVES	<i>Falco hypoleucos</i>	Grey Falcon	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				VU 	<input type="checkbox"/>	<input type="checkbox"/>	Endangered in NSW (BCA)	
CHORDATA / AVES	<i>Fulica atra</i>	Eurasian Coot	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>		Drought refuge
CHORDATA / AVES	<i>Gallinula ventralis</i>	Black-tailed Nativehen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>		
CHORDATA / AVES	<i>Gelochelidon nilotica</i>	Gull-billed Tern	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>		Drought refuge
CHORDATA / AVES	<i>Grus rubicunda</i>	Brolga	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>		
CHORDATA / AVES	<i>Hamirostra melanostemon</i>	Black-breasted Buzzard	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>	Vulnerable in NSW (BCA)	

Phylum	Scientific name	Common name	Species qualifies under criterion				Species contributes under criterion				Pop. Size	Period of pop. Est.	% occurrence <sup>1)</sup>	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
			2	4	6	9	3	5	7	8								
CHORDATA / AVES	 <i>Hieraaetus morphnoides</i>	Little Eagle	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC   	<input type="checkbox"/>	<input type="checkbox"/>	Vulnerable in NSW (BCA)		
CHORDATA / AVES	 <i>Himantopus himantopus</i>	Black-winged Stilt	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC   	<input type="checkbox"/>	<input type="checkbox"/>		Drought refuge	
CHORDATA / AVES	 <i>Larus novaehollandiae</i>	silver gull	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC   	<input type="checkbox"/>	<input type="checkbox"/>		Drought refuge	
CHORDATA / AVES	 <i>Limosa limosa</i>	Black-tailed Godwit	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				NT   	<input type="checkbox"/>	<input type="checkbox"/>	JAMBA and CAMBA agreements, Migratory (EPBC)	Stop-over site	
CHORDATA / AVES	 <i>Malacorhynchus membranaceus</i>	Pink-eared Duck	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC   	<input type="checkbox"/>	<input type="checkbox"/>		Migration	
CHORDATA / AVES	 <i>Nycticorax caledonicus</i>	Rufous Night Heron; Nankeen Night Heron	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC   	<input type="checkbox"/>	<input type="checkbox"/>		Drought refuge	
CHORDATA / AVES	 <i>Oxyura australis</i>	Blue-billed Duck	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				NT   	<input type="checkbox"/>	<input type="checkbox"/>	Nationally vulnerable in NSW (BCA)		
CHORDATA / AVES	 <i>Pelecanus conspicillatus</i>	Australian Pelican	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC   	<input type="checkbox"/>	<input type="checkbox"/>		Refuge	
CHORDATA / AVES	 <i>Peltodyas australis</i>	Inland Dotterel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC   	<input type="checkbox"/>	<input type="checkbox"/>		Drought refuge	
CHORDATA / AVES	 <i>Phalacrocorax sulcirostris</i>	Little Black Cormorant	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC   	<input type="checkbox"/>	<input type="checkbox"/>		Drought refuge	
CHORDATA / AVES	 <i>Phalacrocorax varius</i>	Australian Pied Cormorant	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC   	<input type="checkbox"/>	<input type="checkbox"/>		Refuge	
CHORDATA / AVES	 <i>Platalea flavipes</i>	Yellow-billed Spoonbill	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC   	<input type="checkbox"/>	<input type="checkbox"/>		Refuge	
CHORDATA / AVES	 <i>Plegadis falcinellus</i>	Glossy Ibis	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC   	<input type="checkbox"/>	<input type="checkbox"/>		Drought refuge	
CHORDATA / AVES	 <i>Porzana fluminea</i>	Australian Crane	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC   	<input type="checkbox"/>	<input type="checkbox"/>		Drought refuge	
CHORDATA / AVES	 <i>Pyrrholaemus brunneus</i>	Redthroat	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC   	<input type="checkbox"/>	<input type="checkbox"/>	Vulnerable in NSW (BCA)		
CHORDATA / AVES	 <i>Recurvirostra novaehollandiae</i>	Red-necked Avocet	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC   	<input type="checkbox"/>	<input type="checkbox"/>		Refuge	
CHORDATA / AVES	 <i>Stictonetta naevosa</i>	Freckled Duck	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC   	<input type="checkbox"/>	<input type="checkbox"/>	Nationally vulnerable (EPBC)		
CHORDATA / AVES	 <i>Stiltia isabella</i>	Australian Pratincole	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC   	<input type="checkbox"/>	<input type="checkbox"/>		Drought refuge	

Phylum	Scientific name	Common name	Species qualifies under criterion				Species contributes under criterion				Pop. Size	Period of pop. Est.	% occurrence <sup>1)</sup>	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
			2	4	6	9	3	5	7	8								
CHORDATA / AVES	<i>Threskiomias molucca</i>	Australian White Ibis	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>		Drought refuge
CHORDATA / AVES	<i>Threskiomias spinicollis</i>	Straw-necked Ibis	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>		Drought refuge
CHORDATA / AVES	<i>Tringa nebularia</i>	Common Greenshank	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>	JAMBA and CAMBA agreements, migratory (EPBC)	Stop-over site
CHORDATA / AVES	<i>Tringa stagnatilis</i>	Marsh Sandpiper	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>	JAMBA and CAMBA agreements, migratory (EPBC)	Stop-over site
CHORDATA / AVES	<i>Vanellus miles</i>	Masked Lapwing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>		
CHORDATA / AVES	<i>Vanellus tricolor</i>	Banded Lapwing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>		
<b>Others</b>																		
CHORDATA / REPTILIA	<i>Austrotyphlops endoterus</i>	Interior blind snake	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>	Nationally endangered (EPBC)	
CHORDATA / REPTILIA	<i>Ctenotus brooksi</i>		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>	Endangered in NSW (BCA)	
CHORDATA / REPTILIA	<i>Cyclodomorphus venustus</i>	slender Blue-tongue	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>	Endangered in NSW (BCA)	
CHORDATA / MAMMALIA	<i>Leggadina forresti</i>	Forrest's mouse	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>	Nationally vulnerable (EPBC)	
CHORDATA / REPTILIA	<i>Lerista xanthura</i>	Yellow-tailed Plain Slider	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>	Vulnerable (BCA)	
CHORDATA / MAMMALIA	<i>Nyctophilus timoriensis</i>	Eastern long-eared bat	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					<input type="checkbox"/>	<input type="checkbox"/>	Nationally vulnerable (EPBC)	
CHORDATA / MAMMALIA	<i>Rattus villosissimus</i>	Australian Long-haired Rat	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>	Vulnerable in NSW (BCA)	
CHORDATA / MAMMALIA	<i>Sminthopsis macroura</i>	Stripe-faced Dunnart	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>	Nationally vulnerable (EPBC)	
CHORDATA / REPTILIA	<i>Tiliqua multifasciata</i>	Centralian Blue-tongued Lizard	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC 	<input type="checkbox"/>	<input type="checkbox"/>	Vulnerable in NSW (BCA)	

1) Percentage of the total biogeographic population at the site

Optional text box to provide further information on animal species of international importance:

(This field is limited to 3000 characters)

### 3.4 - Ecological communities whose presence relates to the international importance of the site

Name of ecological community	Community qualifies under Criterion 2?	Description	Justification
<no data available>			

Optional text box to provide further information

*(This field is limited to 3000 characters)*

## 4 - What is the Site like? (Ecological character description)

### 4.1 - Ecological character

Please summarize the ecological components, processes and services which are critical to determining the ecological character of the site. Please also summarize any natural variability in the ecological character of the site, and any known past or current change

(This field is limited to 4000 characters)

The following ecosystem services form the basis of the ecological character of the site;

- Forms a large terminal basin in the Simpson–Strzelecki Dunefields biogeographic region within NSW;
- Supports threatened species including the eastern long-eared bat (*Nyctophilus timoriensis*);
- Supports an abundance of waterbirds including the Australian wood duck (*Chenonettas jubata*) and the pacific heron (*Ardea pacifica*);
- Supports migratory shorebirds listed under the international treaties JAMBA, CAMBA and ROKAMBA during critical stages of their life cycles such as the black-tailed godwit (*Limosa limosa*);
- Provides refuge for waterbirds and other fauna;
- Supports waterbird breeding, such as the grey teal (*Anas gracilis*).

Biodiversity in this arid region is driven by unpredictable flooding and drying cycles. These areas are characterised by low topographic gradients and extreme climatic variability, including high evaporation and erratic floods and extended dry periods. In turn, this flooding and drying cycle affects water quality and the distribution and abundance of vegetation, waterbirds, fish and invertebrates.

Lake Pinaroo is an episodic lake which is dry most of the time with rare and very irregular wet phases in a terminal drainage basin. Lake Pinaroo is located in the most arid part of NSW and receives the second lowest recorded rainfall in the state.

Apart from accounts of water depth and extent of flooding, there has been no regular monitoring of inflows or water depth at Lake Pinaroo. There is also no information available on the extent of groundwater flow into or out of Lake Pinaroo. However, it appears from rainfall data collected at Fort Grey and the limited literature available that Lake Pinaroo can retain water for up to seven years. For example, the lake filled in 1974 and had dried up completely in 1981 ; when full, the water depth in Lake Pinaroo is thought to be 0–2 m and can drop during summer months by over 60 cm. Recently developed satellite imaging capability may be employed in the future to address some of the hydrological and vegetation monitoring requirements.

The natural water regimes of drying and flooding are critical in this temporary wetland as they determine the nature of species distribution. Most plant species in temporary or unpredictable habitats can produce seed banks (reserves of reproductive propagules, including the oospores of charophyte algae) that can survive prolonged drought and respond quickly when water is present.

Lake Pinaroo itself has been classified in the Gnumtah wetland system which has cracking brown clays and crusty brown clays. Lake Pinaroo's bed has fine alluvial sediments which have accumulated to form cracking grey-brown clays. The cracking clays are likely to have higher nutrient levels and greater soil moisture retention than the loam and coarse sands in the surrounding dunes. In dry conditions, large holes can form in these soils.

The geomorphical features of this Ramsar wetland have implications for the distribution of flora and fauna. The shape of the lake and rates of rainfall runoff greatly affect the biological characteristics of this lake and its suitability for species such as shorebirds which prefer gently sloping margins. In the case of small mammals and reptiles, the cracks and holes in the lake bed can provide an important refuge with a cool, moist microclimate where they can shelter in summer months. Dessication cracks can also act as seed traps, substantially altering spatial pattern and depth distributions which may in turn alter subsequent dormancy and germination responses.

Climate change is predicted to exacerbate existing threats to the natural and cultural values of the wetland (OEH 2018).

### 4.2 - What wetland type(s) are in the site?

Please list all wetland types which occur on the site, and for each of them:

- rank the four most abundant types by area from 1 (greatest extent) to 4 (least extent) in the third column,
- if the information exists, provide the area (in ha) in the fourth column
- if this wetland type is used for justifying the application of Criterion 1, indicate if it is representative, rare or unique in the last column
- you can give the local name of the wetland type if different from the Ramsar classification system in the second column

#### Marine or coastal wetlands

Wetland types (code and name)	Local name	Ranking of extent (1: greatest - 4: least)	Area (ha) of wetland type	Justification of Criterion 1
<no data available>				

#### Inland wetlands

Wetland types (code and name)	Local name	Ranking of extent (1: greatest - 4: least)	Area (ha) of wetland type	Justification of Criterion 1
Fresh water > Flowing water >> N: Seasonal/ intermittent/ irregular rivers/ streams/ creeks		2		
Saline, brackish or alkaline water > Lakes >> R: Seasonal/ intermittent saline/ brackish/ alkaline lakes and flats		1	618	Rare

#### Human-made wetlands

Wetland types (code and name)	Local name	Ranking of extent (1: greatest - 4: least)	Area (ha) of wetland type	Justification of Criterion 1
<no data available>				

What non-wetland habitats are within the site?

Other non-wetland habitat

Other non-wetland habitats within the site	Area (ha) if known
<no data available>	

idem

(ECD) Habitat connectivity

## 4.3 - Biological components

### 4.3.1 - Plant species

Other noteworthy plant species

Scientific name	Common name	Position in range / endemism / other
<i>Abutilon malvifolium</i>	Mallow leaf lantern flower	
<i>Acacia ligulata</i>	Sandhill wattle	
<i>Alternanthera nodifera</i>	Joyweed	
<i>Aster bellidiastrum</i>	Bushystarwart	
<i>Atriplex paludosa</i>		
<i>Atriplex stipitata</i>	Bitter saltbush	
<i>Boerhavia diffusa</i>	Tar vine	
<i>Brachyachne ciliaris</i>	variable daisy	
<i>Calotis hispidula</i>	bogan flea	
<i>Centipeda cunninghamii</i>	common sneezeweed	
<i>Crotalaria eremaea eremaea</i>	Loose flowered rattlepod	
<i>Dittrichia graveolens</i>	stinkwort	
<i>Eriodia nutans</i>	Climbing saltbush	
<i>Enchylaena tomentosa</i>	Rubysaltbush	
<i>Epaltes cunninghamii</i>	spreading nut-heads	
<i>Eremophila sturtii</i>	Turpentine	
<i>Eucalyptus coolabah</i>	Coolibah	
<i>Glinus lotoides</i>	Hairy carpet weed	
<i>Glossostigma diandrum</i>	Mudmat	
<i>Glycine canescens</i>	Silky Glycine	
<i>Glycyrrhiza acanthocarpa</i>	Native Lucerne;Native Licorice	
<i>Hakea eyreana</i>	Straggly corkbark	
<i>Heliotropium supinum</i>	Spreading heliotrope	
<i>Maireana aphylla</i>	Cottonbush	
<i>Malvastrum americanum</i>	Malvastrum	
<i>Marsilea drummondii</i>	Nardoo	
<i>Myoporum tenuifolium</i>	Western boobialla	
<i>Myosurus minimus</i>	Mouse tail	
<i>Myriophyllum verrucosum</i>	Red water milfoil	
<i>Olearia muelleri</i>	Mueller's daisy bush	
<i>Osteocarpum acropterum</i>	Water weed	
<i>Phyllanthus lacunarius</i>	Lagoon spurge	
<i>Podolepis capillaris</i>	Invisible plant	
<i>Portulaca oleracea</i>	Pigweed	
<i>Pterocaulon sphacelatum</i>	Fruit salad plant	
<i>Salsola kali kali</i>	Buckbush	

Scientific name	Common name	Position in range / endemism / other
<i>Sclerolaena bicornis bicornis</i>	Goathead burr	
<i>Sclerolaena intricata</i>	Tangled poverty bush	
<i>Sclerolaena patentiscuspis</i>	Spear fruit copperburr	
<i>Senecio cunninghamii</i>	Shrubby groundsel	
<i>Sesbania cannabina cannabina</i>	Yellow pea bush	
<i>Sida corrugata</i>	Corrugated sida	
<i>Solanum oligacanthum</i>	Desert nightshade	
<i>Sporobolus mitchellii</i>	Rat's tail couch	
<i>Stemodia florulenta</i>	Blue rod	
<i>Teucrium racemosum</i>	Grey germander	
<i>Verbena hispida</i>	Rough verbena	
<i>Zehneria macrantha</i>	Desert cucumber	

Invasive alien plant species

Scientific name	Common name	Impacts	Changes at RIS update
<i>Lycium ferocissimum</i>	African Boxthorn	Potentially	unknown
<i>Tamarix aphylla</i>	Athel Pine	Potentially	unknown
<i>Xanthium spinosum</i>	Bathurst Burr	Potentially	unknown

Optional text box to provide further information  
 (This field is limited to 2500 characters)

4.3.2 - Animal species

Other noteworthy animal species

Phylum	Scientific name	Common name	Pop. size	Period of pop. est.	%occurrence	Position in range /endemism/other
CHORDATA/AVES	<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater				
CHORDATA/AVES	<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill				
CHORDATA/AVES	<i>Accipiter fasciatus</i>	Brown Goshawk				
CHORDATA/AVES	<i>Aegotheles cristatus</i>	Australian Owllet-Nightjar				
CHORDATA/AVES	<i>Aphelocephala leucopsis</i>	Southern Whiteface				
CHORDATA/AVES	<i>Aquila audax</i>	Wedge-tailed Eagle				
CHORDATA/AVES	<i>Artamus cinereus</i>	Black-faced Woodswallow				
CHORDATA/AVES	<i>Artamus leucorhynchus</i>	White-breasted Woodswallow				
CHORDATA/AVES	<i>Artamus personatus</i>	Masked Woodswallow				
CHORDATA/AVES	<i>Artamus superciliosus</i>	White-browed Woodswallow				
CHORDATA/AVES	<i>Barnardius zonarius</i>	Mallee Ringneck				
CHORDATA/AVES	<i>Cheramoeca leucosterna</i>	White-backed Swallow				
CHORDATA/AVES	<i>Chrysococcyx basalis</i>	Horsfield's Bronze Cuckoo				
CHORDATA/AVES	<i>Climacteris picumnus</i>	Brown Treecreeper				
CHORDATA/AVES	<i>Coracina maxima</i>	Ground Cuckooshrike				
CHORDATA/AVES	<i>Coracina novaehollandiae</i>	Black-faced Cuckooshrike				
CHORDATA/AVES	<i>Corvus bennetti</i>	Little Crow				

Phylum	Scientific name	Common name	Pop. size	Period of pop. est.	%occurrence	Position in range /endemism/other
CHORDATA/AVES	<i>Corvus coronoides</i>	Australian Raven				
CHORDATA/AVES	<i>Coturnix ypsilophora</i>	Brown Quail				
CHORDATA/REPTILIA	<i>Ctenotus regius</i>	Pale rumped Ctenotus				
CHORDATA/AVES	<i>Cuculus pallidus</i>	Pallid Cuckoo				
CHORDATA/AVES	<i>Dicaeum hirundinaceum</i>	Mistletoebird				
CHORDATA/AVES	<i>Dromaius novaehollandiae</i>	Emu				
CHORDATA/AVES	<i>Eolophus roseicapilla</i>	Galah				
CHORDATA/AVES	<i>Epthianura aurifrons</i>	Orange Chat				
CHORDATA/AVES	<i>Epthianura tricolor</i>	Crimson Chat				
CHORDATA/AVES	<i>Falco berigora</i>	Brown Falcon				
CHORDATA/AVES	<i>Falco cenchroides</i>	Nankeen Kestrel; Australian Falcon				
CHORDATA/REPTILIA	<i>Gehyra variegata</i>	Tree Dtella				
CHORDATA/AVES	<i>Geopelia cuneata</i>	Diamond Dove				
CHORDATA/AVES	<i>Geopelia placida</i>	Peaceful Dove				
CHORDATA/AVES	<i>Grallina cyanoleuca</i>	Magpielark				
CHORDATA/AVES	<i>Gymnorhina tibicen</i>	Australian Magpie				
CHORDATA/AVES	<i>Haliastur sphenurus</i>	Whistling Kite				
CHORDATA/AVES	<i>Hirundo neoxena</i>	Welcome Swallow				
CHORDATA/AVES	<i>Lalage sueurii</i>	White-shouldered Triller				
CHORDATA/AVES	<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater				
CHORDATA/AVES	<i>Lichenostomus virescens</i>	Singing Honeyeater				
CHORDATA/AMPHIBIA	<i>Litoria rubella</i>	Desert Tree Frog				
CHORDATA/AVES	<i>Malurus lamberti</i>	Variegated Fairywren				
CHORDATA/AVES	<i>Malurus leucopterus</i>	White-winged Fairywren				
CHORDATA/AVES	<i>Manorina flavigula</i>	Yellow-throated Miner				
CHORDATA/AVES	<i>Melopsittacus undulatus</i>	Budgerigar				
CHORDATA/AVES	<i>Merops ornatus</i>	Rainbow Bee-eater				
CHORDATA/AVES	<i>Milvus migrans</i>	Black Kite				
CHORDATA/AVES	<i>Myiagra inquieta</i>	Restless Flycatcher				
CHORDATA/AMPHIBIA	<i>Neobatrachus sudelli</i>	Common Spadefoot Toad or Painted Burrowing Frog				
CHORDATA/AVES	<i>Neopsephotus bourkii</i>	Bourke's Parrot				
CHORDATA/AVES	<i>Northiella haematogaster</i>	Bluebonnet				
CHORDATA/AVES	<i>Nymphicus hollandicus</i>	Cockatiel				
CHORDATA/AVES	<i>Ocyphaps lophotes</i>	Crested Pigeon				
CHORDATA/AVES	<i>Oreoica gutturalis</i>	Crested Bellbird				
CHORDATA/AVES	<i>Pachycephala rufiventris</i>	Rufous Whistler				
CHORDATA/AVES	<i>Pardalotus rubricatus</i>	Red-browed Pardalote				
CHORDATA/AVES	<i>Pardalotus striatus</i>	Striated Pardalote				
CHORDATA/AVES	<i>Petrochelidon ariel</i>	Fairy Martin				
CHORDATA/AVES	<i>Petrochelidon nigricans</i>	Tree Martin				
CHORDATA/AVES	<i>Petroica goodenovii</i>	Red-capped Robin				

Phylum	Scientific name	Common name	Pop. size	Period of pop. est.	%occurrence	Position in range /endemism/other
CHORDATA/AVES	<i>Pomatostomus ruficeps</i>	Chestnut-crowned Babbler				
CHORDATA/AVES	<i>Psephotus haematonotus</i>	Red-rumped Parrot				
CHORDATA/AVES	<i>Psephotus varius</i>	Mulga Parrot				
CHORDATA/AVES	<i>Psophodes cristatus</i>	Chirruping Wedgebill				
CHORDATA/AVES	<i>Rhipidura fuliginosa</i>	Grey Fantail				
CHORDATA/AVES	<i>Rhipidura leucophrys</i>	Willie Wagtail				
CHORDATA/REPTILIA	<i>Rhynchoedura ornata</i>	Beaked Gecko				
CHORDATA/AVES	<i>Struthidea cinerea</i>	Apostlebird				
CHORDATA/AVES	<i>Taeniopygia guttata</i>	Zebra Finch				
CHORDATA/AVES	<i>Todiramphus pyrrophygius</i>	Red-backed Kingfisher				
CHORDATA/AVES	<i>Todiramphus sanctus</i>	Sacred Kingfisher				
CHORDATA/REPTILIA	<i>Varanus gouldii</i>	Gould's Goanna				

Invasive alien animal species

Phylum	Scientific name	Common name	Impacts	Changes at RIS update
CHORDATA/MAMMALIA	<i>Canis lupus familiaris</i>	domestic dog	Potentially	unknown
CHORDATA/MAMMALIA	<i>Capra hircus</i>	domestic goat	Potentially	unknown
CHORDATA/MAMMALIA	<i>Felis catus</i>	Domestic Cat	Potentially	unknown
CHORDATA/MAMMALIA	<i>Oryctolagus cuniculus</i>	European Rabbit	Potentially	unknown
CHORDATA/MAMMALIA	<i>Vulpes vulpes</i>	Red Fox	Potentially	unknown

Optional text box to provide further information

(This field is limited to 2500 characters)

NPWS prepares pest management strategies which identify pest species across that region's parks. These strategies also identify and priorities for control and incorporate actions listed in the Priority Action Statement (see Section 3.2), 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 regional pest management strategy for Far West Region (OEH 2013) identifies pest species and priority programs for the park. 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 priority pest plant species include Noogoora Burr (*Xanthium occidentale*), Patersons Curse (*Echium plantagineum*), Bathurst Burr (*Xanthium spinosum*), Athel Pine (*Tamarix aphylla*), Mexican poppy (*Argemone ochroleuca*), African boxthorn (*Lycium ferocissimum*), Tobacco Bush (*Solanum mauritianum*) and animal species including, Wild Dog (*Canis lupus* subspecies), European Fox (*Vulpes vulpes*), Feral Cat (*Felis catus*), European Rabbit (*Oryctolagus cuniculus*), Feral Goat (*Capra hircus*) and Feral Pigs (*Sus scrofa*). More information can be found within the Sturt Plan of Management (2016).

#### 4.4 - Physical components

##### 4.4.1 - Climate

Please indicate the prevailing climate type(s) by selecting below the climatic region(s) and subregion(s), using the Köppen-Gieger Climate Classification System.

Climatic region	Subregion
B: Dry climate	BWh: Subtropical desert (Low-latitude desert)

If changing climatic conditions are affecting the site, please indicate the nature of these changes:

(This field is limited to 1000 characters)

Reduced rainfall and higher than average temperature as a result of climate change could be a major threat to the Lake Pinaroo Ramsar site resulting in a reduction in the frequency and extent of inundation at the wetland. However, it is not yet well understood how climate change could affect local conditions at Lake Pinaroo.

##### 4.4.2 - Geomorphic setting

a) Minimum elevation above sea level (in metres)

a) Maximum elevation above sea level (in metres)

b) Position in landscape/river basin:

- Entire river basin
- Upper part of river basin
- Middle part of river basin
- Lower part of river basin
- More than one river basin
- Not in river basin
- Coastal

Please name the river basin or basins. If the site lies in a sub-basin, please also name the larger river basin. For a coastal/marine site, please name the sea or ocean.  
 (This field is limited to 1000 characters)

Lake Pinaroo is a terminal wetland on Fromes Creek, downstream of Frome Swamp of Australia's Lake Eyre Basin.

4.4.3 - Soil

Mineral

(Update) Changes at RIS update No change  Increase  Decrease  Unknown

Organic

(Update) Changes at RIS update No change  Increase  Decrease  Unknown

No available information

Are soil types subject to change as a result of changing hydrological conditions (e.g., increased salinity or acidification)? Yes  No

Please provide further information on the soil (optional)  
 (This field is limited to 1000 characters)

4.4.4 - Water regime

Water permanence

Presence?	Changes at RIS update
Usually seasonal, ephemeral or intermittent water present	No change

Source of water that maintains character of the site

Presence?	Predominant water source	Changes at RIS update
Water inputs from surface water	<input checked="" type="checkbox"/>	No change
Water inputs from rainfall	<input type="checkbox"/>	No change

Water destination

Presence?	Changes at RIS update
Feeds groundwater	No change

Stability of water regime

Presence?	Changes at RIS update
Water levels fluctuating (including tidal)	No change

Please add any comments on the water regime and its determinants (if relevant). Use this box to explain sites with complex hydrology.  
 (This field is limited to 2000 characters)

Lake Pinaroo's catchment area is approximately 77,706 ha and contains an area primarily enclosed by the Grey Range to the east and south-east. The maximum height of the Grey Ranges is approximately 260 metres, therefore Lake Pinaroo's catchment is very flat and consequently very small changes in elevation will cause great changes in flooding extent. Sixty-one per cent of Lake Pinaroo's catchment (47,233 ha) is contained within Sturt National Park, and the remainder of the catchment is used for grazing domestic stock.

Lake Pinaroo is located in the most arid part of the NSW and receives the second lowest recorded rainfall in the state (Cunningham et al. 1981). Lake Pinaroo fills after Frome Swamp is full and overflows, and this occurs after very intense rainfall. When full, Lake Pinaroo can hold water for extremely long periods of time (up to six years) because there is no point of outflow. Since water is a limited resource throughout the north-west corner of NSW, Lake Pinaroo plays a vital role in the continued survival of native fauna within the region.

(ECD) Connectivity of surface waters and of groundwater No information available

(ECD) Stratification and mixing regime No information available

4.4.5 - Sediment regime

Significant erosion of sediments occurs on the site

(Update) Changes at RIS update No change  Increase  Decrease  Unknown

Significant accretion or deposition of sediments occurs on the site

(Update) Changes at RIS update No change  Increase  Decrease  Unknown

Significant transportation of sediments occurs on or through the site

(Update) Changes at RIS update No change  Increase  Decrease  Unknown

Sediment regime is highly variable, either seasonally or inter-annually

(Update) Changes at RIS update No change  Increase  Decrease  Unknown

Sediment regime unknown

Please provide further information on sediment (optional):

(This field is limited to 1000 characters)

Lake Pinaroo comprises later Tertiary and Quaternary unconsolidated sediments overlying Cretaceous Rolling Downs sedimentary sequence. Goodrick (1984) classified Lake Pinaroo in the Gnumtah wetland system which has cracking brown clays and crusty brown clays.

(ECD) Water turbidity and colour No information available

(ECD) Light - reaching wetland No information available

(ECD) Water temperature No information available

4.4.6 - Water pH

Acid (pH<5.5)

(Update) Changes at RIS update No change  Increase  Decrease  Unknown

Circumneutral (pH: 5.5-7.4 )

(Update) Changes at RIS update No change  Increase  Decrease  Unknown

Alkaline (pH>7.4)

(Update) Changes at RIS update No change  Increase  Decrease  Unknown

Unknown

Please provide further information on pH (optional):

(This field is limited to 1000 characters)

4.4.7 - Water salinity

Fresh (<0.5 g/l)

(Update) Changes at RIS update No change  Increase  Decrease  Unknown

Mixohaline (brackish)/Mixosaline (0.5-30 g/l)

(Update) Changes at RIS update No change  Increase  Decrease  Unknown

Euhaline/Eusaline (30-40 g/l)

(Update) Changes at RIS update No change  Increase  Decrease  Unknown

Hyperhaline/Hypersaline (>40 g/l)

(Update) Changes at RIS update No change  Increase  Decrease  Unknown

Unknown

Please provide further information on salinity (optional):

(This field is limited to 1000 characters)

(ECD) Dissolved gases in water

(This field is limited to 1000 characters)

No information available

4.4.8 - Dissolved or suspended nutrients in water

Eutrophic

(Update) Changes at RIS update No change  Increase  Decrease  Unknown

Mesotrophic

(Update) Changes at RIS update No change  Increase  Decrease  Unknown

Oligotrophic

(Update) Changes at RIS update No change  Increase  Decrease  Unknown

Dystrophic

(Update) Changes at RIS update No change  Increase  Decrease  Unknown

Unknown

Please provide further information on dissolved or suspended nutrients (optional):

(This field is limited to 1000 characters)

(ECD) Dissolved organic carbon No information available

(ECD) Redox potential of water and sediments No information available

(EOD) Water conductivity **No information available**

4.4.9 - Features of the surrounding area which may affect the Site

Please describe whether, and if so how, the landscape and ecological characteristics in the area surrounding the Ramsar Site differ from the i) broadly similar  ii) significantly different  site itself:

If the surrounding area differs from the Ramsar Site, please indicate how. (Please tick all categories that apply)

- Surrounding area has greater urbanisation or development
- Surrounding area has higher human population density
- Surrounding area has more intensive agricultural use
- Surrounding area has significantly different land cover or habitat types

Please describe other ways in which the surrounding area is different:

(This field is limited to 2000 characters)

The surrounding area is classified as Strzelecki wetland system. This arid landscape is dominated by parallel dunes where wetted areas remain so for only 4-6 months after filling. The nature of Lake Pinaroo as a terminal basin ensures that the cracking clays are likely to have higher nutrient levels and greater soil moisture retention than the loam and coarse sands in the surrounding dunes. These differences, when climatic conditions are shared, result in vastly different ecological outcomes.

When dry the lake is generally sparsely vegetated, but this is highly variable and dependent on time since flooding. The lake bed has a dense seedbank of aquatic species such as the fern *Marsilea drummondii* and the sedge *Schenoplectus dissachanthus* which respond to flooding. The lake margins are dominated by low shrubs, forbs and grasses. When the frequency and intensity of flooding changes this affects the vegetation types and availability and diversity of habitat. Because the lake is very flat slight changes in elevation changes the extent of flooding. Lake Pinaroo provides extremely significant habitat in the region and this is primarily attributed to its size, topography and permanence once full.

4.5 - Ecosystem services

4.5.1 - Ecosystem services/benefits

Please select below all relevant ecosystem services/benefits currently provided by the site and indicate their relative importance in the right-hand column.

Provisioning Services

Ecosystem service	Examples	Importance/Extent/Significance
<no data available>		

Regulating Services

Ecosystem service	Examples	Importance/Extent/Significance
Hazard reduction	Flood control, flood storage	Low

Cultural Services

Ecosystem service	Examples	Importance/Extent/Significance
Recreation and tourism	Picnics, outings, touring	Medium
Recreation and tourism	Nature observation and nature-based tourism	Medium
Spiritual and inspirational	Cultural heritage (historical and archaeological)	Medium
Scientific and educational	Important knowledge systems, importance for research (scientific reference area or site)	Medium

Supporting Services

Ecosystem service	Examples	Importance/Extent/Significance
Biodiversity	Supports a variety of all life forms including plants, animals and microorganisms, the genes they contain, and the ecosystems of which they form a part	High

Optional text box to provide further information

(This field is limited to 2500 characters)

The Wild Deserts project aims to bring back seven extinct mammals to the NSW corner country, using large fenced enclosures and a range of innovative predator control and research techniques in Sturt National Park.

Wild Deserts will exclude feral predators and herbivores such as cats, foxes and rabbits, before reintroducing mammals that were once widespread in NSW but have not been seen for over a century. These will include the Stick-nest Rat, Western Barred Bandicoot, Golden Bandicoot, Western Quoll and Crest-tailed Mulgara.

Link: <https://www.ecosystem.unsw.edu.au/research-projects/conservation-practice/reintroductions/reintroducing-locally-extinct-mammals-sturt-national-park>

Other ecosystem service(s) not included above:

(This field is limited to 2000 characters)

Please make a rough estimate of the approximate number of people who directly benefit from the ecological services provided by this site (estimate at least in orders of magnitude: 10s, 100s, 1000s, 10 000s etc.):

Within the site:

Outside the site:

Have studies or assessments been made of the economic valuation of ecosystem services provided by this Ramsar Site? Yes  No  Unknown

Where economic studies or assessments of economic valuation have been undertaken at the site, it would be helpful to provide information on where the results of such studies may be located (e.g. website links, citation of published literature):

*(This field is limited to 2500 characters)*

#### 4.5.2 - Social and cultural values

Is the site considered internationally important for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning? If so, please describe this importance under one or more of the four following categories. You should not list here any values derived from non-sustainable exploitation or which result in detrimental ecological changes.

i) the site provides a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland

Description if applicable

*(This field is limited to 2500 characters)*

ii) the site has exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland

Description if applicable

*(This field is limited to 2500 characters)*

iii) the ecological character of the wetland depends on its interaction with local communities or indigenous peoples

Description if applicable

*(This field is limited to 2500 characters)*

iv) relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland

Description if applicable

*(This field is limited to 2500 characters)*

#### 4.6 - Ecological processes

This section is not intended for completion as part of a standard RIS, but is included for completeness as part of the agreed format of a full Ecological Character Description (ECD) outlined by Resolution X.15

(ECD) Primary production	<input type="text"/>
(ECD) Nutrient cycling	<input type="text"/>
(ECD) Carbon cycling	<input type="text"/>
(ECD) Animal reproductive productivity	<input type="text"/>
(ECD) Vegetational productivity, pollination, regeneration processes, succession, role of fire, etc.	Fires occurrence and intensity is characteristically very low in the arid areas of New South Wales due to very sparse vegetation cover and extremely low fuel loads for the majority of years.
(ECD) Notable species interactions, including grazing, predation, competition, diseases and pathogens	Aquatic and semi-aquatic plants survive the long dry periods as drought resistant seeds or spores within the dry sediments. The sediment seed bank of Lake Pinaroo supports xxx species including red milfoil ( <i>Myriophyllum verrucosum</i> ) and charophyte algae. E
(ECD) Notable aspects concerning animal and plant dispersal	<input type="text"/>
(ECD) Notable aspects concerning migration	<input type="text"/>
(ECD) Pressures and trends concerning any of the above, and/or concerning ecosystem integrity	<input type="text"/>

## 5 - How is the Site managed? (Conservation and management)

### 5.1 - Land tenure and responsibilities (Managers)

#### 5.1.1 - Land tenure/ownership

Public ownership

Category	Within the Ramsar Site	In the surrounding area
Provincial/region/state government	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Private ownership

Category	Within the Ramsar Site	In the surrounding area
<no data available>		

Other

Category	Within the Ramsar Site	In the surrounding area
<no data available>		

Provide further information on the land tenure / ownership regime (optional):

(This field is limited to 1000 characters)

National Park and Travelling Stock Route land tenures comprise the Ramsar site. The surrounding site is also Sturt National Park. Sturt National Park (325,329 ha) was formed when pastoral leases were progressively acquired from 1972 onwards. The majority of Lake Pinaroo was gazetted National Park in 1975 and another smaller portion was gazetted in 1976. Sturt National Park is the only reserved area in the arid north west corner of New South Wales and offers a variety of habitats for the local community and tourists to explore. The park receives 30-40,000 visitors per year and the potential for increased recreation and tourism is high.

#### 5.1.2 - Management authority

Please list the local office / offices of any agency or organization responsible for managing the site:

(This field is limited to 1000 characters)

NSW Office of Environment and Heritage (OEH), NPWS (West Region, West Darling Area, Tibooburra District)

Provide the name and title of the person or people with responsibility for the wetland:

John Holcombe, West Darling Area Manager

Postal address:

(This field is limited to 1000 characters)

National Parks and Wildlife Service  
PO Box 788, Broken Hill NSW 2880

E-mail address:

npws.westdarling@environment.nsw.gov.au

## 5.2 - Ecological character threats and responses (Management)

### 5.2.1 - Factors (actual or likely) adversely affecting the Site's ecological character

Human settlements (non agricultural)

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Housing and urban areas	Low impact	Low impact	<input type="checkbox"/>	unknown	<input checked="" type="checkbox"/>	No change
Tourism and recreation areas	Low impact	Low impact	<input type="checkbox"/>	unknown	<input checked="" type="checkbox"/>	No change

Water regulation

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Water abstraction	Low impact	Low impact	<input type="checkbox"/>	unknown	<input checked="" type="checkbox"/>	unknown

Agriculture and aquaculture

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Livestock farming and ranching	Low impact	Low impact	<input checked="" type="checkbox"/>	unknown	<input checked="" type="checkbox"/>	unknown

Energy production and mining

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Renewable energy	Low impact	Low impact	<input checked="" type="checkbox"/>	unknown	<input checked="" type="checkbox"/>	unknown

Transportation and service corridors

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Unspecified	Low impact	Medium impact	<input checked="" type="checkbox"/>	No change	<input checked="" type="checkbox"/>	No change

Biological resource use

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
<no data available>						

Human intrusions and disturbance

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Recreational and tourism activities	Low impact	Medium impact	<input checked="" type="checkbox"/>	No change	<input checked="" type="checkbox"/>	No change

Natural system modifications

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
<no data available>						

Invasive and other problematic species and genes

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Invasive non-native/ alien species	unknown impact	unknown impact	<input type="checkbox"/>	unknown	<input checked="" type="checkbox"/>	unknown

Pollution

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
<no data available>						

Geological events

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
<no data available>						

Climate change and severe weather

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Temperature extremes	unknown impact	unknown impact	<input checked="" type="checkbox"/>	increase	<input checked="" type="checkbox"/>	increase
Unspecified	unknown impact	unknown impact	<input checked="" type="checkbox"/>	increase	<input checked="" type="checkbox"/>	increase
Droughts	unknown impact	unknown impact	<input checked="" type="checkbox"/>	unknown	<input checked="" type="checkbox"/>	increase

Please describe any other threats (optional):

(This field is limited to 3000 characters)

Note that the introduced Athel Pine is being actively controlled by NPWS within the Ramsar site. The outcome is yet to be determined.

Note that it is presently unknown whether native animals are overgrazing vegetation at the wetland (it is argued that the perennial artificial watering points, created by the graziers led to an increase in native fauna i.e. Kangaroos). NPWS has been and is still actively working at decommissioning these. Therefore pressure from overgrazing from native animals should decrease over time.

unspecified factors affecting the site include increased fire within the site and surrounding it.

5.2.2 - Legal conservation status

Please list any other relevant conservation status, at global, regional or national level and specify the boundary relationships with the Ramsar Site:

Global legal designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
<no data available>			

Regional (international) legal designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
<no data available>			

National legal designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
Pending Native Title Claim	QUD52/2008 Wongkumara People	<a href="http://www.nntt.gov.au/searchReg Apps/NativeTitleRegisters/Pages/Search-Register-of-Native-Title-Claims.aspx">http://www.nntt.gov.au/searchReg Apps/NativeTitleRegisters/Pages/Search-Register-of-Native-Title-Claims.aspx</a>	whole
State Protected Area (NSW)	Sturt National Park	<a href="http://www.nationalparks.nsw.gov.au/visit-a-park/parks/sturt-national-park">http://www.nationalparks.nsw.gov.au/visit-a-park/parks/sturt-national-park</a>	partly

Non-statutory designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
Other non-statutory designation			

5.2.3 - IUCN protected areas categories (2008)

1a Strict Nature Reserve

- Ib Wilderness Area: protected area managed mainly for wilderness protection
- II National Park: protected area managed mainly for ecosystem protection and recreation
- III Natural Monument: protected area managed mainly for conservation of specific natural features
- IV Habitat/Species Management Area: protected area managed mainly for conservation through management intervention
- V Protected Landscape/Seascape: protected area managed mainly for landscape/seascape conservation and recreation
- VI Managed Resource Protected Area: protected area managed mainly for the sustainable use of natural ecosystems

5.2.4 - Key conservation measures

Legal protection

Measures	Status
Legal protection	Implemented

Habitat

Measures	Status
<no data available>	

Species

Measures	Status
Control of invasive alien plants	Implemented
Control of invasive alien animals	Implemented

Human Activities

Measures	Status
Regulation/management of wastes	Implemented
Livestock management/exclusion (excluding fisheries)	Implemented
Regulation/management of recreational activities	Implemented
Communication, education, and participation and awareness activities	Implemented

Other:

(This field is limited to 3000 characters)

Control of invasive alien plants, including Athel Pine, Noogoora Burr, Mexican Poppy and Saffron thistle.

Control of feral cats under the 'Wild Deserts' program is not included as fencing under that program does not include the Ramsar site.

In Australia, the ecological character of Ramsar sites is protected as a Matter of National Environmental Significance under the Environmental Protection and Biodiversity Conservation Act 1999.

5.2.5 - Management planning

Is there a site-specific management plan for the site? Yes

Is the management plan/planning implemented? Yes  No

The management plan covers All of Ramsar Site

Is the management plan currently subject to review and update? Yes  No

Has a management effectiveness assessment been undertaken for the site? Yes  No

Please give link to site-specific plan or other relevant management plan if this is available via the Internet or upload it in section 'Additional material':

(This field is limited to 500 characters)

<http://www.environment.nsw.gov.au/parkmanagement/SturtNPMgmtplan.htm>

If the site is a formal transboundary site as indicated in section Data and location > Site location, are there shared management planning processes with another Contracting Party? Yes  No

Please indicate if a Ramsar centre, other educational or visitor facility, or an educational or visitor programme is associated with the site:

(This field is limited to 1000 characters)

Visitor facilities are provided within Sturt National Park, which includes the Fort Grey Precinct (containing Lake Pinaroo). For Grey Precinct includes Sites for tents, camper trailers, caravans, picnic tables, gas barbecues, solar lighting, non-potable water, rubbish bins, information and toilets. Activities for this Precinct includes Camping, Fort Grey Wells Walk, Sturt's Tree Walk, Observing threatened species, Lake Pinaroo (Ramsar wetland), Birdwatching, Desert sand dunes, Old Fort Grey Homestead, Dog Fence and Cameron Corner. Visitor numbers are estimated at 30,000 people per year to Sturt National Park.

URL of site-related webpage (if relevant):

5.2.6 - Planning for restoration

Is there a site-specific restoration plan? No need identified

Has the plan been implemented? Yes  No

The restoration plan covers:

Is the plan currently being reviewed and updated? Yes  No

Where the restoration is being undertaken to mitigate or respond to a threat or threats identified in this RIS, please indicate it / them:

*(This field is limited to 1000 characters)*

Further information

*(This field is limited to 2500 characters)*

5.2.7 - Monitoring implemented or proposed

Monitoring	Status
Water regime monitoring	Proposed
Water quality	Proposed
Plant community	Proposed
Plant species	Proposed
Animal community	Proposed
Animal species (please specify)	Proposed
Birds	Proposed

Please indicate other monitoring activities:

*(This field is limited to 3000 characters)*

## 6 - Additional material

### 6.1 - Additional reports and documents

#### 6.1.1 - Bibliographical references

*(This field is limited to 3000 characters)*

- 1.AMBS (2012), Charles Sturt's Expedition Sites on Office of Environment and Heritage Managed Estates and Sturt National Park: Archaeological Management Plan, Australian Museum, Sydney.
- 2.Briggs, S. (1980). Notes on visits to north-west wetlands, including Sturt National Park in November 1979 and January 1980. Unpublished report. NSW NPWS, Hurstville.
- 3.Briggs, S.V. (1982). Food habits of the Freckled Duck and associated waterfowl in North-western New South Wales. *Waterfowl* 33, 88-93.
- 4.Bureau of Meteorology 201206. Climate data online. Weather station directory. Accessed at: <http://www.bom.gov.au/climate/cdo/about/sitedata.shtml>
- 5.Cunningham, G.M., Mulham, W.E., Milthorpe, P.L., & Leigh, J.H. (1981). Plants of Western New South Wales, Soil Conservation Service of New South Wales.
- 6.Goodrick, G. (1984). Wetlands of North-western New South Wales Occasional Paper No. 6, New South Wales National Parks and Wildlife Service.
- 7.Marchant, S. & Higgins, P.J. (1990). Handbook of Australian, New Zealand and Antarctic Birds, Volume 1, Part B, Oxford University Press, Melbourne.
- 8.Montague-Drake, R. and Croft, D.B. (2004). Do kangaroos exhibit water-focused grazing patterns in arid New South Wales? A case study in Sturt National Park. *Australian Mammalogy* 26: 87-100.
- 9.New South Wales Department of Environment and Climate Change (DECC), (2008). Ecological Character Description: Lake Pinaroo Ramsar Site, ISBN 978 1 74122 839 7, Sydney.
- 10.New South Wales Office of Environment and Heritage National Parks and Wildlife Service (2018unpub.). Draft Sturt National Park Plan of Management 2016. Office of Environment and Heritage NSW National Parks and Wildlife Service.
- 11.New South Wales National Parks and Wildlife Service (1996). Sturt National Park Plan of Management, New South Wales National Parks and Wildlife Service.
- 12.New South Wales Office of Environment and Heritage (2014), Far West Climate Change Snapshot, ISSN 1837-5650, Sydney.
- 13.Oliver, I., Holmes, A., Dangerfield, M., Gillings, M., Pik, A.J., Britton, D. R., Holley, M., Montgomery, M.E., Raison, M., Logan, V., Pressey, R.L. and Beattie, A. J. (2004). Land Systems as surrogates for biodiversity in conservation planning. *Ecological Applications* 14 (2): 485-503.
- 14.Ramsar Information Sheet (1998). Lake Pinaroo Ramsar Information sheet, January 1998. Wetlands International Ramsar Information website. Accessed June 2009 at: <http://ramsar.wetlands.org/Database/Searchforsites/tabid/765/Default.aspx>
15. Stanley, R.J. (1983). Soils and vegetation: An assessment of current status. In Messer, J. and Mosley, G. (eds), *What is the future for Australia's arid lands?* pp 8-18. Australian Conservation Foundation, Australia.
- 16.Thackway, R. & Cresswell, I.D. (1995). Towards an Interim Biogeographic Regionalisation for Australia: A framework for setting priorities in the National Reserves System Cooperative Program, Australian Nature Conservation Agency, Canberra

#### 6.1.2 - Additional reports and documents

i. taxonomic lists of plant and animal species occurring in the site (see section 4.3)

<no file available>

ii. a detailed Ecological Character Description (ECD) (in a national format)

 [AJ799\\_ECD1510.pdf](#)

iii. a description of the site in a national or regional wetland inventory

<no file available>

iv. relevant Article 3.2 reports

<no file available>

v. site management plan

<no file available>

vi. other published literature

 [AJ799\\_lit17112112\\_other\\_values\\_2017.docx](#)

 [AJ799\\_lit171219\\_references\\_2017.docx](#)

*Please note that any documents uploaded here will be made publicly available.*

#### 6.1.3 - Photograph(s) of the Site

Please provide at least one photograph of the site:



Sturts tree walk, Lake Pinaroo, Sturt National Park (Jen Spencer/OEH 24-10-2016)

#### 6.1.4 - Designation letter and related data

Designation letter

 [AJ799\\_DesLet161205.pdf](#)

Date of Designation