Ramsar Information Sheet

Published on 5 September 2025
Update version, previously published on : 1 January 2012

Australia

Macquarie Marshes

Designation date	1 August 1986
Site number	337
Coordinates	30°51'30"S 147°38'24"E
Area	19 304,00 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 Macquarie Marshes Ramsar site covers 19,304 ha and lies within the greater Macquarie Marshes of the lower Macquarie River in central western NSW. As the Macquarie River flows onto the Darling Riverine Plain, it develops distributary streams and forms extensive floodplain wetlands. These streams flow north and northwest, while the main Macquarie River channel continues north, anastomosing and forming the greater Macquarie Marshes and extending for about 120 km northwards before the river reforms and discharges to the Barwon River.

The Macquarie Marshes Ramsar site comprises approximately 10% of the greater Macquarie Marshes and functions as part of the larger system. The ecological character of the Ramsar site is dependent on the condition of the greater Macquarie Marshes (OEH 2012).
The Macquarie Marshes is part of the traditional land of the Wayilwan People who continue to maintain connections to country, and place great importance on traditional ceremonial areas and the water, animals and plants.

Macquarie Marshes meets Ramsar criteria 1, 2, 3, 4, 5, and 8.
1: The greater Macquarie Marshes are one of the largest freshwater wetlands in the Murray–Darling Basin (MDB), covering an area of around 200,000 ha of the floodplain of the lower Macquarie River. The Ramsar site encompasses 19,304 ha of this ecosystem.

2: The site provides habitat for species listed as threatened nationally (under the EPBC Act) and/ or internationally (under the IUCN Redlist), including fish and waterbird species.

3: The Ramsar site contains a variety of wetland types, from semi-permanent and frequently inundated marshes to ephemeral wetlands inundated by only the largest floods. These include three wetland vegetation communities uncommon in the MDB that support many wetland faunal species. This habitat diversity contributes to the marshes being one of the MDB's most biologically diverse wetland systems.

4: The site provides regionally and nationally significant habitat for large groups of nesting waterbirds, which breed at the site in large numbers.

5: The site supports large numbers of waterbirds nesting in large groups, covering at least nine species and estimated to have exceeded 80,000 birds on occasions.

8: The site provides spawning habitat for at least three native fish species and provides migratory routes for upstream/downstream movement and between adjacent systems during high flow/flooding events.

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 Climate Change, Energy, the Environment and Water
Postal address	GPO Box 3090 Canberra ACT 2601 Australia

National Ramsar Administrative Authority

Institution/agency	Department of Climate Change, Energy, the Environment and Water
Postal address	GPO Box 3090 Canberra ACT 2601 Australia

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

From year	1986
To year	2022

2.1.3 - Name of the Ramsar Site

Official name (in English, French or Spanish)	Macquarie Marshes

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	the area has decreased
(Update) The Site area has been calculated more accurately	☑
(Update) The Site has been delineated more accurately	☐
(Update) The Site area has increased because of a boundary extension	☐
(Update) The Site area has decreased because of a boundary restriction	☐
(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?	Uncertain
(Update) Optional text box to provide further information	

In 2009 a likely change in ecological character was notified under Article 3.2 of the Convention. This identified potential declines in wetland vegetation communities due to significant reductions in frequency, extent and duration of low, medium and high inundation events. Increased water extractions upstream of the site, combined with a major, decade-long, drought in eastern Australia led to an approximate halving of high inundation events. The 2012 ECD identified changes in the reed beds, river red gum forests and woodlands, water couch, cumbungi and mixed marsh vegetation communities of the site. Waterbirds also declined, with no colonial waterbird breeding events recorded between 2001 and 2010.

A draft Adaptive Environmental Management Plan was prepared in 2009 and a Response Strategy in 2013 (OEH 2013). These include:
• Water recovery for the Macquarie Marshes, including government buy-back of water
• Use of environmental water to establish a more 'natural' flow regime
•Improved water management infrastructure (including removal of some structures and fish barriers)
• Improved land management practices, including provision of government incentives; government buy-back; pest control; and revegetation
• Fire management.

Widespread flooding 2010-2011, supplemented by use of environmental water to extend natural flooding events for group-nesting waterbird breeding, improved wetland vegetation condition at the site.

Between 2011-2020, the site experienced two extreme droughts (2012-2016 and 2017-2019), including the deepest drought on record. During this time, Environmental water was used to support core wetland vegetation areas of the site.

Significantly wet conditions in 2021 & 2022 supported widespread inundation in the marshes and large-scale waterbird breeding for two consecutive years. Environmental water was used to support completion of these breeding events and maintain foraging habitat.

The site has been subject to a changing climate.

2.2 - Site location

2.2.1 - Defining the Site boundaries

b) Digital map/image
<5 file(s) uploaded>

Former maps: 0

Boundaries description

The Macquarie Marshes Ramsar site includes three areas, which include part of the Macquarie Marshes Nature Reserve (northern and southern sections), part of the privately owned property 'Wilgara' ('Wilgara wetland') and the privately owned property 'The Mole' ('U-block').

The boundary for the Nature Reserve component of the Ramsar site is the Reserve boundary as gazetted on 13/1/2006, excluding Ninia (Lots 1 and 4, DP753493) and reserve additions since this time. The Nature Reserve section of the Ramsar site includes both the Macquarie Marshes Reserve northern section and the Macquarie Marshes Reserve southern section.

The boundary for the Wilgara Wetland component of the Ramsar site generally follows the cadastral boundary of Lot 1, DP 753498 except for the eastern boundary which is defined by a fence extending from its intersection with the northern boundary of Lot 1 at 147°45'2.55"E and 30°55'21".6 S to its intersection with the southern boundary of Lot 1 at 147°45'11.04" E and 30°56'47.7".

The boundary of the U-block component of the Ramsar site is the cadastral boundary of Lot 47, DP 727216. The boundary excludes the road reserve (Warren-Carinda road) that runs south to north through the western part of the block. In 2012 'Creswell' was added to the Ramsar site, increasing the total area of the site to 19,304 ha. Creswell' is contiguous with the northern boundary of the nature reserve and includes Lot 1 – DP403974, Lot 4 – DP751575, Lot 2 – DP751622 and Lot 1 – DP751622.

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? Quambone, population166 (ABS 2022) lies 30km east of the Ramsar site.

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): 19304

Area, in hectares (ha) as calculated from GIS boundaries: 19303.724

2.2.5 - Biogeography

Biogeographic regions

Regionalisation scheme(s)	Biogeographic region
Other scheme (provide name below)	Murray-Darling Basin, Macquarie-Bogan Rivers
Other scheme (provide name below)	Darling Riverine Plains

Other biogeographic regionalisation scheme

Within Australia, the Australian Hydrological Geospatial Fabric (Geofabric), Integrated Marine Coastal Regionalisation of Australia (IMCRA) and/ or the Interim Biogeographic Regionalisation for Australia (IBRA) are the biogeographic regionalisation schemes typically used.

Bureau of Meteorology (2012). Australian Hydrological Geospatial Fabric (Geofabric): Topographic Drainage Divisions and River Regions – Murray-Darling Basin, Macquarie-Bogan Rivers; and Murray-Darling Basin, Darling Riverine Plains. (http://www.bom.gov.au/water/geofabric/documents/BOM002_Map_Poster_A3_Web.pdf).

The Australian Hydrological Geospatial Fabric (Geofabric) is a specialised Geographic Information System (GIS). It registers the spatial relationships between important hydrological features such as rivers, water bodies, aquifers and monitoring points. The National Topographic Drainage Divisions and River Regions are currently derived from Geofabric version 2. These provide a set of surface water reporting units based on drainage-enforced digital elevation models and are used to depict where water flows and drains across the landscape.

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

The greater Macquarie Marshes are one of the largest freshwater wetlands in the Murray-Darling Basin biogeographic region. They are a representative example of an inland floodplain wetland relying on water from a higher rainfall upper catchment and having extensive and changeable wetlands in their semi-arid lowland reaches. They are unique in terms of their size and their diversity of wetland types (Mussared 1997), and the extent of particular wetland communities. It is estimated that the Murray-Darling Basin has over 30,000 wetlands, but the greater Macquarie Marshes is one of only four wetlands covering 200,000 hectares or more (Crabb 1997). The movement of waterbirds and fish between areas within the greater Macquarie Marshes provides connectivity with the Ramsar listed areas.

The wetland communities in the Ramsar site comprise a mosaic of beds of common reeds, water couch marsh and mixed marsh, lignum shrublands, river red gum forests and woodlands, coolibah woodlands and open water lagoons. These habitats are characteristic of the broader Macquarie Marshes wetland complex.

Other reasons

The river red gum forest and woodlands, common reed beds and water couch marsh communities support significant wetland species diversity including colonial nesting waterbirds, migratory shorebirds, frogs, fish and reptiles (Marchant and Higgins 1990; Mussared 1997; Kingsford and Johnson 1998; Kingsford and Auld 2005).

The Macquarie Marshes contains four Ramsar wetland types:
• freshwater tree-dominated wetlands (Xf): including river red gum forest and woodland; and coolibah and/or black box woodland.
• freshwater marshes (Ramsar type Ts): including common reed beds, cumbungi rushland, freshwater lagoons, water couch marsh, water couch grassland, marsh club-rush sedgeland and mixed marsh grassland.
• shrub-dominated wetlands (W): comprising of lignum in the northern section of the marshes and at Wilgara.
• seasonal/ intermittent/ irregular rivers/ streams/ creeks (N): such as the Macquarie River, Bora Channel, Monkeygar Creek, Terrigal Creek and Ginghet Creek.

☑ Criterion 2 : Rare species and threatened ecological communities

Optional text box to provide further information

The site provides habitat for wetland-dependent species that are listed as threatened nationally under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), and/ or internationally under the IUCN Red List, such as:
• Australasian bittern, Botaurus poiciloptilus (EPBC - endangered, IUCN - vulnerable)
• Australian painted snipe, Rostratula australis (EPBC - endangered, IUCN - endangered)
• silver perch, Bidyanus bidyanus (EPBC - endangered)
• Murray cod, Maccullochella peelii peelii (EPBC - vulnerable)
• glossy black-cockatoo, Calyptorhynchus lathami (EPBC - vulnerable)
• greenshank, Tringa nebularia (EPBC - endangered)

The site also provides habitat for threatened species that may not be wetland-dependent but could utilise the wetlands (e.g. resting in nearby trees and/or feeding on wetland dependent species). These include:
• Superb parrot, Polytelis swainsonii (EPBC - vulnerable)
• Grey snake Hemiaspis damelii (EPBC - endangered)

The site contains one threatened ecological community listed under the EPBC Act:
• Coolibah-black box woodlands of the Darling Riverine Plains; and the Brigalow Belt South bioregions (EPBC - endangered).

☑ Criterion 3 : Biological diversity

Justification

The Macquarie Marshes support one of only three extensive river red gum (Eucalyptus camaldulensis) woodlands (covering approx. 6,000 ha across the broader wetland complex) in the Murray-Darling Basin. The other two are in the southern half of the Murray-Darling Basin on the Murrumbidgee and Murray Rivers. The woodlands in the Macquarie Marshes Ramsar site provide nesting sites and habitat for waterbirds and woodland birds.

The Macquarie Marshes is one of only two sites in the Murray-Darling Basin (the other being the Great Cumbung Swamp) supporting extensive common reed (Phragmites australis) beds. In 1991, the Macquarie Marshes Nature Reserve supported approximately 2,000 hectares of common reed in two main reed beds, one in the northern and one in the southern section of the Nature Reserve.
The Macquarie Marshes is one of only two areas (the other being the Gwydir Wetlands) with extensive water couch (Paspalum distichum) marsh in the Murray-Darling Basin. These wetland vegetation communities provide habitat for 77 waterbird species
(including nesting waterbirds, migratory shorebirds) frogs, fish and reptiles.

The site also supports at least 35 species that are listed as rare or threatened at the state level, and the state-listed aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River (NSW Fisheries Management Act 1994).

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

Optional text box to provide further information

The Macquarie Marshes provide significant habitat for colonial nesting waterbirds, with up to 16 species recorded at the site, including egrets (4 species), ibis (3), herons (3), cormorants (2), darters (1) and magpie geese. It is one of the few sites supporting large breeding colonies of straw-necked ibis (Threskiornis spinicollis) in Australia and one of the most significant sites in NSW where the magpie goose (Anseranas semipalmata) breeds (Kingsford & Thomas 1995). The site supports some of the largest breeding colonies of intermediate egret (Ardea intermedia), nankeen night heron (Nycticorax caledonicus) and royal spoonbill (Platalea regia) in southern Australia, as well as a rich diversity of waterbirds including cormorants, herons, spoonbills and ducks, many of which breed there.

In a catchment that has been modified by agricultural activities, these remaining wetlands have become a regionally important refuge for wildlife. They represent an important drought refuge during periods when many other inland wetlands have dried out.

The Ramsar site provides important habitat for 14 species of migratory birds covered under one or more of the Japan–Australia, China–Australia and South Korea–Australia Migratory Bird Agreements (JAMBA, CAMBA and/or ROKAMBA), and or the Convention on the Conservation of Migratory Species of Wild Animals (CMS). All these species are listed under the EPBC Act. These are:
• Caspian tern (Hydroprogne caspia)
• bar-tailed godwit (Limosa lapponica)
• black-tailed godwit (Limosa limosa)
• common greenshank (Tringa nebularia)
• common sandpiper (Actitis hypoleucos)
• curlew sandpiper (Calidris ferruginea)
• Latham's snipe (Gallinago hardwickii)
• marsh sandpiper (Tringa stagnatilis)
• red-necked stint (Calidris ruficollis)
• sharp-tailed sandpiper (Calidris acuminata)
• wood sandpiper (Tringa glareola)
• glossy ibis (Plegadis falcinellus)
• fork-tailed swift (Apus pacificus)
• white-throated needletail (Hirundapus caudacutus)

Waterbirds and fish move between the Ramsar listed areas and the broader Macquarie Marshes system, demonstrating the importance of connectivity between these areas.

☑ Criterion 5 : >20,000 waterbirds

Overall waterbird numbers	20000
Start year	1986
End year	2022
Source of data:	Kingsford and Auld (2003, 2005) Capon et al. (2018) Brandis et al (2022)

Optional text box to provide further information

Survey data has been collected for the broader Macquarie Marshes ecosystem. Ramsar site specific bird count data is a knowledge gap.

Between 1986 and 2000, the broader Macquarie Marshes probably supported more than 20,000 colonial nesting waterbirds in at least two-thirds of the years when flows exceeded 200,000 ML at Oxley (1988, 1989, 1990, 1993, 1996, 1998 and 2000). Nest counts in the Ramsar site for these years were 2,600, 6,200, 37,500, 9,300, 2,700, 23,800 and 29,100. If nests are a used to estimate bird numbers (2 adults per nest plus 1-3 chicks), then it is likely that 20,000 colonial nesting waterbirds were supported by the Ramsar site in at least five of these years (1989, 1990, 1993, 1998 and 2000) (Kingsford and Auld 2003).

Using NSW government ground count data from 1995 to 2016, Capon et al. (2018) calculated colonial waterbird nest counts from 2006 to 2018 and total waterbird counts from 1995 to 2016 Total annual abundance ranged from 0 in 2007 and 2009 (during the 'millennium drought') to 80,756 in 2012.

Following above average rainfall, river flows and subsequent widespread flooding in the Macquarie Marshes during the spring/summer of 2021/22, 4 large ibis colonies, composed predominantly of straw-necked ibis (Threskiornis spinicollis), Australian white ibis (T. molluca), and royal spoonbill (Platelea regia) established (Brandis et al. 2022). Mapping and nest counts of the 4 colonies identified over 116,000 nests across the colonies ranging from 11,000 nests at the smallest colony and 38,500 at the largest. Only one of these four large-scale ibis colonies was in the Ramsar site (T-block). There were also large scale egret and night heron nesting colonies (>5,000 nests) recorded by DPE EHG during the same summer, including two on the northern Nature Reserve part of the Ramsar site.

In response to continued wet conditions in 2022, large-scale colonial waterbird breeding occurred at numerous sites throughout the Macquarie Marshes, along with smaller numbers of other colonial nesters such as herons and cormorants, and non-colonial species like ducks and waterhens.

☑ Criterion 8 : Fish spawning grounds, etc.

Justification

The broader Macquarie Marshes provides habitat for native fish species.
Due to the location of the Macquarie Marshes near the lower end of the Macquarie catchment, its fish communities are likely to be a blend of those found in adjacent main channel habitats upstream and downstream, but also in adjacent systems such as Marthaguy Creek. During high flows, fish are likely to move into the marshes from these areas (King 2004; Jenkins and Wolfenden 2006). The Macquarie Marshes support a significant life history stage as evidence suggests that native fish such as silver perch (Bidyanus bidyanus) and golden perch (Macquarie ambigua), move out of the main channel habitats into the floodplain to breed and spawn with the onset of high flows (Balcombe et al. 2007). It is also possible that these species may breed in the main channel during smaller flow events if conditions are suitable (Humphries et al. 1999).

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	*Eucalyptus camaldulensis*	☐	☑	☑	NT	☐		Key species in rare and representative wetland community type (redgum forest and woodland). The site provides a source of genetic material (e.g. seeds) for reintroduction to the surrounding lanscape after extreme condictions (such as drought). Provision of important habitat.
TRACHEOPHYTA / MAGNOLIOPSIDA	*Eucalyptus coolabah*	☐	☑	☑	NT	☐		Key species in rare and representative wetland community type (coolibah-black box woodland). The site provides a source of genetic material (e.g. seeds) for reintroduction to the surrounding lanscape after extreme condictions (such as drought). Provision of important habitat.
TRACHEOPHYTA / MAGNOLIOPSIDA	*Eucalyptus largiflorens*	☑	☑	☑	VU	☐		Internatinally listed threatened species. Key species in rare and representative wetland community type (coolibah-black box woodland). The site provides a source of genetic material (e.g. seeds) for reintroduction to the surrounding lanscape after extreme condictions (such as drought). Provision of important habitat.
TRACHEOPHYTA / LILIOPSIDA	*Paspalum distichum*	☐	☑	☐	LC	☐		Key species in rare and representative wetland community type (water couch marsh). The site provides a source of genetic material (e.g. seeds) for reintroduction to the surrounding lanscape after extreme condictions (such as drought).
TRACHEOPHYTA / LILIOPSIDA	*Phragmites australis*	☐	☑	☐	LC	☐		Key species in rare wetland community type (common reed beds). The site provides a source of genetic material (e.g. seeds) for reintroduction to the surrounding lanscape after extreme condictions (such as drought). Provision of important habitat
TRACHEOPHYTA / LILIOPSIDA	*Typha domingensis*	☐	☑	☑	LC	☐		A key species in a representative community type (mixed marsh). The site provides a source of genetic material (e.g. seeds) for reintroduction to the surrounding lanscape after extreme condictions (such as drought). Provision of important habitat.
TRACHEOPHYTA / LILIOPSIDA	*Typha orientalis*	☐	☑	☑	LC	☐		A key species in a representative community type (mixed marsh). The site provides a source of genetic material (e.g. seeds) for reintroduction to the surrounding lanscape after extreme condictions (such as drought). Provision of important habitat

These species are considered cornerstone species of the wetland community types that are rare and/or outstanding representative examples within the Ramsar site and are important in maintaining the geographic range of these plant communities.

Tangled Lignum (Duma florulenta, formerly Muehlenbeckia florulenta) is a key species in a representative wetland community type. It provides important habitat for waterbirds. This species is not listed in the Catalogue of Life database so cannot be included in the table above.

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	*Chelodina expansa*	☐	☑	☐	☐	☑	☐	☐	☐					☐	☐		The site provides habitat for this species and acts as a refuge at times, when other inland wetlands may be dry.
CHORDATA / REPTILIA	*Chelodina longicollis*	☐	☑	☐	☐	☑	☐	☐	☐					☐	☐		The site provides habitat for this species and acts as a refuge at times, when other inland wetlands may be dry.
CHORDATA / REPTILIA	*Emydura macquarii*	☐	☑	☐	☐	☑	☐	☐	☐					☐	☐		The site provides habitat for this species and acts as a refuge at times, when other inland wetlands may be dry.
CHORDATA / AMPHIBIA	*Limnodynastes tasmaniensis*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides habitat for this species and acts as a refuge at times, when other inland wetlands may be dry.
CHORDATA / AMPHIBIA	*Litoria caerulea*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides habitat for this species and acts as a refuge at times, when other inland wetlands may be dry.
CHORDATA / AMPHIBIA	*Litoria peronii*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides habitat for this species and acts as a refuge at times, when other inland wetlands may be dry.
Fish, Mollusc and Crustacea																	
CHORDATA / ACTINOPTERYGII	*Bidyanus bidyanus*	☑	☐	☐	☐	☐	☐	☐	☑				NT	☐	☐	Nationally listed (EPBC Act) - endangered	This is a nationally listed threatened species. The site may provide breeding habitat for this species.
CHORDATA / ACTINOPTERYGII	*Maccullochella peelii*	☑	☐	☐	☐	☐	☐	☐	☑				LC	☐	☐	Nationally listed (EPBC Act) - vulnerable	This is a nationally listed threatened species. The site may provide breeding habitat for this species.
CHORDATA / ACTINOPTERYGII	*Macquaria ambigua*	☐	☐	☐	☐	☐	☐	☐	☑				LC	☐	☐		The site may provide breeding habitat for this species.
Birds																	
CHORDATA / AVES	*Actitis hypoleucos*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐	Nationally listed (EPBC Act) - migratory	This is species is listed nationally as migratory. It breeds in the northern hemisphere and migrates* to Australia in its non-breeding season. It uses the site for non-breeding habitat and as a stopover point during migration. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Anas castanea*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides habitat for this species and may act as a refuge when other inland wetlands may be dry. This species may breed at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Anas gracilis*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Anas rhynchotis*	☐	☑	☐	☐	☑	☐	☐	☐					☐	☐		This species breeds at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at 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								
CHORDATA / AVES	*Anas superciliosa*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides habitat for this species and may act as a refuge when other inland wetlands may be dry. This species breeds at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Anhinga melanogaster*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Anseranas semipalmata*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		The site provides habitat for this species and may act as a refuge when other inland wetlands may be dry. This species breeds at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Apus pacificus*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐	Nationally listed (EPBC Act) - migratory	This is species is listed nationally as migratory. It breeds in the northern hemisphere and migrates to Australia in its non-breeding season. It uses the site for non-breeding habitat and as a stopover point during migration. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Ardea alba*	☐	☑	☐	☐	☐	☑	☐	☐	2600			LC	☐	☐		This species breeds in colonies at the site. More than 2600 individuals of this species has been observed in the marshes.
CHORDATA / AVES	*Ardea pacifica*	☐	☑	☐	☐	☐	☑	☐	☐				LC	☐	☐		This species breeds at the site.
CHORDATA / AVES	*Aythya australis*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Biziura lobata*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Botaurus poiciloptilus*	☑	☐	☐	☐	☐	☐	☐	☐				VU	☐	☐	Nationally listed (EPBC Act) - endangered	Nationally and internationally listed threatened species.
CHORDATA / AVES	*Calidris acuminata*	☑	☑	☐	☐	☐	☐	☐	☐				VU	☐	☐	Nationally listed (EPBC Act) - vulnerable, migratory	This is a nationally and internationally listed threatened species. This species breeds in the northern hemisphere and migrates to Australia in its non-breeding season. It uses the site for non-breeding habitat and as a stopover point during migration.
CHORDATA / AVES	*Calidris ferruginea*	☑	☑	☐	☐	☐	☐	☐	☐				VU	☐	☐	Nationally listed (EPBC Act) - critically endangered, migratory	This is a nationally listed threatened species. This species breeds in the northern hemisphere and migrates to Australia in its non-breeding season. It uses the site for non-breeding habitat and as a stopover point during migration.
CHORDATA / AVES	*Calidris ruficollis*	☐	☑	☐	☐	☑	☐	☐	☐				NT	☐	☐	Nationally listed (EPBC Act) - migratory	This is species is listed nationally as migratory. It breeds in the northern hemisphere and migrates to Australia in its non-breeding season. It uses the site for non-breeding habitat and as a stopover point during migration. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Chenonetta jubata*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at 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								
CHORDATA / AVES	*Chlidonias hybrida*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Cygnus atratus*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Dendrocygna eytoni*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Egretta intermedia*	☐	☑	☐	☐	☐	☑	☐	☐	40000				☐	☐		The site provides habitat for this species and may act as a refuge when other inland wetlands may be dry. This species breeds in colonies in the marshes.
CHORDATA / AVES	*Egretta novaehollandiae*	☐	☑	☐	☐	☐	☑	☐	☐				LC	☐	☐		The site provides habitat for this species and may act as a refuge when other inland wetlands may be dry.
CHORDATA / AVES	*Egretta picata*	☐	☑	☐	☐	☐	☑	☐	☐				LC	☐	☐		This species breeds at the site.
CHORDATA / AVES	*Elseyornis melanops*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Erythrogonys cinctus*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Fulica atra*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Gallinago hardwickii*	☑	☑	☐	☐	☐	☐	☐	☐				NT	☐	☐	Nationally listed (EPBC Act) - vulnerable, migratory	This is a nationally listed threatened species. This species breeds in the northern hemisphere and migrates to Australia in its non-breeding season. It uses the site for non-breeding habitat and as a stopover point during migration.
CHORDATA / AVES	*Himantopus himantopus*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Hirundapus caudacutus*	☑	☑	☐	☐	☐	☐	☐	☐				LC	☐	☐	Nationally listed (EPBC Act) - vulnerable, migratory	This is a nationally listed threatened species. This species breeds in the northern hemisphere and migrates to Australia in its non-breeding season. It uses the site for non-breeding habitat and as a stopover point during migration
CHORDATA / AVES	*Hydroprogne caspia*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐	Nationally listed (EPBC Act) - migratory	This is species is listed nationally as migratory. This species uses the site for non-breeding habitat/refugia (e.g. when other sites may be dry). This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Ixobrychus minutus*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at 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								
CHORDATA / AVES	*Limosa lapponica*	☐	☑	☐	☐	☑	☐	☐	☐				NT	☐	☐	Nationally listed (EPBC Act) - migratory	This is species is listed nationally as migratory. It breeds in the northern hemisphere and migrates to Australia in its non-breeding season. It uses the site for non-breeding habitat and as a stopover point during migration. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Limosa limosa*	☑	☑	☐	☐	☐	☐	☐	☐				NT	☐	☐	Nationally listed (EPBC Act) - endangered	This is a nationally listed threatened species. This species breeds in the northern hemisphere and migrates to Australia in its non-breeding season. It uses the site for non-breeding habitat and as a stopover point during migration.
CHORDATA / AVES	*Malacorhynchus membranaceus*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Microcarbo melanoleucos*	☐	☑	☐	☐	☐	☑	☐	☐				LC	☐	☐		This species breeds in colonies at the site.
CHORDATA / AVES	*Nycticorax caledonicus*	☐	☑	☐	☐	☐	☑	☐	☐	30000			LC	☐	☐		This species breeds in colonies at the site.
CHORDATA / AVES	*Oxyura australis*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Phalacrocorax carbo*	☐	☑	☐	☐	☐	☑	☐	☐				LC	☐	☐		This species breeds at the site.
CHORDATA / AVES	*Phalacrocorax sulcirostris*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds in colonies at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Platalea flavipes*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Platalea regia*	☐	☑	☐	☐	☑	☐	☐	☐	6000	2022		LC	☐	☐		This species breeds in colonies at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Plegadis falcinellus*	☐	☑	☐	☐	☐	☑	☐	☐	7500			LC	☐	☐		This species breeds in colonies at the site.
CHORDATA / AVES	*Podiceps cristatus*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Poliocephalus poliocephalus*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Polytelis swainsonii*	☑	☐	☐	☐	☐	☐	☐	☐				LC	☐	☐	Nationally listed (EPBC Act) - vulnerable	Nationally listed threatened species.
CHORDATA / AVES	*Porphyrio porphyrio*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Porzana tabuensis*	☐	☑	☐	☐	☑	☐	☐	☐					☐	☐		This species breeds at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at 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								
CHORDATA / AVES	*Rostratula australis*	☑	☐	☐	☐	☐	☐	☐	☐				EN	☐	☐	Nationally listed (EPBC Act) - endangered	Nationally and internationally listed threatened species.
CHORDATA / AVES	*Stictonetta naevosa*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Tachybaptus novaehollandiae*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Threskiornis molucca*	☐	☐	☐	☐	☐	☑	☐	☐					☐	☐		This species breeds in large colonies at the site.
CHORDATA / AVES	*Threskiornis spinicollis*	☐	☑	☐	☐	☐	☑	☐	☐				LC	☐	☐		This species breeds in large colonies at the site.
CHORDATA / AVES	*Tringa glareola*	☐	☑	☐	☐	☐	☐	☐	☐				LC	☐	☐	Nationally listed (EPBC Act) - migratory	This species breeds in the northern hemisphere and migrates to Australia in its non-breeding season. It uses the site for non-breeding habitat and as a stopover point during migration.
CHORDATA / AVES	*Tringa nebularia*	☑	☑	☐	☐	☐	☐	☐	☐				LC	☐	☐	Nationally listed (EPBC Act) - endangered, migratory	Nationally listed threatened species. This species breeds in the northern hemisphere and migrates to Australia in its non-breeding season. It uses the site for non-breeding habitat and as a stopover point during migration.
CHORDATA / AVES	*Tringa stagnatilis*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐	Nationally listed (EPBC Act) - migratory	This species breeds in the northern hemisphere and migrates to Australia in its non-breeding season. It uses the site for non-breeding habitat and as a stopover point during migration. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.
CHORDATA / AVES	*Vanellus miles*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds at the site. This species contributes to the overall waterbird diversity (species richness) and abundance recorded at the site.

1) Percentage of the total biogeographic population at the site

The Ramsar site includes significant areas for waterbird breeding and important habitat areas for amphibians, fish, mammals and reptiles. The Ramsar site supports significant and diverse waterbird populations including many rare or endangered bird species.

The Macquarie Marshes are important for waterbird wintering habitat, non-breeding habitat, and provides refugia during adverse conditions. In dry conditions, parts of the broader Macquarie Marshes ecosystem have the potential to retain some water, except in extreme climatic events such as the millennium drought.

*The East Asian-Australasian flyway (EAAF) is the migratory route used by many bird species that breed in the northern hemisphere and migrate to Australia during their non-breeding season. See: https://www.eaaflyway.net/the-flyway/

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

Name of ecological community	Community qualifies under Criterion 2?	Description	Justification
Coolibah – Black Box Woodlands of the Darling Riverine Plains and Brigalow Belt South bioregions	☑	Occurrences of semi-arid to humid subtropical woodland where Eucalyptus coolabah subsp. coolabah (coolibah) and/or Eucalyptus largiflorens (black box) are the dominant canopy species and where the understorey tends to be grassy.	The Ramsar site supports the nationally endangered Coolibah – Black Box Woodland of the Darling Riverine Plains and Brigalow Belt South bioregions (Environment Protection and Biodiversity Conservation Act 1999).

Optional text box to provide further information

Coolibah – Black Box Woodlands of the Darling Riverine Plains and Brigalow Belt South bioregions (continued from above): Open eucalypt woodlands formerly occurred across a range of climatic regions of Australia. The position in the landscape of these woodlands, such as floodplains or uplands can determine their vegetation structure, and consequently ecological community. The Coolibah – Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions ecological community represents occurrences of one type of semi-arid to humid subtropical woodland where Eucalyptus coolabah subsp. coolabah (coolibah) and/or Eucalyptus largiflorens (black box) are the dominant canopy species and where the understorey tends to be grassy. The association of the woodland ecological community with floodplains indicates its particular importance for birds both as woodland habitat and as nesting sites for colonial breeding waterbirds that rely on occasional wetlands in addition to woodland habitats Most of the amphibian species associated with the ecological community are burrowing frogs and only emerge after significant rainfall.

Whilst not listed nationally as threatened, the following communities form part of the ecological character of the site:
• River red gum woodland: The northern section of the nature reserve contains rare or unique examples of near natural wetland types including river red gum (Eucalyptus camaldulensis) woodlands, an important and extensive plant community in the marshes. These are fed by overbank flooding from many small channels and provide nesting sites and habitat for both waterbirds and woodland birds. River red gum woodland can contain wetland understorey of water couch, cumbungi and common reed, changing to a grassy understorey or even chenopod shrub species understorey under high water stress conditions.

• Lowland Darling River aquatic ecological community: this ecological community is listed as endangered at the state level under the Fisheries Management Act 1994.
The Darling River aquatic ecological community occurs in a lowland riverine environment. The water-bodies in this community are characterised by naturally variable and unpredictable patterns of high and low flows. The natural morphology of the river systems provides a mosaic of habitats, including deep channels, deep pool areas, suspended load depositional ‘benches’, higher floodplain ‘benches’, braided channels, terminal wetland complexes, gravel beds and riffle zones. This high, natural spatio-temporal variability and complex river morphology provides a multitude of habitats that play a critical role in the life cycles of the species making up this ecological community. The floodplain is also an integral part of this river system. The community includes 21 species of native fish, many of which rely on the seasonal flow pattern and inundation of the floodplain for successful reproduction (NSW Government 2007).

• Marsh club-rush sedgeland in the Darling Riverine Plains Bioregion: this ecological community is listed as critically endangered at the state level under the Biodiversity Conservation Act 2016, and has been recorded in the Macquarie Marshes near the bypass channel (NSW Government, pers comm.) Marsh club-rush sedgeland is dominated by the marsh club-rush (Bolboschoenus fluviatilis) which forms dense stands up to 2 m tall. It is characterised by an understorey including tussock sedge (Carex appressa), ribbed spike rush (Eleocharis plana), blown grass (Lachnagrostis filiformis), water couch (Paspalum distichum) and swamp buttercup (Ranunculus undosus).”

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

4.1 - Ecological character

The critical components and processes of the Macquarie Marshes Ramsar site are:

• Wetland types and vegetation – the broad range of semi-permanent wetland vegetation and floodplain wetland vegetation are critical to the site's biodiversity. Wetland vegetation includes river red gum woodland, common reed beds and water couch marsh.
River red gum forest occurs mostly in the channel country of the north marsh. When inundated, it has a wetland understorey that includes aquatic species, reeds, rushes, and sedges. River red gum woodland has a less dense canopy, occurs between the main channels in less frequently flooded areas and an understorey of grasses and forbs.
River red gum woodland has a less dense canopy, occurring in less frequently flooded areas, with a variable understorey depending on inundation: emergent plants during wet years through to grasses and forbs in dry years.
Common reedbeds provide habitat for waterbirds, including habitat for the Australasian bittern and nest platforms for large breeding colonies of ibis.
Water couch forms grasslands within the marshes and is an important understorey plant in woodland areas. Water couch provides habitat for frogs and macroinvertebrates, which are important prey for glossy ibis and other waterbird species. Glossy ibis avoid areas dominated by Typha and Eleocharis rushes (Taylor and Taylor 2015).

• Aquatic ecological community – this comprises all native fish and aquatic invertebrates that occur within the ecosystem and provides a key food source for waterbird breeding. The aquatic invertebrates and diversity of fish species play a critical role in energy and nutrient cycling which maintains biological diversity.

• Birds – the site supports thousands of birds including waterbirds and shorebirds, including species listed under international migratory bird agreements and breeding waterbirds. Colonial nesting species of at least 16 species have been recorded, with great egret, intermediate egret, little egret, rufous night heron, glossy ibis, straw-necked ibis, little pied cormorant and little black cormorant breeding in large numbers.

• Hydrology – a range of inundation magnitudes and frequencies support the critical components of the Ramsar site. Flows to the marshes come primarily from the Macquarie River, which has a long history of natural variability and river regulation. Intra-seasonal, inter-annual and inter-decadal climatic fluctuations cause hydrological variability. Provision of environmental water assists the river and Macquarie Marshes. Once water reaches the marshes, it branches out to different parts of the floodplain via the complex system of creeks.

• Geomorphology – In the Macquarie Marshes geomorphology and hydrology are closely related. At geological time scales hydrology is contributing to the morphology of the Macquarie Valley, while at a contemporary scale, geomorphology influences the hydrology of the Macquarie River and the Macquarie Marshes.
The core wetlands of the Macquarie Marshes and the nature reserve Ramsar site are associated with the modern channel of the Macquarie River and its primary distributaries, while the alluvial plain consists of an arrangement of active and abandoned channels. The modern river system is dominated by silt and clay-sized sediments that are accreting over alluvial materials deposited on the Macquarie Alluvial Plain by the late quaternary.
Throughout the Macquarie Marshes, finer spatial scale geomorphological features include small channels, low levees, flood basins, depressions, shallow scour-lines and gilgai. These features may affect the distribution of floodwaters, particularly small–moderate magnitude events, across the floodplain and affect processes of channel and floodplain sedimentation and erosion (Beadle 1948; Ralph 2008).

The ecological character of the Macquarie Marshes Ramsar site is dependent on the condition of the greater Macquarie Marshes.

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	Macquarie River, Bora channel, Ginghet Creek, Monkeygar Creek	4	200	Representative
Fresh water > Marshes on inorganic soils >> Ts: Seasonal/ intermittent freshwater marshes/ pools on inorganic soils	Freshwater lagoons, common reed swamps, water couch grasslands, marsh club-rush sedgeland	2	4880	Representative
Fresh water > Marshes on inorganic soils >> W: Shrub-dominated wetlands	Lignum shrubland	3	200	Representative
Fresh water > Marshes on inorganic soils >> Xf: Freshwater, tree-dominated wetlands	River red gum forest and woodland, coolibah woodlands, black box woodlands	1	7115	Representative

Other non-wetland habitat

Other non-wetland habitats within the site	Area (ha) if known
Chenopod shrubland/grassland	
Chenopod shrubland	
Poplar box woodland	
Weeping Myall woodland	

(ECD) Habitat connectivity	The site has a high degree of longitudinal hydrological connectivity with the greater Macquarie Marshes and Barwon River. It has a high degree of lateral connectivity through its anastomosing channels and across the floodplain during high flow events.

4.3 - Biological components

4.3.1 - Plant species

Invasive alien plant species

Phylum	Scientific name	Impacts	Changes at RIS update
TRACHEOPHYTA/MAGNOLIOPSIDA	*Marrubium vulgare*	Actual (minor impacts)	unknown
TRACHEOPHYTA/MAGNOLIOPSIDA	*Xanthium occidentale*	Actual (minor impacts)	unknown
TRACHEOPHYTA/MAGNOLIOPSIDA	*Xanthium spinosum*	Actual (minor impacts)	unknown

Optional text box to provide further information

Noteworthy flora:
The Ramsar site protects some 259 native plant species which is significant which means considerable biodiversity is protected by the listing and therefore also ecological processes that this biodiversity underpins (OEH 2012).
• Two notable plant species have been recorded at the site but are not listed in the Catalogue of Life database so cannot be included in the table above: Lepidium hyssopifolia - This species is nationally listed (EPBC - endangered) but is not considered wetland-dependent.
• Sclerolaena muricata. This native species can be considered invasive outside of its natural range.

Invasive species:
The invasion of exotic species was noted to be changing some vegetation complexes pre 2000 (Brock 1998). A moderate infestation of lippia (Phyla canescens), with high levels of infestation was reported along some waterways, especially along the North Marsh bypass channel. Lippia is a threat to water couch during dry periods, as its prostrate growth form can completely cover the ground (Brock 1998). Following the commencement of Commonwealth environmental watering in 2009, declines of invasive plant species & terrestrial invaders were noted by Capon et al. (2018).

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/MAMMALIA	*Chalinolobus picatus*				State listed threatened species (NSW TSC Act)
CHORDATA/AVES	*Grantiella picta*				Nationally listed threatened species but may not be wetland dependent.
CHORDATA/AVES	*Haliaeetus leucogaster*				State listed threatened species (NSW TSC Act)
CHORDATA/MAMMALIA	*Mormopterus norfolkensis*				State listed threatened species (NSW TSC Act)
CHORDATA/MAMMALIA	*Petaurus norfolcensis*				State listed threatened species (NSW TSC Act)
CHORDATA/MAMMALIA	*Saccolaimus flaviventris*				State listed threatened species (NSW TSC Act)
CHORDATA/MAMMALIA	*Sminthopsis macroura*				State listed threatened species (NSW TSC Act)
CHORDATA/AVES	*Burhinus grallarius*				State listed threatened species (NSW TSC Act)
CHORDATA/AVES	*Cacatua leadbeateri*				State listed threatened species (NSW TSC Act)
CHORDATA/AVES	*Calyptorhynchus banksii*				State listed threatened species (NSW TSC Act)
CHORDATA/AVES	*Calyptorhynchus lathami*				State listed threatened species (NSW TSC Act)
CHORDATA/AVES	*Climacteris picumnus*				State listed threatened species (NSW TSC Act)
CHORDATA/AVES	*Ephippiorhynchus asiaticus*				State listed threatened species (NSW TSC Act)
CHORDATA/AVES	*Grus rubicunda*				State listed threatened species (NSW TSC Act)
CHORDATA/AVES	*Hamirostra melanosternon*				State listed threatened species (NSW TSC Act)
CHORDATA/AVES	*Lophoictinia isura*				State listed threatened species (NSW TSC Act)
CHORDATA/AVES	*Melanodryas cucullata*				State listed threatened species (NSW TSC Act)
CHORDATA/AVES	*Melithreptus gularis gularis*				State listed threatened species (NSW TSC Act)
CHORDATA/AVES	*Neophema pulchella*				State listed threatened species (NSW TSC Act)
CHORDATA/AVES	*Nettapus coromandelianus*				State listed threatened species (NSW TSC Act)
CHORDATA/AVES	*Ninox connivens*				State listed threatened species (NSW TSC Act)
CHORDATA/AVES	*Pandion haliaetus*				State listed threatened species (NSW TSC Act)
CHORDATA/AVES	*Pomatostomus temporalis*				State listed threatened species (NSW TSC Act)
CHORDATA/AVES	*Stagonopleura guttata*				Nationally listed threatened species but may not be wetland dependent.
CHORDATA/AVES	*Turnix maculosus*				State listed threatened species (NSW TSC Act)

Invasive alien animal species

Phylum	Scientific name	Impacts	Changes at RIS update
CHORDATA/MAMMALIA	*Capra hircus*	Actual (minor impacts)	unknown
CHORDATA/MAMMALIA	*Felis catus*	Actual (minor impacts)	unknown
CHORDATA/MAMMALIA	*Sus scrofa*	Actual (minor impacts)	unknown
CHORDATA/MAMMALIA	*Vulpes vulpes*	Actual (minor impacts)	unknown
CHORDATA/ACTINOPTERYGII	*Cyprinus carpio*	Actual (minor impacts)	unknown

Optional text box to provide further information

Noteworthy fauna:
The Ramsar site supports a large number of bat species (19 species), 4 of which are state listed, and 1 species is nationally listed, all these would be dependent upon wetland conditions to some degree being insectivores. It also supports an exceptional number of reptiles (66 species) and amphibians (17 species) as well as birds and fish noted elsewhere (OEH 2012).

Invasive species:
Feral pigs are common on the lower floodplain and among the reed beds. They prey on eggs and young of ground-nesting birds and disturb marsh soil and vegetation. Gambusia, starlings and (increasingly) common mynahs have been identified as problematic species at the site (NSW NPWS pers com.). Foxes and feral cats occur at the site and impact native fauna (Brock 1998).
All feral animals are regularly controlled by NSW National Parks and Wildlife Service within the nature reserve and private landholders or Local Land Services in other areas.

European carp cause erosion in the marshes, damaging aquatic vegetation and resuspending nutrients such as phosphorus (Brock 1998), and compete with native fish.

4.4 - Physical components

4.4.1 - Climate

Climatic region	Subregion
B: Dry climate	BSh: Subtropical steppe (Low-latitude dry)

The Macquarie Marshes has a semi-arid climate with hot summers and cool to mild winters. Winter nights can be cold. Mean monthly minimum temperatures range from 4 to 5.2°C in winter and 18.2 to 19.9°C in summer. Mean monthly maximum temperatures range from 16.6 to 18.8°C in winter and 33.4 to 34.6°C in summer.
Rainfall tends to be uniformly distributed throughout the year, with a mean annual rainfall of 450.1 mm at Quambone (1900-2023). Rainfall is extremely variable, within years and between years.

According to BOM and CSIRO (2020), projections for Australia's NRM regions (Eastern Australia: central slopes), average temperatures will continue to increase in all seasons, with more hot days and warm spells projected. Average winter and spring rainfall is projected to decrease. Changes to summer and autumn rainfall is unclear. Increased intensity of extreme rainfall events is projected and there will be a harsher fire-weather climate in the future (CSIRO 2022).

4.4.2 - Geomorphic setting

a) Minimum elevation above sea level (in metres): 135

a) Maximum elevation above sea level (in metres): 145

- 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.

The Macquarie Marshes lies within the lower part of the Macquarie catchment.

4.4.3 - Soil

- Mineral ☑

(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)

The soils of the Nature Reserve and U-block consist almost entirely of heavy-textured grey-brown (sometimes black) silts and clays to a depth of 2-9m. Sand content is usually < 20% and organic material is only 5-10%. As these clay-rich soils dry out, they can develop deep cracks, allowing water and organic material to enter the soils (and providing refuge for frogs during dry periods). When floodwater enters these cracks, deep soil recharge occurs, with soil storage of over 1m of water (equivalent to 10ML/ ha). Reduced flooding in the Macquarie Marshes leads to a diminished reservoir of organic matter and dormant biota in floodplain sediments (Jenkins and Wolfenden (2006). Beyond the area of regular inundation, red-brown texture contrast soils are typical.

4.4.4 - Water regime

Water permanence

Presence?	Changes at RIS update
Usually permanent water present	No change
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 precipitation	☐	No change
Water inputs from surface water	☑	No change
Water inputs from groundwater	☐	unknown

Water destination

Presence?	Changes at RIS update
To downstream catchment	unknown

Stability of water regime

Presence?	Changes at RIS update
Water levels fluctuating (including tidal)	unknown

Please add any comments on the water regime and its determinants (if relevant). Use this box to explain sites with complex hydrology:

Flows to the Macquarie Marshes come primarily from the Macquarie River and rely on water from rainfall in the upper catchment. Rainfall in the catchment is naturally highly variable within and across years, leading to large floods and substantial periods of drying. These conditions are exacerbated by a changing climate and are projected to become more intense.

The highly variable climate, combined with the site's highly anastomosed system of channels, create a local hydrology within the site that varies substantially within space and time, leading to extensive, diverse and changeable wetlands. This is a natural phenomenon and occurs without upstream regulation or extraction. However, the combination of increasing volumes of water extraction from the Macquarie River and the millennium drought (2000 – 2009) demonstrated the unsustainability of the water management regime as it existed in the early 2000s.

Environmental water was first delivered in the Macquarie catchment in 1980 by the NSW government. Since 2009, Commonwealth environmental water has been provided to the system. Through trial and review of outcomes it has been steadily increasing in total catchment regulated volume since 1986, with the NSW and Commonwealth market-based interventions in the 2000's adding a further volume beyond that in the Water Sharing Plan (2004).

Over recent years environmental water has been managed for drought buffering, system recovery in wetter years and to secure waterbird breeding colonies, fish breeding and hydrological connectivity outcomes. This water is rarely specifically targeted at the Ramsar site but is managed for the greater Macquarie Marshes.

Delivery of environmental water is informed by an assessment of environmental demands across the catchment, and the amount of water available to help meet those demands. The environmental watering plans consider antecedent and projected conditions.

(ECD) Connectivity of surface waters and of groundwater: The water table in the marshes rises to 1–2m below the surface following floods and falls to 6–8m below the surface in low flow periods (Brereton 1993). Replenishment of the freshwater layer is essential for the maintenance of the marshes.

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):

The wetlands provide trapping and stabilisation of sediment and accumulation of organic matter that allows the formation of fertile self-mulching clays in the marshes.

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

Fresh (<0.5 g/l)	☑
(Update) Changes at RIS update	No change ○ Increase ○ Decrease ○ Unknown ◉
Mixohaline (brackish)/Mixosaline (0.5-30 g/l)	☐
(Update) Changes at RIS update	No change ○ Increase ○ Decrease ○ Unknown ◉
Euhaline/Eusaline (30-40 g/l)	☐
(Update) Changes at RIS update	No change ○ Increase ○ Decrease ○ Unknown ◉
Hyperhaline/Hypersaline (>40 g/l)	☐
(Update) Changes at RIS update	No change ○ Increase ○ Decrease ○ Unknown ◉
Unknown	☐

Please provide further information on salinity (optional):

Salinity in the Macquarie River was recorded in 1998 as averaging 620 µS/cm (approx 0.37 g/L). Water quality data collected at the Macquarie River between 2007 and 2015 had median salinity values of 326 µS/cm (approx 0.20 g/L), 419 µS/cm (approx 0.25 g/L) and 554 µS/cm (approx 0.33 g/L) downstream of Burrendong Dam, at Warren Weir and at Bells Bridge, respectively NSW DPI 2020).
The groundwater below the uppermost 2 to 3 m layer of fresh groundwater is highly saline due to the marshes occupying a natural sump in the landscape and accumulating salt over a long period of time (OEH 2012).

4.4.8 - Dissolved or suspended nutrients in water

Eutrophic	☐
(Update) Changes at RIS update	No change ○ Increase ○ Decrease ○ Unknown ◉
Mesotrophic	☐
(Update) Changes at RIS update	No change ○ Increase ○ Decrease ○ Unknown ◉
Oligotrophic	☐
(Update) Changes at RIS update	No change ○ Increase ○ Decrease ○ Unknown ◉
Dystrophic	☐
(Update) Changes at RIS update	No change ○ Increase ○ Decrease ○ Unknown ◉
Unknown	☑

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 greater Macquarie Marshes are the immediate surrounding area, containing a mix of marshes and agriculture. Agriculture here includes primarily grazing of cattle and sheep, with some minor areas of irrigated and dryland cultivation.

Beyond the marshes, the surrounding and upstream catchment is used for dryland grazing and cropping in the dryer areas, and irrigated cropping and extensive grazing elsewhere.

Immediately upstream of the marshes is a significant area of irrigated cultivation, primarily used for cotton production. Downstream areas are used for irrigated cotton production, with large areas of grazing.

Further away from the site dryland cultivation and grazing occur across most of the landscape, with relatively high levels of native vegetation removal to the east, north and south.

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)	Medium
Fresh water	Water for irrigated agriculture	Medium
Fresh water	Drinking water for humans and/or livestock	Medium
Wetland non-food products	Livestock fodder	Medium
Genetic materials	Genes for tolerance to certain conditions (e.g., salinity)	Low

Regulating Services

Ecosystem service	Examples	Importance/Extent/Significance
Maintenance of hydrological regimes	Groundwater recharge and discharge	Medium
Erosion protection	Soil, sediment and nutrient retention	Medium
Pollution control and detoxification	Water purification/waste treatment or dilution	Medium
Biological control of pests and disease	Support of predators of agricultural pests (e.g., birds feeding on locusts)	Low
Hazard reduction	Flood control, flood storage	Medium

Cultural Services

Ecosystem service	Examples	Importance/Extent/Significance
Recreation and tourism	Recreational hunting and fishing	Low
Recreation and tourism	Nature observation and nature-based tourism	Low
Spiritual and inspirational	Aesthetic and sense of place values	Medium
Spiritual and inspirational	Cultural heritage (historical and archaeological)	High
Scientific and educational	Important knowledge systems, importance for research (scientific reference area or site)	Medium
Scientific and educational	Educational activities and opportunities	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
Nutrient cycling	Storage, recycling, processing and acquisition of nutrients	Medium
Nutrient cycling	Carbon storage/sequestration	Medium

Other ecosystem service(s) not included above:

Spiritual and inspirational: The marshes are an iconic natural area with significant cultural values. It is the traditional area for people of the Wayilwaan Aboriginal nation. Many Wayilwaan people have significant links with the marshes through historic connections, land and water management roles, living and/ or working in the near vicinity, or they are involved with an environmental or a primary production group. Aboriginal cultural values relate to the deep history of Aboriginal interaction with the wetlands and the values, interests and aspirations of contemporary Aboriginal communities with custodial relationships to the wetlands. Aboriginal cultural values relate to specific places, specific plants and animals, and also the wetlands landscape as a whole.

Optional text box to provide further information

Aesthetic amenity: The site provides 'iconic' natural scenery and attractive landscapes that people can view, enjoy or otherwise appreciate in a semi-arid environment. It also supports wetland characteristics of high value such as waterbird communities.

Distinct or Unique wetland species: Supports species which may be common but are also notable or otherwise important, such as keystone or indicator species. These may also include iconic species such as those species which are especially important to a community, often in a symbolic sense or by association (such as colonial waterbirds).

Ecological connectivity: The site supports other wetlands in the region including species transfer/movement such as interconnected habitat for waterbirds, migratory birds and woodland birds and providing a pathway for seed dispersal.

Threatened species and communities: Supports listed threatened species and endangered ecological communities.

Within the site:	100s
Outside the site:	1000s

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	Primary production is associated with frequency and persistence of floods. Upstream areas typically have more productivity on the floodplains due to greater flooding, while downstream areas have greater productivity in their shallow, wider channels.
(ECD) Nutrient cycling	Nutrients build up in floodplain sediments and depositional patches in river and creek channels & are mineralised during dry phases. Flooding events inundate these soils releasing nutrients & are vital to the reservoir of organic matter & dormant biota.
(ECD) Carbon cycling	Organic matter builds up in floodplain sediments & depositional patches in river and creek channels & is broken down during dry phases. Flooding events release carbon to the water & are vital to the reservoir of organic matter & dormant biota of the site.
(ECD) Notable aspects concerning animal and plant dispersal	The site provides a pathway for seed dispersal and the movement of fish and aquatic invertebrates during high flow events.
(ECD) Notable aspects concerning migration	The site supports species transfer/ movement, providing interconnected habitat for waterbirds, migratory birds and woodland birds.
(ECD) Pressures and trends concerning any of the above, and/or concerning ecosystem integrity	Loss of flooding in the Macquarie Marshes had diminished the reservoir of organic matter and dormant biota in floodplain sediments. Subsequent restoration actions have improved flooding of the site.

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	☑	☑

Private ownership

Category	Within the Ramsar Site	In the surrounding area
Other types of private/individual owner(s)	☑	☑

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

The Ramsar site includes publicly and privately owned land. NSW National Parks and Wildlife owns and manages the Macquarie Marshes Nature Reserve. U-Block and Wilgara are privately owned.

The Macquarie Marshes is part of the traditional land of the Wayilwan People who continue to maintain connections to country, and place great importance on traditional ceremonial areas and the water, animals and plants. The Wayilwan Creation story of the Macquarie Marshes, the Macquarie River, and nearby rivers highlights the importance of connectivity of the river system.

5.1.2 - Management authority

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

Land Managers:
1) Macquarie Marshes Nature Reserve (north and south): NSW Department of Planning and Environment, National Parks and Wildlife Service
2) Wilgara wetlands: 'Wilgara' private owners
3) U-block: Garry and Leanne Hall, 'The Mole'

Environmental water managers:
4) NSW Department of Planning and Environment, Environment and Heritage Group
5) Australian Government, Department of Climate Change, Energy, the Environment and Water, Commonwealth Environmental Water Holder

Postal address:

1) NSW NPWS
PO Box 105, Baradine NSW 2396
Email: John.Whittall@environment.nsw.gov.au

2) Wilgara – Gordon family
Quambone NSW 2831
Email: derowie1@gmail.com

3) The Mole - Hall Family
Carinda Road, Warren NSW 2824
Email: garryandleanne1@bigpond.com

4) NSW DCCEEW – BCS Group
PO Box 211, Dubbo NSW 2830
Email: tim.hosking@environment.nsw.gov.au

5) DCCEEW – Commonwealth Environmental Water Holder
GPO Box 3090, Canberra ACT 2601
Australia
Email: wetlandsmail@dcceew.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	High impact	☑	No change	☑	No change
Salinisation	Medium impact	Medium impact	☑	No change	☑	No change

Agriculture and aquaculture

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Annual and perennial non-timber crops	unknown impact	unknown impact	☐	unknown	☑	unknown

Natural system modifications

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Fire and fire suppression	Medium impact	Medium impact	☑	No change	☑	No change
Dams and water management/use	High impact	High 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	Medium impact	Medium impact	☑	No change	☑	No change

Climate change and severe weather

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Habitat shifting and alteration	Medium impact	Medium impact	☑	unknown	☑	unknown

Please describe any other threats (optional):

Channel erosion causing deeply incised channels and disconnected floodplains, particularly in the southern reserve is currently happening and is having immediate and longer term impacts.
The lack of understanding complex systems is a threat with medium likelihood and long term impact on the system.

5.2.2 - Legal conservation status

National legal designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
State protected area	Macquarie Marshes Nature Reserve	https://www.nationalparks.nsw.gov.au/visit-a-park/parks/macquarie-marshes-nature-reserve	partly

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
Hydrology management/restoration	Partially implemented

Species

Measures	Status
Threatened/rare species management programmes	Partially implemented

Human Activities

Measures	Status
Livestock management/exclusion (excluding fisheries)	Partially implemented

Other:

In Australia, the ecological character of a designated Ramsar site is protected as a matter of national environmental significance (MNES) under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

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

Further information

https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Water/Wetlands/macquarie-ma rshes-ramsar-site-response-strategy-130104.pdf

5.2.7 - Monitoring implemented or proposed

There is no targeted monitoring program for the values for the Ramsar site. Apart from stream flow gauging, resources for monitoring of the greater Macquarie Marshes are limited and inconsistent over time.

Long-term hydrology is monitored by a series of stream flow gauges operated by Water NSW on behalf of the NSW government.

There has been monitoring of wetland values undertaken by NSW, DCCEEW and past Water Departments over time (1980-2024). This monitoring has been not targeted at the Ramsar site, instead monitoring values at the greater Macquarie Marshes scale. Examples include vegetation community extent (1991, 2008, 2013, 2023), vegetation condition 2006-2024, birds (2012-2024), frogs (2012-2024) and inundation extent from satellite data (2008-2024 but going back in time using Landsat data).
Some short-term intervention monitoring of group-nesting waterbirds over 2016-2023 has been funded through the Office of the Commonwealth Environmental Water Holder. Additional resources are being provided to the greater Macquarie Marshes under a program commencing in 2024 – 'Flow MER2'. See: https://www.dcceew.gov.au/water/cewo/catchment/macquarie/monitoring

6 - Additional material

6.1 - Additional reports and documents

6.1.1 - Bibliographical references

This RIS has been prepared using information from the Macquarie Marshes Ramsar site documentation, including the Ecological Character Description; Management Plan/s; past Ramsar Information Sheets; and other key information sources. A full bibliography is included as an attachment under Section 6.1.2 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
<1 file(s) uploaded>

6.1.3 - Photograph(s) of the Site

Please provide at least one photograph of the site:

Sinclairs Lagoon, Macquarie Marshes (unknown date) (*Nerida Sloane, DCCEEW, 01-01-2015*)

Macquarie Marshes (*Neal Foster, DCCEEW, 1-05-2010*)

Reed bed, Macquarie Marshes (*Bruce Gray, DCCEEW, 13-12-2006*)

6.1.4 - Designation letter and related data

Designation letter
<1 file(s) uploaded>

Date of Designation: 1986-08-01