



# Ramsar Information Sheet

Published on 13 April 2023

Update version, previously published on : 1 January 1998

## Australia

### Gunbower Forest



Designation date	15 December 1982
Site number	263
Coordinates	35°47'38"S 144°17'46"E
Area	20 180,00 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

The Gunbower Forest is located in northern Victoria and consists of the section of the Murray River floodplain between the Murray River and the anabranch Gunbower Creek.

The Site meets four of nine criteria (1, 2, 4 and 8) for listing as a wetland of International Importance. It is one of few intact floodplain systems in the Murray-Darling Basin, comprising predominantly river red gum (*Eucalyptus camaldulensis*) forest (second largest river red gum forests in the Murray-Darling Basin) and woodland, with smaller areas of black box (*E. largiflorens*) woodland. The Site also features a variety of permanent and temporary wetlands, including lakes, swamps and lagoons, supporting six wetland types overall. These support wetland vegetation communities and provide habitat for at least sixty-six bird species, many of which breed within the site. The Site supports four nationally and internationally threatened species, comprising two fish (Murray cod and silver perch) and two plant species (swamp wallaby grass and winged peppergrass). In addition, the Site supports hundreds of colonial nesting waterbirds during times of inundation. It is also important for breeding of native fish and provides migratory routes between habitat in the Murray River, anabranches and flood plains and is considered important for recruitment of native fish.

The Site has the following critical components and processes: hydrology; vegetation extent, diversity and condition; diversity of fish; diversity and abundance of waterbirds. The critical services for the Site include supporting services for a diversity of wetland types, for waterbird feeding and breeding, for threatened species, for fish migration and organic carbon cycling.

Threats to the ecological character of the site include water resource development, climate change, forestry activities, altered fire regimes, invasive species and human disturbance from recreational activities.

## 2 - Data & location

### 2.1 - Formal data

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

##### Responsible compiler

Institution/agency	Department of Environment, Land, Water and Planning
Postal address	8 Nicholson St, East Melbourne, Victoria 3002

##### National Ramsar Administrative Authority

Institution/agency	Australian Government 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	2000
To year	2020

#### 2.1.3 - Name of the Ramsar Site

Official name (in English, French or Spanish)	Gunbower Forest
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#### 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) B. Changes to Site area	the area has increased
(Update) The Site area has been calculated more accurately	<input checked="" 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"/>
(Update) For secretariat only: This update is an extension	<input type="checkbox"/>

#### 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?	No
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##### (Update) Optional text box to provide further information

While there have been no changes to the ecological character of the Gunbower Forest since the last RIS in 1998, there have been updates to the Criteria satisfied by this Site as a result of further investigations undertaken during the preparation of the Ecological Character Description in 2011. The Ecological Character Description identified that the Site has always met and continues to meet four of the nine Criteria. The Site has never met Criterion 5. Since the production of the Ecological Character Description in 2011 (Hale and Butcher 2011), there have been several changes to documentation and infrastructure at the Site.

The 2011 ECD (Hale and Butcher) identified the threatened species Australasian bittern to be regularly supported by the Site and therefore a critical component of the ecological character. Further investigation has determined that there are only a small number of historical records and the species has not been recorded in the Site since the 1960s and suitable habitat is not likely to be provided by the Site. This species has been removed from the justification for criterion 2 and from the critical CPS.

The Living Murray structural works program in the middle and lower forest was completed in 2013. The works allow up to 4,500 ha of the wetlands and floodplain to be watered with considerably less water than would be required if the new watering infrastructure was not in place. The works enable efficient watering through Gunbower Creek and the forest to maintain wetland and floodplain condition, and they provide a link between the creek, forest floodplain and the River Murray.

## 2.2 - Site location

### 2.2.1 - Defining the Site boundaries

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

Former maps	0
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Boundaries description

The Site is confined within the Gunbower State Forest and adjoining River Murray Reserve.

The Gunbower Forest Ramsar Site is located along the Murray River, approximately 235 km north-west of Melbourne. The Gunbower Forest Site includes public land from the River Murray Reserve, Spence Bridge Education Area, State Forest, and Gunbower National Park.

Approximate geographical coordinates for the site are Latitude: 35 degrees 39 minutes south to 36 degrees 00 minutes south; Longitude: 144 degrees 08 minutes east to 144 degrees 30 minutes east.

A detailed boundary description document can be found at:  
[https://www.water.vic.gov.au/\\_\\_data/assets/pdf\\_file/0018/52821/FINAL\\_Gunbower\\_Forest\\_Boundary\\_Description\\_Dec2013.pdf](https://www.water.vic.gov.au/__data/assets/pdf_file/0018/52821/FINAL_Gunbower_Forest_Boundary_Description_Dec2013.pdf)  
 A copy of this boundary description is attached under section 6.1.2 vi.

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

2.2.4 - Area of the Site

Official area, in hectares (ha):

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

2.2.5 - Biogeography

Biogeographic regions

Regionalisation scheme(s)	Biogeographic region
Freshwater Ecoregions of the World (FEOW)	Murray-Darling

Other biogeographic regionalisation scheme

### 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

Hydrological services provided

Gunbower Forest is part of the second largest river red gum forest in the Murray-Darling Basin (the largest being Barmah-Millewa Forest). The size and intact nature of this forested floodplain makes it clearly one of the best representatives of the wetland type Xf in the bioregion (Hale and Butcher 2011).

The Gunbower Forest Ramsar site forms an extensive area of intact floodplain between the Murray River and Gunbower Creek, and is one of the few such areas with native vegetation in the bioregion (Hale and Butcher 2011).

- Criterion 2 : Rare species and threatened ecological communities

Optional text box to provide further information

The Site is considered important for supporting five nationally threatened species:

- Murray cod (*Maccullochella peelii*) - listed as endangered under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)
- silver perch (*Bidyanus bidyanus*) - vulnerable (EPBC Act)
- Australasian bittern (*Botaurus poiciloptilus*) - endangered (EPBC Act)
- swamp wallaby-grass (*Amphibromus fluitans*) - vulnerable (EPBC Act)
- winged peppergrass (*Lepidium monoplacoides*) - vulnerable (EPBC Act).

The Site supports two internationally listed threatened species:

- Australasian bittern (*Botaurus poiciloptilus*) - endangered (IUCN Redlist)
- black box (*Eucalyptus largiflorens*) - vulnerable (IUCN Redlist).

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

Optional text box to provide further information

The Gunbower Forest is significant for supporting breeding of wetland birds, particularly colonial nesting waterbirds such as ibis, herons and cormorants. A total of 48 species of wetland bird have been recorded breeding within the Gunbower Ramsar site, which represents over 70 percent of the total wetland bird species regularly recorded at this site. In addition, there are records of fish spawning in wetland and stream habitats (MDBC 2007) (Hale and Butcher 2011, North Central CMA pers. comm. February 2016).

- Criterion 8 : Fish spawning grounds, etc.

**Justification**

The Site provides migratory routes between habitat in the Murray River and floodplains; with Gunbower Creek an important passage for native fish. Native fish of the Murray River main channel utilise anabranch and flood runner channels when they are available (Thoms et al. 2000). Native fish move into off-stream areas on rising flows, and make refuge movements into deeper waters during low flow periods. Many species spawn on the floodplains (Jones 2006). Tagged fish have been recorded moving large distances from the site (up to 300 kilometres upstream and 900 kilometres downstream), which is indicative of pre- and post-spawning behaviour (McKinnon 1997). In the region of the Ramsar site significant populations of golden (Macquaria ambigua) and silver perch (Bidyanus bidyanus) are found in the anabranches and tributaries of the Murray River, including Gunbower Creek. These populations are dependent on connectivity with the Murray River because juvenile size classes (1-2 years old and 80-250 mm long) re-colonise the anabranches and tributaries from the main-stem spawning areas (Stuart and Sharpe 2015). This is a major mechanism of colonisation, when juvenile fish migrate upstream along the Murray River and into the lower reaches of anabranches, especially if there is a flow cue (O'Connor et al. 2013; Koster et al. 2014 cited in Stuart and Shapre 2015). River red gum forests make a significant contribution to in stream nutrient accumulation and productivity through litterfall (Gawne et al. 2007) and provide important shelter in the form of coarse woody debris and shaded water (Jones and Stuart 2007).

### 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
<b>Plantae</b>								
TRACHEOPHYTA/ LILIOPSIDA	<i>Amphibromus fluitans</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	Nationally listed as vulnerable (EPBC Act)	
TRACHEOPHYTA/ MAGNOLIOPSIDA	<i>Eucalyptus largiflorens</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	VU	<input type="checkbox"/>		Internationally listed as threatened. This species is a key component of the woodland ecosystem.
TRACHEOPHYTA/ MAGNOLIOPSIDA	<i>Lepidium monoplacoides</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	Nationally listed as vulnerable (EPBC Act)	

Two additional threatened plant species, Ridged water milfoil (*Myriophyllum porcatum*) and Stiff groundsel (*Senecio behrianus*), have been established in the Gunbower Forest in 2014 and are being maintained via environmental watering when required. While there are early indications that the reintroduction of these species has been successful, it is not yet known if self-sustaining populations have been established and this information should be reviewed at the next update to the Ramsar Information Sheet.

### 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 <sup>1)</sup>	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
		2	4	6	9	3	5	7	8								
<b>Others</b>																	
CHORDATA/ AMPHIBIA	<i>Limnodynastes fletcheri</i>	<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"/>		Breeds in the site
CHORDATA/ AMPHIBIA	<i>Limnodynastes tasmaniensis</i>	<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"/>		Breeds in the site
CHORDATA/ AMPHIBIA	<i>Litoria peronii</i>	<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"/>		Breeds in the site
<b>Fish, Mollusc and Crustacea</b>																	

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/ ACTINOPTERYGII	<i>Bidyanus bidyanus</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>				NT	<input type="checkbox"/>	<input type="checkbox"/>	Nationally listed as vulnerable (EPBC Act)	
CHORDATA/ ACTINOPTERYGII	<i>Maccullochella peelii</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>				LC	<input type="checkbox"/>	<input type="checkbox"/>	Nationally listed as endangered (EPBC Act).	Migrates into and out of the site during floods
CHORDATA/ ACTINOPTERYGII	<i>Macquaria ambigua</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>				LC	<input type="checkbox"/>	<input type="checkbox"/>		Migrates into and out of the site during floods
CHORDATA/ ACTINOPTERYGII	<i>Retropinna semoni</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>				LC	<input type="checkbox"/>	<input type="checkbox"/>		Uses the site as a migration path and breeds at the site
<b>Birds</b>																	
CHORDATA/ AVES	<i>Anas gracilis</i>	<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"/>		Breeds in the site
CHORDATA/ AVES	<i>Anas superciliosa</i>	<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"/>		Breeds in the site
CHORDATA/ AVES	<i>Anhinga novaehollandiae</i>	<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"/>		Breeds in the site
CHORDATA/ AVES	<i>Ardea modesta</i>	<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"/>					<input type="checkbox"/>	<input type="checkbox"/>		Breeds in the site
CHORDATA/ AVES	<i>Botaurus poiciloptilus</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"/>				EN	<input type="checkbox"/>	<input type="checkbox"/>	Nationally listed as endangered (EPBC Act).	
CHORDATA/ AVES	<i>Chenonetta jubata</i>	<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"/>		Breeds in the site
CHORDATA/ AVES	<i>Cygnus atratus</i>	<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"/>		Breeds in the site
CHORDATA/ AVES	<i>Ixobrychus dubius</i>	<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"/>		Breeds in the site
CHORDATA/ AVES	<i>Microcarbo melanoleucos</i>	<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"/>		Breeds in the site
CHORDATA/ AVES	<i>Nycticorax caledonicus</i>	<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"/>		Breeds in the site
CHORDATA/ AVES	<i>Phalacrocorax carbo</i>	<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"/>		Breeds in the site
CHORDATA/ AVES	<i>Phalacrocorax sulcirostris</i>	<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"/>		Breeds in the site
CHORDATA/ AVES	<i>Phalacrocorax varius</i>	<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"/>		Breeds in the site
CHORDATA/ AVES	<i>Platalea flavipes</i>	<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"/>		Breeds in the site
CHORDATA/ AVES	<i>Platalea regia</i>	<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"/>		Breeds in the site
CHORDATA/ AVES	<i>Tachybaptus novaehollandiae</i>	<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"/>		Breeds in the site
CHORDATA/ AVES	<i>Tadorna tadornoides</i>	<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"/>		Breeds in the site
CHORDATA/ AVES	<i>Threskiornis molucca</i>	<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"/>					<input type="checkbox"/>	<input type="checkbox"/>		Breeds in the site
CHORDATA/ AVES	<i>Threskiornis spinicollis</i>	<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"/>		Breeds in the site

1) Percentage of the total biogeographic population at the site

The Gunbower Forest fish community monitoring program has involved systematic monitoring of fish community data since the program commenced in its current form in 2008. The species richness at Gunbower Forest in 2018 was higher than for the previous 2017 sampling event, with eleven native species and five exotic species recorded, with the notable exception of trout cod (*Maccullochella macquariensis*) which was not recorded from the current survey but had been recorded during two previous surveys. Native fish species richness was high in flowing habitats (Creek and River) and the Lagoon macrohabitats and low in the Wetland macrohabitat (Bloink et al, 2018).

In 2018 large-bodied native species Murray cod (*Maccullochella peelii*) and golden perch (*Macquaria ambigua*) were recorded in low to moderate abundance at twelve sites including two Lagoon sites (golden perch at Splatt Lagoon and Murray cod at Gum Lagoon). Young of Year (YOY) Murray cod were present at the majority of Creek and all River sites, and golden perch YOY were present at two of the three River sites and just under half of the Creek sites.

Carp gudgeons (*Hypseleotris* spp.) also migrate through the site, and breed at the site, being one of the most frequently encountered small native fish species (Bloink et al, 2018). This species complex contributes to meeting criterion 8.

A number of threatened fauna species listed at the national and/or international level have been recorded within the boundary of the Gunbower Forest. However, it cannot be demonstrated that the wetland supports terrestrial species such as the plains wanderer (*Pedionomus torquatus*) and mountain regent honeyeater (*Anthochaera phrygia*). In addition, there are records from 1920 to 1951 for the Australian painted snipe (*Rostratula australis*), but no records post 1960 and so this species has also not been considered with respect to criterion 2. There is a small number of other wetland dependent threatened species that have been recorded within the site since 1960s. However, there is a very low degree of certainty that the site is important for the growling grass frog (*Litoria raniformis*), trout cod (*Maccullochella macquariensis*) and western water-starwort (*Callitriche cyclocarpa*), with only isolated records for these species.

### 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

There are nine components, processes and services that are critical to the ecological character of the Gunbower Forest:

**Hydrology** - Inundation is driven largely by flows within the Murray River and major tributaries. The hydrology is highly regulated and seasonality of low and moderate flow is determined largely by irrigation needs. Large scale floods that inundate the forest are generally the result of catchment scale rainfall events. Groundwater under Gunbower Forest is considered to be a separate hydrological unit from the rest of the Riverine plain. Groundwater is low in salt and accessed for evapotranspiration from the soil down to 15m by river red gums and black box trees. This process is important for the water balance of the Forest. The floodplain is termed a “flushing zone” as it loses groundwater to the river following inundation.

**Vegetation** - The two critical wetland vegetation categories are floodplain forests and floodplain marshes. Approximately 80 percent of the site is covered in inundation dependent forest and woodland (river red gum and black box), which has a combined extent of over 16 000 hectares. River red gum forest is the dominant vegetation community, comprising 65 percent of the site. Seventy-five species of native aquatic / wetland plant species are recorded in floodplain marshes.

**Fish** - Twelve native species of fish have been recorded from within the site.

**Wetland birds** - Sixty-six species of wetland birds have been recorded from the site. This includes nine species listed under international migratory agreements and the internationally threatened Australasian bittern (*Botaurus poiciloptilus*). Maximum counts recorded during the 1974 floods comprise approximately 6000 individuals. A large proportion of the wetland birds recorded within the site have been observed breeding.

**Diversity of wetland types** - the Site supports part of the second largest remaining river red gum forest and provides a mosaic of vegetated wetland habitats.

**Physical habitat** - Gunbower Forest provides habitat for feeding and breeding of wetland birds.

**Threatened species** - the Site regularly supports four species listed under the EPBC Act and / or the IUCN Red List.

**Ecological connectivity** - the Site provides migratory routes between riverine, wetland and floodplain habitats for fish spawning and recruitment.

**Organic carbon cycling** - as part of a major floodplain system, the Site is important for the cycling of nutrients, particularly carbon.

### 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 >> M: Permanent rivers/ streams/ creeks	Gunbower Creek	3		
Fresh water > Flowing water >> N: Seasonal/ intermittent/ irregular rivers/ streams/ creeks	Yarran Creek	2		
Fresh water > Lakes and pools >> O: Permanent freshwater lakes		3	415	
Fresh water > Marshes on inorganic soils >> Ts: Seasonal/ intermittent freshwater marshes/ pools on inorganic soils		2	995	
Fresh water > Marshes on inorganic soils >> Xf: Freshwater, tree-dominated wetlands	Little Gunbower Complex, Pig Swamp, Reedy Lagoon	1	15000	Representative

#### Human-made wetlands

Wetland types (code and name)	Local name	Ranking of extent (1: greatest - 4: least)	Area (ha) of wetland type
9: Canals and drainage channels or ditches		4	

(ECD) Habitat connectivity

Gunbower Forest provides a network of connected river and floodplain wetland sites important for native fish, amphibians, waterbirds and vegetation (see ECD section 4.3.4 for more detail).

### 4.3 - Biological components

#### 4.3.1 - Plant species

## Other noteworthy plant species

Phylum	Scientific name	Position in range / endemism / other
TRACHEOPHYTA/MAGNOLIOPSIDA	<i>Eucalyptus camaldulensis</i>	Second largest remaining stand of river redgum in Victoria
TRACHEOPHYTA/LILIOPSIDA	<i>Najas tenuifolia</i>	Rare in Victoria
TRACHEOPHYTA/MAGNOLIOPSIDA	<i>Nymphoides crenata</i>	Listed as threatened under Victorian Flora and Fauna Guarantee Act (FFGA).
TRACHEOPHYTA/MAGNOLIOPSIDA	<i>Rorippa eustylis</i>	Rare in Victoria

## Invasive alien plant species

Phylum	Scientific name	Impacts	Changes at RIS update
TRACHEOPHYTA/MAGNOLIOPSIDA	<i>Malvella leprosa</i>	Actual (minor impacts)	No change
TRACHEOPHYTA/MAGNOLIOPSIDA	<i>Myriophyllum aquaticum</i>	Actual (minor impacts)	No change
TRACHEOPHYTA/MAGNOLIOPSIDA	<i>Nymphaea mexicana</i>	Actual (minor impacts)	No change
TRACHEOPHYTA/LILIOPSIDA	<i>Sagittaria montevidensis</i>	Actual (minor impacts)	No change
TRACHEOPHYTA/LILIOPSIDA	<i>Sagittaria platyphylla</i>	Actual (minor impacts)	No change
TRACHEOPHYTA/MAGNOLIOPSIDA	<i>Xanthium strumarium</i>	Actual (minor impacts)	No change

## Optional text box to provide further information

Under the Living Murray program there is monitoring of the condition of River Red Gum and Black Box stands in Gunbower Forest. In 2017 The Living Murray stand condition results suggest a modest improvement in the components assessed between 2010 and 2017; however akin to findings in 2016, the condition and trajectories of individual sites varied. It is likely the trend of overall improvement reflects the effect of rainfall and flooding between 2010 and 2012 and in 2016, and the receipt of eFlow from the Hipwell Regulator at some sites in 2014 and 2015 (Bennetts and Jolly, 2017).

## 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/REPTILIA	<i>Chelodina expansa</i>				Listed as Threatened under Victorian Flora and Fauna Guarantee Act (FFGA).
CHORDATA/REPTILIA	<i>Chelodina longicollis</i>				Listed as Threatened under Victorian Flora and Fauna Guarantee Act (FFGA).
CHORDATA/REPTILIA	<i>Emydura macquarii macquarii</i>				Considered to be vulnerable in Victoria (Advisory List of Threatened Vertebrate Fauna in Victoria, 2013)
CHORDATA/REPTILIA	<i>Morelia spilota</i>				Listed as Threatened under Victorian Flora and Fauna Guarantee Act (FFGA).

## Invasive alien animal species

Phylum	Scientific name	Impacts	Changes at RIS update
CHORDATA/MAMMALIA	<i>Felis catus</i>	Potential	No change
CHORDATA/MAMMALIA	<i>Sus scrofa</i>	Actual (minor impacts)	No change
CHORDATA/MAMMALIA	<i>Vulpes vulpes</i>	Actual (minor impacts)	No change
CHORDATA/ACTINOPTERYGII	<i>Cyprinus carpio</i>	Actual (major impacts)	No change
CHORDATA/ACTINOPTERYGII	<i>Gambusia holbrooki</i>	Actual (minor impacts)	No change
CHORDATA/ACTINOPTERYGII	<i>Misgurnus anguillicaudatus</i>	Potential	No change

## Optional text box to provide further information

In 2017-18, a drying phase was implemented across Gunbower Forest to reduce the number of carp on the floodplain following widespread natural flooding in 2016. Reedy Lagoon and Black Swamp, two high priority permanent wetlands, were pumped dry to remove over 1000kg of carp and then filled to provide refuges for native plants and animals. The water was delivered through carp screens to minimise the number of carp entering the wetlands.

#### 4.4 - Physical components

##### 4.4.1 - Climate

Climatic region	Subregion
B: Dry climate	BSk: Mid-latitude steppe (Mid-latitude dry)

The Site is subject to a changing climate. Australia has warmed by just over 1 °C since 1910, with most warming since 1950. It is projected to experience further increase in temperatures, with more extremely hot days and fewer extremely cool days over the coming decades under all emissions scenarios. Warming over Australia is expected to be slightly higher than the global average (BOM, State of the Climate 2018). As the global climate continues to warm the region (Murray Basin) is projected to experience an increase in average temperatures in all seasons with more hot days and warm spells and fewer frosts. In the near future (2030) natural variability is projected to predominate over rainfall trends in the region. Increased intensity of extreme rainfall events is projected. Time spent in drought is projected, with medium confidence, to increase over the course of the century. Fire weather is projected to be harsher across region though the magnitude of the change is uncertain.

##### 4.4.2 - Geomorphic setting

a) Minimum elevation above sea level (in metres)

a) Maximum elevation above sea level (in metres)

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.

Murray-Darling 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)

Soils in the region have developed from Quaternary alluvial deposits and are often silty gradational loams (Land Conservation Council 1983). Soils supporting river red gum forests and woodlands are typically composed of a layer of anoxic clay overlying interleaved clay and sand strata. The overlying layer of clay may be greater than 30 metres thick (Bren 1988). The site is a highly depositional environment, although there are no specific measures of sedimentation within the site.

##### 4.4.4 - Water regime

Water permanence

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

Source of water that maintains character of the site

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

Water destination

Presence?	Changes at RIS update
Feeds groundwater	No change
To downstream catchment	increase

Stability of water regime

Presence?	Changes at RIS update
Water levels largely stable	No change
Unknown	No change
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.

Cycles of wetting and drying are fundamental to these floodplain ecosystems. The duration, seasonality, frequency and intensity of wetting and drying determines the type of biota and provides important cues for flora and fauna in reproductive cycles.

Water resource development had decreased the frequency and duration of inundation and altered the seasonality of inundation with flow to the site determined largely by irrigation needs. Large scale floods are generally the result of catchment scale rainfall events.

Environmental watering has been undertaken at the site since 2006 to increase the frequency of flooding to the site. Overall, these environmental watering events have increased water inflows and return flows compared to the time of listing. Infrastructure, commissioned in 2013, allows 4500 hectares of the site to be inundated through managed water events. The remainder of the site receives water from natural floods, the most recent in 2016–17, when over 80% of the site was inundated.

(ECD) Connectivity of surface waters and of groundwater

Groundwater under Gunbower Forest is considered to be a separate hydrological unit from the rest of the Riverine plain. The floodplain is referred to as a 'flush zone' (SKM 2009)

4.4.5 - Sediment regime

Significant accretion or deposition of sediments occurs on the site

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

Sediment regime unknown

Please provide further information on sediment (optional):

Water quality within the Site is influenced both by the quality of water in river sources as well as floodplain interactions that occur during cycles of wetting and drying. During the filling and inundating phase, depending on the water quality of source water, velocity of flooding and sediment type, the floodwaters may become highly turbid (particularly in channels where velocity is greatest) and sediments may be deposited on the low relief floodplain surface.

(ECD) Water turbidity and colour

Turbidity varies from low (less than 10 NTU) to relatively high (almost 100 NTU).

(ECD) Light - reaching wetland

No information available

(ECD) Water temperature

No information available

4.4.6 - Water pH

Circumneutral (pH: 5.5-7.4)

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

Unknown

4.4.7 - Water salinity

Fresh (<0.5 g/l)

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

Unknown

Please provide further information on salinity (optional):

Salinity is mostly fresh, but in times of low or no flow can be considered brackish with electrical conductivity rising above 2000 micro Siemens per centimetre.

(ECD) Dissolved gases in water

Blackwater events that result in low oxygen concentrations occur when there is a long period during flood events. These events can be toxic to fish and other aquatic fauna (Howitt et al. 2005).

4.4.8 - Dissolved or suspended nutrients in water

Unknown

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

The flooding of ephemeral wetlands and floodplain surfaces may trigger blackwater events (Howitt et al. 2005). These are defined as flood events with elevated levels of dissolved organic carbon, sufficient to colour the water a deep brown. They are associated with reduced levels of dissolved oxygen in the water column, both on the floodplain and in receiving channels and wetlands, as micro organisms that consume litter on the floodplain surface upon wetting use oxygen from the water column in the process.

(ECD) Dissolved organic carbon	No information available
(ECD) Redox potential of water and sediments	No information available
(ECD) Water conductivity	Salinity is mostly fresh, but in times of low or no flow can be considered brackish

#### 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:

- 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:

Gunbower Forest is a floodplain forest in a productive rural and agricultural region. In-channel flow is controlled by a large number of regulating structures within the forest and along Gunbower Creek, which is an irrigation supply channel. Gunbower Forest was recognised as a “working forest” at the time of designation as a Wetland of International Importance with the ecological character at the time of listing reflecting the continuing use of these forests, including timber harvesting. Therefore authorised, sustainable timber harvesting and other forestry activities are considered a provisioning service provided by the site.

### 4.5 - Ecosystem services

#### 4.5.1 - Ecosystem services/benefits

##### Provisioning Services

Ecosystem service	Examples	Importance/Extent/Significance
Food for humans	Sustenance for humans (e.g., fish, molluscs, grains)	Low
Fresh water	Water for irrigated agriculture	Medium
Fresh water	Drinking water for humans and/or livestock	High
Wetland non-food products	Timber	Medium
Wetland non-food products	Fuel wood/fibre	High

##### Regulating Services

Ecosystem service	Examples	Importance/Extent/Significance
Maintenance of hydrological regimes	Groundwater recharge and discharge	High
Maintenance of hydrological regimes	Storage and delivery of water as part of water supply systems for agriculture and industry	High
Climate regulation	Regulation of greenhouse gases, temperature, precipitation and other climactic processes	Medium
Biological control of pests and disease	Support of predators of agricultural pests (e.g., birds feeding on locusts)	High
Hazard reduction	Flood control, flood storage	Low

##### Cultural Services

Ecosystem service	Examples	Importance/Extent/Significance
Recreation and tourism	Recreational hunting and fishing	Medium
Recreation and tourism	Picnics, outings, touring	Low
Recreation and tourism	Nature observation and nature-based tourism	Low
Spiritual and inspirational	Cultural heritage (historical and archaeological)	High
Scientific and educational	Major scientific study site	High
Scientific and educational	Educational activities and opportunities	Low
Scientific and educational	Important knowledge systems, importance for research (scientific reference area or site)	High
Scientific and educational	Long-term monitoring site	High

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
Nutrient cycling	Carbon storage/sequestration	High

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) Primary production	Floodplain inundation, with its associated boom in productivity, provides both physical habitat and food resources that are important in maintaining the ecological character of the site.
(ECD) Nutrient cycling	The sites river red gum forests are important in the cycling of organic carbon in the river system.
(ECD) Carbon cycling	As part of a major floodplain system, the site is important for the cycling of nutrients, particularly carbon both on the floodplain and as a source of organic carbon to receiving waterways.
(ECD) Animal reproductive productivity	Breeding of fish, frogs and waterbirds are all considered critical to ecological character of the site.
(ECD) Vegetational productivity, pollination, regeneration processes, succession, role of fire, etc.	Hydrological regime (specifically extended periods of inundation) supports river red gums populations.
(ECD) Notable species interactions, including grazing, predation, competition, diseases and pathogens	Invasive species (weeds, introduced fish) increased predation or competition with native flora and fauna and increase the risk of destructive wildfire through increased understorey biomass.
(ECD) Notable aspects concerning animal and plant dispersal	Floodplain wetlands maintains ecological connectivity for spawning/recruitment of native fish.
(ECD) Notable aspects concerning migration	Supports migration of native fish between rivers and floodplain wetlands.
(ECD) Pressures and trends concerning any of the above, and/or concerning ecosystem integrity	Water resource use in the Murray Darling Basin resulting in altered hydrology is the most significant threat to the sites ecological character.

## 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 type="checkbox"/>

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

At the time of listing (1982) the Gunbower Forest comprised two primary land tenures. Gunbower Island State Forest covered approximately 85 percent of the site and was managed for the purposes of timber production and harvesting (DSE 2003). The remaining parts of the site (approximately 3000 hectares) were, at the time Crown Land. In June 2010, 8892 hectares was declared a National Park by the Victorian Government to protect and enhance the river red gum forests (Parks Victoria 2010). The site currently comprises of Gunbower State Forest (8843 hectares), Gunbower National Park (8892 hectares) and Murray River Park (1666 hectares).

#### 5.1.2 - Management authority

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

North Central Catchment Management Authority; Parks Victoria; Victorian Department of Environment, Land, Water, and Planning

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

Rod White, Gunbower Forest Ramsar site coordinator (North Central Catchment Management Authority)

Postal address:

PO Box 18, Huntly Vic 3551

E-mail address:

rod.white@nccma.vic.gov.au

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

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

Water regulation

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

Agriculture and aquaculture

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Wood and pulp plantations	Medium impact	High impact	<input checked="" type="checkbox"/>	No change	<input type="checkbox"/>	No change

Biological resource use

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Logging and wood harvesting	Medium impact	High impact	<input checked="" type="checkbox"/>	No change	<input checked="" type="checkbox"/>	No change
Hunting and collecting terrestrial animals	Low impact	Low impact	<input checked="" type="checkbox"/>	No change	<input checked="" type="checkbox"/>	increase
Fishing and harvesting aquatic resources	Low impact	Low impact	<input checked="" type="checkbox"/>	No change	<input checked="" type="checkbox"/>	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	Medium impact	High impact	<input checked="" type="checkbox"/>	increase	<input type="checkbox"/>	No change

Natural system modifications

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Dams and water management/use	High impact	High impact	<input checked="" type="checkbox"/>	increase	<input checked="" type="checkbox"/>	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	Medium impact	High impact	<input checked="" type="checkbox"/>	increase	<input type="checkbox"/>	No change

Climate change and severe weather

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

Please describe any other threats (optional):

The most recent Ramsar Rolling Review for this site was conducted in 2015 and identified the following imminent threats and trends in the Ramsar site:

Water resource use: Decreased frequency and extent of inundation - Decline in frequency of inundation since listing (frequency of small to moderate floods decreased as evidenced by flows in Murray River).

Logging and wood harvesting: Physical disturbance - Unknown trend, while forestry is controlled by a code of practice, firewood collection by the public is not (Dan. McLaughlin, Parks Victoria).

Recreation: Physical disturbance from off road vehicles and motorcycles - Unknown trend, as area of disturbance is not monitored.

Invasive species: carp - In 2017 over 1000kg of carp were removed from the site and carp screens were used to stop reintroduction during subsequent inundation.

Invasive species: weather loach - Some evidence of a decline in oriental weather loach from 2008 to 2013 (Sharpe et al. 2013).

Invasive species: weeds - indicated a declining trend immediately post breaking of the drought, but it is expected that many of the weeds have returned.

### 5.2.2 - Legal conservation status

National legal designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
National Park	Gunbower National Park	<a href="http://parkweb.vic.gov.au/exploration/parks/gunbower-national-park">http://parkweb.vic.gov.au/exploration/parks/gunbower-national-park</a>	partly
Natural Features Reserve	Murray River Reserve	<a href="http://parkweb.vic.gov.au/exploration/parks/river-murray-reserve">http://parkweb.vic.gov.au/exploration/parks/river-murray-reserve</a>	partly
State Forest	Gunbower Island State Forest		whole

### 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

Habitat

Measures	Status
Catchment management initiatives/controls	Partially implemented
Hydrology management/restoration	Partially implemented
Re-vegetation	Partially implemented

Species



Measures	Status
Control of invasive alien plants	Partially implemented
Control of invasive alien animals	Partially implemented
Reintroductions	Partially implemented
Threatened/rare species management programmes	Partially implemented

Human Activities

Measures	Status
Management of water abstraction/takes	Implemented
Fisheries management/regulation	Implemented
Regulation/management of recreational activities	Implemented
Communication, education, and participation and awareness activities	Partially implemented
Research	Partially implemented
Harvest controls/poaching enforcement	Partially implemented

Other:

In Australia, the ecological character of a designated Wetland of International Importance is protected as a Matter of National Environmental Significance (MNES) under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). This means that developments which have or are likely to have a significant impact on the ecological character of the site must be referred for assessment and approval by from the Australian Government Minister for the Environment.

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

5.2.6 - Planning for restoration

Is there a site-specific restoration plan? Yes, there is a plan

5.2.7 - Monitoring implemented or proposed

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

River flow is monitored by the MDBA.  
Icon site monitoring under the Living Murray program includes monitoring of:

- Tree stand condition
- Sentinel wetland and understorey vegetation
- Fish - Murray cod, golden perch, common carp
- Waterbirds
- Frogs
- Turtles
- Water quality
- Flood events
- Water depth

## 6 - Additional material

### 6.1 - Additional reports and documents

#### 6.1.1 - Bibliographical references

included as an attachment in section 6.2.1 vi

#### 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)  
<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  
<no file available>

vi. other published literature  
<3 file(s) uploaded>

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

Please provide at least one photograph of the site:



Gunbower forest (  
*Genevieve Smith*, 06-12-  
2017 )



Gunbower forest flood plain  
(floating primrose) (  
*Genevieve Smith*, 06-12-  
2017 )

#### 6.1.4 - Designation letter and related data

Designation letter  
<no file available>

Date of Designation 1982-12-15