Ramsar Information Sheet

Published on 1 July 2022
Update version, previously published on : 1 January 2012

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

Summary

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 decease 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

Responsible compiler

Institution/agency	NSW Office of Environment and Heritage
Postal address	PO Box A290 Sydney South, NSW, 1232 Australia

National Ramsar Administrative Authority

Institution/agency	Department of Agriculture, Water and the Environment
Postal address	GPO Box 858 Canberra, ACT 2601 Australia

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

From year	1996
To year	2019

2.1.3 - Name of the Ramsar Site

Official name (in English, French or Spanish)	Lake Pinaroo
Unofficial name (optional)	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 ○ No ◉
(Update) B. Changes to Site area	No change to area
(Update) For secretariat only: This update is an extension	☐

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

2.2 - Site location

2.2.1 - Defining the Site boundaries

b) Digital map/image
<2 file(s) uploaded>

Former maps	0

Boundaries description

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.

2.2.2 - General location

a) In which large administrative region does the site lie?	New South Wales
b) What is the nearest town or population centre?	Tibooburra (population 134), 80 km south east of Lake Pinaroo

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 ◉

2.2.4 - Area of the Site

Official area, in hectares (ha): 719

Area, in hectares (ha) as calculated from GIS boundaries: 719.353

2.2.5 - Biogeography

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

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

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

Other reasons

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

☑ Criterion 3 : Biological diversity

Justification

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).

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.

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

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

Phylum	Scientific name	Criterion 2	Criterion 3	Criterion 4	IUCN Red List	CITES Appendix I	Other status	Justification
Plantae								
TRACHEOPHYTA / MAGNOLIOPSIDA	*Dysphania platycarpa*	☐	☑	☐		☐		This species is listed as threatened at the state level and contributes to the biodiversity of the site.
TRACHEOPHYTA / MAGNOLIOPSIDA	*Osteocarpum pentapterum*	☐	☑	☐		☐		This species is listed as threatened at the state level and contributes to the biodiversity of the site.

The state listed threatened plant species water weed (Osteocarpum pentapterum) and crumbweed (Dysphania platycarpa) 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 (Glyccyrhiza 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	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								
Others																	
CHORDATA / REPTILIA	*Austrotyphlops endoterus*	☑	☐	☐	☐	☐	☐	☐	☐				LC	☐	☐	Nationally endangered (EPBC)	Nationally listed threatened species (EPBC Act).
CHORDATA / MAMMALIA	*Nyctophilus timoriensis*	☑	☐	☐	☐	☐	☐	☐	☐					☐	☐	Nationally vulnerable (EPBC)	Nationally listed threatened species (EPBC Act).
Birds																	

Phylum	Scientific 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								
CHORDATA / AVES	*Anas gracilis*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species may breed at the site. The site plays an important role for birds migrating from other wetlands, and acts as a drought refuge.
CHORDATA / AVES	*Anas rhynchotis*	☐	☑	☐	☐	☑	☐	☐	☐					☐	☐		This species may breed at the site. The site plays an important role for birds migrating from other wetlands, and acts as a drought refuge.
CHORDATA / AVES	*Anas superciliosa*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Anhinga novaehollandiae*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Ardea modesta*	☐	☑	☐	☐	☑	☐	☐	☐					☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Ardea pacifica*	☐	☑	☐	☐	☐	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Aythya australis*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species may breed at the site. The site plays an important role for birds migrating from other wetlands, and acts as a drought refuge.
CHORDATA / AVES	*Biziura lobata*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Calidris ruficollis*	☐	☑	☐	☐	☐	☐	☐	☐				NT	☐	☐	Listed migratory species (EPBC Act, JAMBA and CAMBA agreements).	Internationally migratory species that uses the site for non-breeding habitat or as a stop-over on their northward and/or southward migrations.
CHORDATA / AVES	*Charadrius ruficapillus*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Chenonetta jubata*	☐	☑	☐	☐	☐	☐	☐	☐				LC	☐	☐		The site plays an important role for birds migrating from other wetlands, and acts as a drought refuge.
CHORDATA / AVES	*Chlidonias hybrida*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Cygnus atratus*	☐	☐	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Dendrocygna eytoni*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Egretta novaehollandiae*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Erythrogonys cinctus*	☐	☐	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Falco hypoleucos*	☑	☐	☐	☐	☐	☐	☐	☐				VU	☐	☐	Nationally vulnerable (EPBC)	Nationally listed threatened species (EPBC Act). Internationally listed threatened species (IUCN).
CHORDATA / AVES	*Fulica atra*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Gallinula ventralis*	☐	☐	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Gelochelidon nilotica*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Grus rubicunda*	☐	☐	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Himantopus himantopus*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Larus novaehollandiae*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.

Phylum	Scientific 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								
CHORDATA / AVES	*Limosa limosa*	☐	☑	☐	☐	☐	☐	☐	☐				NT	☐	☐	Listed migratory species (EPBC Act, JAMBA and CAMBA agreements)	Internationally migratory species that uses the site for non-breeding habitat or as a stop-over on their northward and/or southward migrations.
CHORDATA / AVES	*Malacorhynchus membranaceus*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species may breed at the site. The site plays an important role for birds migrating from other wetlands, and acts as a drought refuge.
CHORDATA / AVES	*Nycticorax caledonicus*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Oxyura australis*	☐	☑	☐	☐	☑	☐	☐	☐				NT	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Pelecanus conspicillatus*	☐	☑	☐	☐	☐	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Peltohyas australis*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Phalacrocorax sulcirostris*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Phalacrocorax varius*	☐	☑	☐	☐	☐	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Platalea flavipes*	☐	☑	☐	☐	☐	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Plegadis falcinellus*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Porzana fluminea*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Recurvirostra novaehollandiae*	☐	☑	☐	☐	☐	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Stictonetta naevosa*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species may breed at the site. The site plays an important role for birds migrating from other wetlands, and acts as a drought refuge.
CHORDATA / AVES	*Stiltia isabella*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Threskiornis molucca*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Threskiornis spinicollis*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Tringa nebularia*	☐	☑	☐	☐	☐	☐	☐	☐				LC	☐	☐	Listed migratory species (EPBC Act, JAMBA and CAMBA agreements)	Internationally migratory species that uses the site for non-breeding habitat or as a stop-over on their northward and/or southward migrations.
CHORDATA / AVES	*Tringa stagnatilis*	☐	☑	☐	☐	☐	☐	☐	☐				LC	☐	☐	Listed migratory species (EPBC Act, JAMBA and CAMBA agreements)	Internationally migratory species that uses the site for non-breeding habitat or as a stop-over on their northward and/or southward migrations.
CHORDATA / AVES	*Vanellus miles*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.
CHORDATA / AVES	*Vanellus tricolor*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides a drought refuge for this species.

1) Percentage of the total biogeographic population at the site

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

<no data available>

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

4.1 - Ecological character

The ecological character of the site is derived from the position of the site in the landscape - a large terminal basin in the Simpson–Strzelecki Dunefields biogeographic region within NSW.

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

• 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, 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 Gnurntah 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. Desiccation 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?

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

4.3 - Biological components

4.3.1 - Plant species

Other noteworthy plant species

Phylum	Scientific name	Position in range / endemism / other
TRACHEOPHYTA/MAGNOLIOPSIDA	*Abutilon malvifolium*	uncommon in Western NSW
TRACHEOPHYTA/MAGNOLIOPSIDA	*Glinus orygioides*	Presumed extinct in NSW.

Invasive alien plant species

Phylum	Scientific name	Impacts	Changes at RIS update
TRACHEOPHYTA/MAGNOLIOPSIDA	*Lycium ferocissimum*	Potential	unknown
TRACHEOPHYTA/MAGNOLIOPSIDA	*Tamarix aphylla*	Potential	unknown
TRACHEOPHYTA/MAGNOLIOPSIDA	*Xanthium spinosum*	Potential	unknown

Optional text box to provide further information

Invasive plant species:
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). More information can be found within the Sturt Plan of Management (2016).

4.3.2 - Animal species

Other noteworthy animal species

Phylum	Scientific name	Pop. size	Period of pop. est.	%occurrence	Position in range /endemism/other
CHORDATA/AVES	*Ardeotis australis*				Listed as endangered in NSW.
CHORDATA/AVES	*Certhionyx variegatus*				Listed as vulnerable in NSW.
CHORDATA/AVES	*Circus assimilis*				Listed as vulnerable in NSW.
CHORDATA/REPTILIA	*Ctenotus brooksi*				Listed as endangered in NSW.
CHORDATA/REPTILIA	*Cyclodomorphus venustus*				Listed as endangered in NSW.
CHORDATA/AVES	*Epthianura albifrons*				Listed as vulnerable in NSW.
CHORDATA/AVES	*Hamirostra melanosternon*				Listed as vulnerable in NSW.
CHORDATA/AVES	*Hieraaetus morphnoides*				Listed as vulnerable in NSW.
CHORDATA/MAMMALIA	*Leggadina forresti*				Listed as vulnerable in NSW.
CHORDATA/REPTILIA	*Lerista xanthura*				Listed as vulnerable in NSW.
CHORDATA/AVES	*Pyrrholaemus brunneus*				Listed as vulnerable in NSW.
CHORDATA/MAMMALIA	*Rattus villosissimus*				Listed as vulnerable in NSW.
CHORDATA/MAMMALIA	*Sminthopsis macroura*				Listed as vulnerable in NSW.
CHORDATA/REPTILIA	*Tiliqua multifasciata*				Listed as vulnerable in NSW.

Invasive alien animal species

Phylum	Scientific name	Impacts	Changes at RIS update
CHORDATA/MAMMALIA	*Canis lupus familiaris*	Potential	unknown
CHORDATA/MAMMALIA	*Capra hircus*	Potential	unknown
CHORDATA/MAMMALIA	*Felis catus*	Potential	unknown
CHORDATA/MAMMALIA	*Oryctolagus cuniculus*	Potential	unknown
CHORDATA/MAMMALIA	*Vulpes vulpes*	Potential	unknown

Optional text box to provide further information

Noteworthy animal species:
The Ramsar site provides habitat for a number of animal species that are listed as threatened at the state level. A taxonomic list of animal species found at the site is attached under Section 6.1.2.

Invasive animal species:
NPWS prepares pest management strategies which identify pest species across that region's parks. These strategies also identify 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 priority pest animal species for the Far West Region (OEH 2013) include: 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

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

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): 118

a) Maximum elevation above sea level (in metres): 120

- 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.

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

4.4.3 - Soil

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)

Lake Pinaroo comprises cracking brown clays and crusty brown clays (Goodrick 1984, cited in DECC 2008).

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	☑	No change
Water inputs from precipitation	☐	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:

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):

Lake Pinaroo comprises later Tertiary and Quaternary unconsolidated sediments overlying Cretaceous Rolling Downs sedimentary sequence. Goodrick (1984) classified Lake Pinaroo in the Gnurntah 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 ☑

4.4.7 - Water salinity

Unknown ☑

(ECD) Dissolved gases in water

No information available

4.4.8 - Dissolved or suspended nutrients in water

Unknown ☑

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

(ECD) 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 site itself: i) broadly similar ○ ii) significantly different ◉

- 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:

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

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 microorganizms, the genes they contain, and the ecosystems of which they form a part	High

Optional text box to provide further information

The Wild Deserts project aims to bring back seven extinct mammals to the NSW corner country, using large fenced exclosures 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

Within the site:	2000

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

4.5.2 - Social and cultural values

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	☐
ii) the site has exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland	☐
iii) the ecological character of the wetland depends on its interaction with local communities or indigenous peoples	☐
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	☐

<no data available>

4.6 - Ecological processes

(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 (Myriophyllum verrucosum) and charophyte algae.

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	☑	☑

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

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

Provide the name and/or title of the person or people with responsibility for the wetland: John Holcombe, West Darling Area Manager

Postal address: 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
Tourism and recreation areas	Low impact	Low impact	☐	unknown	☑	No change
Housing and urban areas	Low impact	Low impact	☐	unknown	☑	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	☐	unknown	☑	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	☑	unknown	☑	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	☑	unknown	☑	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	☑	No change	☑	No change

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	☑	No change	☑	No change

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	☐	unknown	☑	unknown

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	☑	increase	☑	increase
Unspecified	unknown impact	unknown impact	☑	increase	☑	increase
Droughts	unknown impact	unknown impact	☑	unknown	☑	increase

Please describe any other threats (optional):

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

National legal designations

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

Ia 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

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:

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

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

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:

Visitor facilities are provided within Sturt National Park, which includes the Fort Grey Precinct (containing Lake Pinaroo). Fort 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): http://www.nationalparks.nsw.gov.au/visit-a-park/parks/sturt-national-park

5.2.6 - Planning for restoration

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

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

Potential monitoring invasive species including Athel Pin, Noogoora Burr, wild dogs, rabbits and goats.

6 - Additional material

6.1 - Additional reports and documents

6.1.1 - Bibliographical references

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 HeritageNational Parks and Wildlife Service (2018unpub.). Draft Sturt National Park Plan of Management 2016. Office of Environment and HeritageNSW 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, Canberr

6.1.2 - Additional reports and documents

i. taxonomic lists of plant and animal species occurring in the site (see section 4.3)
<1 file(s) uploaded>

ii. a detailed Ecological Character Description (ECD) (in a national format)
<1 file(s) uploaded>

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
<1 file(s) uploaded>

vi. other published literature
<2 file(s) uploaded>

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
<1 file(s) uploaded>

Date of Designation: 1996-03-17