



Ramsar Information Sheet

Published on 21 October 2002

Australia

Fivebough and Tuckerbil Swamps



Designation date	21 October 2002
Site number	1224
Coordinates	34°30'28"S 146°23'24"E
Area	619,00 ha

Color codes

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

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

1 - Summary

1.1 - Summary description

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

Summary
 (This field is limited to 2500 characters)

Fivebough and Tuckerbil Swamps (619 ha) are located on separate parcels of Crown Land, less than 10 km apart, near Leeton in the Riverina region of NSW in the Murray Darling Drainage Division.

Fivebough Wetland comprises permanent and intermittent fresh-brackish, shallow wetlands. Tuckerbil Wetland is a seasonal, shallow, brackish-saline wetland. Both wetlands support a high abundance and diversity of waterbirds, including migratory shorebirds and threatened species. Together the two wetlands form the Fivebough and Tuckerbil Swamps Ramsar site. Fivebough and Tuckerbil Wetlands have long been recognised as important sites for waterbirds.

Components and processes which are considered critical to the ecological character of the site, and directly support the listing criteria, are hydrology and waterbirds. Both wetlands were originally ephemeral wetlands with the water balance determined by rainfall and evaporation. The hydrology of Fivebough and Tuckerbil Wetlands has been highly modified, and inflows now consist primarily of local rainfall and irrigation runoff, floodwaters which exceed drainage system capacity, treated effluent releases from the Leeton Sewage Treatment Plant (Fivebough Wetland only) and environmental water allocations (since after the date of listing).

Fivebough and Tuckerbil Wetlands meets the following four of the nine criteria (2,3,4 and 6) for listing as a wetland of International Importance.

The site supports Australasian Bittern (*Botaurus poiciloptilus*) and Australian Painted Snipe (*Rostratula australis*), both of which are listed as 'Endangered' under the Environment Protection and Biodiversity Conservation Act 1999 (criteria 2).

The site is important for maintaining a high diversity of species of waterbirds within the Murray-Darling Basin drainage division (criteria 3), with Fivebough Wetland and Tuckerbil Wetland having the highest and the second highest number of waterbird species respectively recorded in that region. A total of 83 species of waterbirds have been recorded at Fivebough Wetland and 69 species at Tuckerbil Wetland.

At least 22 species of waterbird have been recorded breeding at Fivebough Wetland and 11 species at Tuckerbil Wetland. Tuckerbil Wetland is a post-breeding roost site for up to 130 Brolga (*Grus rubicunda*). Fivebough Wetland is a significant roosting site for large numbers of Glossy Ibis (*Plegadis falcinellus*) and Whiskered Tern (*Chlidonias hybridus*) during spring-summer.

2 - Data & location

2.1 - Formal data

2.1.1 - Name and address of the compiler of this RIS

Compiler 1

Name	Programs Officer, Environmental Water Governance
Institution/agency	NSW Office of Environment and Heritage
Postal address (This field is limited to 254 characters)	PO Box A290 Sydney South, NSW, 1232 Australia
E-mail	ramsar.wetlands@environment.nsw.gov.au
Phone	+61 2 6229 7053
Fax	+61 2 6229 7005

Compiler 2

Name	
Institution/agency	
Postal address (This field is limited to 254 characters)	
E-mail	
Phone	
Fax	

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

From year	2002
To year	2018

2.1.3 - Name of the Ramsar Site

Official name (in English, French or Spanish)	Fivebough and Tuckerbil Swamps
Unofficial name (optional)	Fivebough and Tuckerbil Wetlands

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

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

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

2.1.5 - Changes to the ecological character of the Site

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

(Update) Are the changes Positive ☐ Negative ☐ Positive & Negative ☒

What extent of the Ramsar site is affected (%)

(Update) Positive %

(Update) Negative %

(Update) No information available ☐

(Update) Optional text box to provide further information

(This field is limited to 2000 characters)

The future climate of the Murrumbidgee Catchments is likely to be warmer and drier. Such trends would also increase evaporation, increase the number of days the catchment experiences extreme heat and increase extreme winds and fire risk. Changes in rainfall and higher evaporation rates are likely to lead to less water for streams and rivers in the Murrumbidgee catchment. For example, due to recent trends toward reduced rainfall, as of August 2006, the Blowering Dam on the Tumut River was at 54% of capacity and Burrinjuck Dam on the Murrumbidgee River was at only 34%. (CSIRO, 2006)

Various studies of stream flows in NSW indicate that climate change is likely to further reduce flows, with subsequent consequences for storages and use. For example, flows where the Murrumbidgee meets the Murray may decrease by 9-14% by 2050 and 16-24% by 2100 (Beare and Heaney, 2002). Changes to climate are likely to threaten species, communities and ecological assets in the Murrumbidgee Catchments.

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

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

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

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

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

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

(This field is limited to characters)

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

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

2.2 - Site location

2.2.1 - Defining the Site boundaries

a) GIS boundaries [link](#)

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

b) Digital map/image

 [AU1224map_over.pdf](#)

 [AU1224_map161118.pdf](#)

 [AU1224_map161118_1.pdf](#)

 [AU1224_map161118_2.pdf](#)

 [AU1224_map171220_1_new_map_2017.pdf](#)

Former maps

<no file available>

Boundaries description

(This field is limited to 2500 characters)

Fivebough Wetland is located on Crown Land (342 ha) comprising Lot 7303 DP 1159880, Parish Willimbong, County Cooper, in the locality of Leeton NSW. The eastern boundary does not include the part of Lot 7303 included in a perpetual grazing licences located inside the contour drain. Five freehold properties and a sewage treatment plant adjoin the site's boundary (Lot 22 DP 914401, Lot 897 DP 821549, Lot 99 DP 751742, Lot 102 DP 751742, Lot 633 DP 44540 and Lot 1 DP 786496). None of those properties or lots are included in the Ramsar site. The boundary joins Lot 633 DP 44540 at the Lot's north-eastern corner and extends north running parallel to the Crown land boundary and west to a vehicle track. The boundary then runs south-west along the boundary of Lot 897 DP 821549 and then to the edge of a contour drain then follows the contour drain (excluding the drain) south. It then follows the northern and eastern boundaries of Lot 99 DP 751742 and the eastern and southern boundaries of Lot 102 DP 751742 to the south-western corner of Lot 102, and then it again follows the contour drain (excluding the drain) south-east till it reaches and follows the boundaries of Lot 1 DP 786496 east and then to the south-west corner of Lot 633 DP 44540.

Tuckerbil Wetland is located on Crown Land (277.5 ha) comprising Lots 139, 165, 166, 167 and 283 in DP 751735, Parish Tuckerbil, County Cooper, in the locality of Leeton NSW. The Ramsar site boundary is the cadastral boundary of these properties except along the south-western boundary of Tuckerbil Wetland where the boundary is the inside edge (north eastern side) of the adjoining contour drain. From where the contour drain intersects the south-eastern cadastral boundary of Lot 167, the Ramsar boundary follows the contour drain from 146 21'00" E 34 29'46" S, west to 146 20'55" E 34 29'46"S and then northwest to 146 20'23" E 34 29'2" S where it exits the western side of Lot 139. The contour drain is not included in the Ramsar site.

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

2.2.2 - General location

- a) In which large administrative region does the site lie?
- b) What is the nearest town or population centre?

2.2.3 - For wetlands on national boundaries only

- a) Does the wetland extend onto the territory of one or more other countries? Yes ☐ No ☒
- b) Is the site adjacent to another designated Ramsar Site on the territory of another Contracting Party? Yes ☐ No ☒
- c) Is the site part of a formal transboundary designation with another Contracting Party? Yes ☐ No ☒
- d) Transboundary Ramsar Site name:

2.2.4 - Area of the Site

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

Official area, in hectares (ha):

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

2.2.5 - Biogeography

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

Biogeographic regions

Regionalisation scheme(s)	Biogeographic region
Other scheme (provide name below)	Murray Darling Basin Drainage Division: Murrumbidgee River

Other biogeographic regionalisation scheme

(This field is limited to 2500 characters)

Australian Hydrological Geospatial Fabric (Geofabric): Topographic Drainage Divisions and River Regions (BOM 2012) – Murray-Darling Basin: Murrumbidgee River

3 - Why is the Site important?

3.1 - Ramsar Criteria and their justification

Tick the box against each criterion applied to the designation of the Ramsar Site. All criteria which apply should be ticked.

Please explain why you selected a criterion by filling in the relevant fields on this page, on the three other pages of this section 'Criteria & justification' and on the 'Wetland types' page of the section 'What is the site like?'. More guidance on how to justify a criterion will appear when you tick it as well as in the help box.

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

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

Hydrological services provided

(This field is limited to 3000 characters)

Other ecosystem services provided

(This field is limited to 3000 characters)

Other reasons

(This field is limited to 3000 characters)

☒ Criterion 2 : Rare species and threatened ecological communities

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

Optional text box to provide further information

(This field is limited to 3000 characters)

The site supports the Australasian Bittern (*Botaurus poiciloptilus*) which is listed as 'Endangered' under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and the IUCN Red List (IUCN 2000). This species occurs regularly at both Fivebough and Tuckerbil Wetlands with maximum recorded counts of 34 (Keith 2015). Between 2013 and 2017 a total of 50 Australasian Bitterns were recorded at the site, with a maximum of 18 individuals being recorded in 2015 (Bionet Atlas 2018)

Australasian Bittern were recorded in 2011 (OEH 2014) and frequently in 2013/14/15 at both Fivebough (count of up to 34 birds) and Tuckerbil Wetlands (count of up to 6 birds) (K. Hutton, pers.comm. 2014). Much of the habitat needed to support Australasian Bittern in the Riverina bioregion has been lost (Mike Schultz pers. comm.). Fivebough Wetland provides suitable habitat for Australasian Bittern, which favours wetlands with large areas (>5 ha) of tall, dense vegetation dominated by *Typha* spp. and *Phragmites australis* (DLWC 2002).

The site also supports Australian Painted Snipe (*Rostratula australis*), which is listed as Endangered (2013) under the EPBC Act. The RIS (Schultz et al. 2002) indicates that the species occurred at both Fivebough Wetland (counts of up to eight birds) and Tuckerbil Wetland at the time of listing. The species was also recorded in 2012 and 2013 (K. Hutton, pers.comm. 2014, Bionet Atlas 2018) and 2014 (Bionet Atlas 2018).

☒ **Criterion 3 : Biological diversity**

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

Justification
(This field is limited to 3000 characters)

The site is important for maintaining a high diversity of waterbird species within the Riverina bioregion, an area with few other non-riparian wetlands. The number of internationally listed migratory species, threatened species, and the abundance of some bird species, are amongst the highest recorded in the Murray-Darling Basin.

The site is important for maintaining a high diversity of species of waterbirds within the Murray-Darling Basin drainage division, with Fivebough Wetland and Tuckerbil Wetland having the highest and the second highest number of waterbird species respectively recorded in that region.

A total of 83 species of waterbirds have been identified at Fivebough Swamp and 69 species at Tuckerbil Swamp (Appendix 1).

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

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

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

22 species of waterbird have been recorded breeding at Fivebough Wetland and 11 species at Tuckerbil Wetland. At least 12 of these species are known to breed regularly at the site.

Tuckerbil Wetland is a post-breeding roost site for up to 130 Brolga (*Grus rubicunda*). During spring-summer, thousands of Glossy Ibis (*Plegadis falcinellus*) gather at Fivebough Wetland in the evenings to roost, although many also feed extensively in the wetland. This also applies to a lesser extent to Whiskered Tern (*Chlidonias hybridus*).

Fivebough Wetland provides important feeding habitat for three species of egret during their breeding season between September and February: Little Egret (*Egretta garzetta*), Intermediate Egret (*Ardea intermedia*) and Cattle Egret (*Ardea ibis*) (Bionet Atlas 2018).

The site is important for migratory waterbirds 24 species recorded at Fivebough Wetland and 13 species at Tuckerbil Wetland are listed under the Japan-Australia and/or the China-Australia Migratory Bird Agreements (JAMBA and CAMBA). Of these recorded migratory waterbird species, 19 at Fivebough Wetland and 10 at Tuckerbil Wetland are shorebirds. The wetlands support seventeen species of waterbirds listed under the Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).

☐ **Criterion 5 : >20,000 waterbirds**

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

Overall waterbird numbers
Start year
End year
Source of data:
Optional text box to provide further information
(This field is limited to 3000 characters)

Overall waterbird numbers	40000
Start year	1998
End year	1998
Source of data:	Hutchison in Glazebrook and Taylor
Optional text box to provide further information (This field is limited to 3000 characters)	

☒ **Criterion 6 : >1% waterbird population**

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

The RIS for the site at the time of listing (Schultz et al. 2002) reported five species of waterbird at numbers estimated to represent greater than 1% of their population:

Glossy Ibis - 20,000 recorded at Fivebough Wetland.
Sharp-tailed Sandpiper (*Calidris acuminata*) - 2,015 at Fivebough Wetland and 2,253 at Tuckerbil Wetland. Whiskered Tern - 20,000 at Fivebough Wetland and 900 at Tuckerbil Wetland.
Australasian Bittern - 17 at Fivebough Wetland and 6 at Tuckerbil Wetland.
Brolga - 9 at Fivebough Wetland and up to 130 at Tuckerbil Wetland.

The claim for Criterion 6 should be based on waterbird numbers at the date of listing measured against the most accurate population estimates up to the current time.

Optional text box to provide further information

(This field is limited to 3000 characters)

Further investigation of available population estimate data based on updated information since the time of listing indicated that the numbers of waterbirds recorded up to the time of listing met the 1% thresholds only for the Sharp-tailed Sandpiper (1.22%) and Glossy Ibis (1.36%) based on 1% population estimates of 1,600 and 10,000 respectively (Biosis Research Pty Ltd & Wetlands International Oceania 2006, Wetlands International 2006). Revised population estimates indicate that highest count of 34 Australasian Bittern and 2200 Sharp-tailed Sandpiper at Fivebough and Tuckerbil Wetlands (Keith Hutton 2015) currently meets the 1% threshold for the species of 25 and 850 (Bionet Atlas 2018, Wetlands International 2012). It is presently unclear whether the northern and southern population of the Brolga should be regarded as separate populations (Wetlands International 2012) so this criterion can not be met with any certainty based on a likely 1% population threshold of 1,000 for this species. Whiskered Tern and Glossy Ibis at Fivebough Wetland have met the 1% threshold of 10,000 (Wetlands International 2006) on at least 1 occasion, however there is no evidence that this is a regular occurrence, with numbers recorded usually between several hundred to a few thousand.

☐ **Criterion 7 : Significant and representative fish**

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

Justification

(This field is limited to 3000 characters)

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

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

Justification

(This field is limited to 3000 characters)

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

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

Optional text box to provide further information

(This field is limited to 3000 characters)












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

Scientific name	Common name	Criterion 2	Criterion 3	Criterion 4	IUCN Red List	CITES Appendix I	Other status	Justification
<no data available>								

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

(This field is limited to 3000 characters)

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

Phylum	Scientific name	Common name	Species qualifies under criterion				Species contributes under criterion				Pop. Size	Period of pop. Est.	% occurrence ¹⁾	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
			2	4	6	9	3	5	7	8								
Birds																		
CHORDATA / AVES	<i>Botaurus poiciloptilus</i> 	Australasian Bittern	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	34	2015	1.36	EN 	<input type="checkbox"/>	<input type="checkbox"/>		SE and SW 1% of popn is 25
CHORDATA / AVES	<i>Calidris acuminata</i> 	Sharp-tailed Sandpiper	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2200	2015	1.22	LC 	<input type="checkbox"/>	<input type="checkbox"/>		1% of popn is 1800
CHORDATA / AVES	<i>Chlidonias hybrida</i> 	Whiskered Terns	<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"/>		1% is 10,000
CHORDATA / AVES	<i>Grus rubicunda</i> 	Brolga	<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"/>		Flocking area Population area: Australia 1000
CHORDATA / AVES	<i>Plegadis falcinellus</i> 	Glossy Ibis	<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"/>		nesting and breeding. 1% Popn is 10,000
CHORDATA / AVES	<i>Rostratula australis</i> 	Australian Painted Snipe	<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"/>	EPCB Act Endangered	Nationally endangered and regularly recorded at site

1) Percentage of the total biogeographic population at the site

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

(This field is limited to 3000 characters)

The site is important for maintaining a high diversity of species of waterbirds within the Murray-Darling Basin drainage division, Fivebough Wetland and Tuckerbil Wetland having the highest and the second highest number of waterbird species respectively recorded in that region. A total of 83 species of waterbirds have been recorded at Fivebough Wetland and 69 species at Tuckerbil Wetland.

During dry times and after boom phases, waterbirds often concentrate in large numbers at Fivebough Swamp, making Fivebough an important drought refuge (Bino, 2014).

The site supports various egret species.

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

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

Optional text box to provide further information

(This field is limited to 3000 characters)

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

4.1 - Ecological character

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

(This field is limited to 4000 characters)

Hydrology and waterbirds are considered critical to the ecological character of the site.

The hydrology of Fivebough and Tuckerbil Swamps has been highly modified. Both wetlands were originally ephemeral wetlands with a water balance determined by rainfall and evaporation. Inflows now consist primarily of local rainfall and irrigation runoff, floodwaters which exceed the drainage system capacity, treated effluent releases from the Leeton Sewage Treatment Plant (Fivebough Wetland only) and environmental water allocations (since after the date of listing). Regular treated effluent discharge of approximately 2.5 ML per day results in a permanent wetland area in the central southern part of Fivebough Wetland of approximately 39 ha. The remainder of Fivebough Wetland fills in most years during autumn/winter, when evaporation rates are low, to a maximum depth of 45 cm and an average depth of 21.5 cm. The area of intermittent inundation at Fivebough Wetland usually dries out rapidly due to high evaporation rates during spring/summer. It becomes shallow then contracts to the deepest section within the central eastern part of the wetland, exposing extensive waterlogged mudflats, which become a series of disconnected pools before drying completely. Fivebough Wetlands have received five Commonwealth environmental water allocations in the past ten years. Effluent releases into Tuckerbil are estimated to be 1000 ML annually (WetlandCare Australia 2014)

Tuckerbil Wetland fills intermittently during autumn/winter, when evaporation rates are low. Tuckerbil Wetland has an average depth of 30 cm and a maximum depth of approximately 40 cm when full. Tuckerbil Wetland dries rapidly during late spring /early summer. Water levels recede in the central and south western parts of the wetland prior to the eastern portion of the wetland. Wetland hydrology drives the temporal and spatial diversity of waterbird habitats at Fivebough and Tuckerbil Wetlands.

Fivebough and Tuckerbil Wetlands have long been recognised as important sites for waterbirds. Nationally threatened Australasian Bittern and Australian Painted Snipe have been regularly recorded within the site (Bionet Atlas 2018). Both wetlands support a high diversity of waterbirds with 64 species being recorded at the wetlands between 2011 and 2016 (Bionet Atlas 2018). 83 species recorded at Fivebough Wetland and 69 species at Tuckerbil Wetland. Both Fivebough and Tuckerbil Wetlands provide habitat for internationally significant migratory waterbirds with 24 species (19 shorebirds) recorded at Fivebough Wetland and 13 species (10 shorebirds) at Tuckerbil Wetland. At Fivebough Wetland, 22 waterbird species have been recorded breeding, and 11 at Tuckerbil Wetland. The wetlands also provide significant feeding and roosting habitat for waterbirds including egrets and brolgas.

The provision of waterbird habitat is considered to be a critical service provided by the Fivebough and Tuckerbil Swamps. Waterbird habitat is primarily a function of the wetland hydrology, geomorphology, climate, vegetation communities and livestock grazing. The distinct hydrological cycle of Fivebough and Tuckerbil Swamps (as a function of the prevailing geomorphology, water inputs and climate) drives wetland vegetation communities and provides a spatial and temporal diversity of habitats which support the significant numbers, species and activities of waterbirds. These elements interact, and where possible are managed, to produce the range of significant habitats provided by the site which support the critical waterbird services.

The site supports Australasian Bittern (*Botaurus poiciloptilus*), listed as Endangered under the EPBC Act (1999) and the IUCN Red List (IUCN 2000, OEH 2014, Bionet Atlas, 2018). The site also supports Australian Painted Snipe (*Rostratula australis*), listed as Endangered under the EPBC Act (K. Hutton, pers.comm. 2014, Bionet Atlas, 2018).

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

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

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

Marine or coastal wetlands

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

Inland wetlands

Wetland types (code and name)	Local name	Ranking of extent (1: greatest - 4: least)	Area (ha) of wetland type	Justification of Criterion 1
Saline, brackish or alkaline water > Lakes >> C: Permanent saline/brackish/alkaline lakes	Fivebough Wetland	3	39	Representative
Saline, brackish or alkaline water > Marshes & pools >> Ss: Seasonal/intermittent saline/brackish/alkaline marshes/pools	Fivebough Wetland	1	303	Representative

Human-made wetlands

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

What non-wetland habitats are within the site?

Other non-wetland habitat

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

idem

(ECD) Habitat connectivity

Fivebough Wetland currently only receives water from surrounding areas via a contour irrigation drain which was constructed in 1939 (Wetlandcare Australia 2014).

4.3 - Biological components

4.3.1 - Plant species

Other noteworthy plant species

Scientific name	Common name	Position in range / endemism / other
<i>Casuarina cristata</i>		
<i>Eucalyptus largiflorens</i>	Black box	

Invasive alien plant species

Scientific name	Common name	Impacts	Changes at RIS update
<i>Alternanthera pungens</i>	Khaki Weed	Actually (minor impacts)	No change
<i>Centaurea calcitrapa</i>	Star Thistle	Actually (minor impacts)	No change
<i>Cuscuta pentagona</i>	Golden Dodder	Actually (minor impacts)	No change
<i>Lycium ferocissimum</i>	African Boxthorn	Actually (minor impacts)	No change
<i>Xanthium spinosum</i>	Bathurst Burr	Actually (minor impacts)	No change

Optional text box to provide further information

(This field is limited to 2500 characters)

The dominant vegetation at Fivebough Swamp was once a Black Box (*Eucalyptus largiflorens*) - Lignum (*Muehlenbeckia cunninghamii*) association, but little of this remains today.

The vegetation at Tuckerbil Swamp was originally a *Eucalyptus largiflorens*, *Casuarina cristata* *Muehlenbeckia cunninghamii* association but only small remnants of these communities now remain on higher ground in the north-eastern corner of the Swamp.

Numerous introduced weed species have been identified at Fivebough Wetland (see Appendix 2), some of which are listed noxious weeds. These include African Boxthorn (*Lycium ferocissimum*), Khaki Weed (*Alternanthera pungens*) and Star Thistle (*Centaurea calcitrapa*), along with Bathurst Burr (*Xanthium spinosum*) and Golden Dodder (*Cuscuta campestris*) which have been a problem in sections of Fivebough Wetland for many decades. Bathurst Burr is rarely grazed by livestock due to its large spines. Golden Dodder can reshoot from stem fragments and stems and seeds can be transported by water, posing a risk of downstream spread. Major weed issues in Tuckerbil Wetland are Noogoora Burr (*Xanthium occidentale*), which is toxic to cattle, and Bathurst Burr.

Weeds are a significant problem for wetland ecology as they outcompete native aquatic, emergent and terrestrial species growing in the wetland basin, reducing habitat availability and food resources for native fauna including waterbirds.

The management plan for the site (Price et al. 2014) outlines strategies to reduce the impacts of weeds on the ecological character of the site. Integrated weed control methods are suggested including strategic grazing, revegetation, mechanical, chemical and biological control.

4.3.2 - Animal species

Other noteworthy animal species

Phylum	Scientific name	Common name	Pop. size	Period of pop. est.	%occurrence	Position in range /endemism/other
<no data available>						

Invasive alien animal species

Phylum	Scientific name	Common name	Impacts	Changes at RIS update
CHORDATA/MAMMALIA	<i>Canis lupus familiaris</i>	Domestic Dog	Potentially	No change
CHORDATA/MAMMALIA	<i>Felis catus</i>	Domestic Cat	Potentially	No change
CHORDATA/MAMMALIA	<i>Lepus capensis</i>	Cape Hare	Potentially	No change
CHORDATA/MAMMALIA	<i>Oryctolagus cuniculus</i>	European Rabbit	Potentially	No change
CHORDATA/MAMMALIA	<i>Vulpes vulpes</i>	Red Fox	Potentially	No change

Optional text box to provide further information

(This field is limited to 2500 characters)

Foxes (*Vulpes vulpes*) and feral cats (*Felis catus*) are known to occur at Fivebough and Tuckerbil Wetlands. These species can have a significant impact on waterbird breeding activities when water levels are low., as occurred in September 1996 when water levels fell to a level which allowed them to kill young and adult Black Swans. The ongoing impact of foxes and feral cats on the fauna of the site is not known, although there is strong anecdotal evidence of heavy predation on Long-necked Tortoises. Recent fox activity has been noted as part of bird surveys at the site. Foxes are known predators of nesting shorebirds and their eggs and young. Feral cats are also known to eat frogs and lizards.

These predators are particularly damaging to the bird populations critical to the ecological character of the site. The management plan for the site (Price et al. 2014) recommends that a strategic pest control program be ongoing at the site including fox and cat trapping and baiting as appropriate to reduce pest predator populations.

Domestic cats and dogs (*Canis familiaris*) also have the potential to affect the native fauna of the wetlands, and especially the smaller bush birds and waterbirds. Free roaming dogs in particular can disturb or kill wildlife, while some domestic cats are skilled hunters like their feral relatives. Unrestrained domestic cats and dogs are therefore to be discouraged from both sites.

Hares (*Lepus capensis*) have been sighted at both wetlands and rabbits (*Oryctolagus cuniculus*) at Fivebough Wetland. Hares and rabbits both compete with native animals and stock for food, and intensify predation by foxes and cats. Rabbits contribute significantly to soil erosion by burrowing, removing vegetation and disturbing soil, as well as suppressing habitat regeneration via predation on native vegetation.

4.4 - Physical components

4.4.1 - Climate

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

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

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

(This field is limited to 1000 characters)

In the Murray Murrumbidgee region the 2030 maximum temperatures are projected to rise 0.7 °C and continue to rise 2 °C by 2070. Mean temperatures are projected to rise 0.6 °C by 2030. Increases are occurring across the region with the greatest increases during summer. All models show there are no declines in mean temperatures across the Murray Murrumbidgee region. By 2030 there will be little change in annual rainfall. Rainfall increases will be seen across the region during autumn. The greatest decreases in rainfall are across most of the region during spring. Rainfall will also decreases to the west during winter. Severe fire weather is projected to increase across the Murray Murrumbidgee during spring and summer, and decrease during autumn. By 2030 the Murray Murrumbidgee is projected to experience an average of 8 more days above 35 °C per year and continue to rise to 23 days per year by 2070 (NSW OEH, 2019).

4.4.2 - Geomorphic setting

a) Mnimum elevation above sea level (in metres)

a) Maximum elevation above sea level (in metres)

b) Position in landscape/river basin:

- Entire river basin ☐
- Upper part of river basin ☐
- Middle part of river basin ☒
- Lower part of river basin ☐
- Mbre than one river basin ☐
- Not in river basin ☐

Coastal ☐

Please name the river basin or basins. If the site lies in a sub-basin, please also name the larger river basin. For a coastal/marine site, please name the sea or ocean.

(This field is limited to 1000 characters)

Murrumbidgee sub-basin within the 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)

(This field is limited to 1000 characters)

The Fivebough and Tuckerbil Swamps are situated approximately 135 m above sea level in shallow, circular depressions on the eastern margin of the Riverine Plain of NSW. They once were semi-permanent wetlands, part of a series of wetlands and lagoons associated with a natural watercourse that flowed westerly across heavy clay soils onto the Murrumbidgee floodplain 15 km north of the river.

4.4.4 - Water regime

Water permanence

Presence?	Changes at RIS update
Usually permanent water present	
Usually seasonal, ephemeral or intermittent water present	

Source of water that maintains character of the site

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

Water destination

Presence?	Changes at RIS update
To downstream catchment	unknown

Stability of water regime

Presence?	Changes at RIS update
Water levels largely stable	unknown

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

(This field is limited to 2000 characters)

Flows are heavily regulated by irrigation channels. Water inputs consist primarily of rainfall runoff when it exceeds drainage system capacity; treated effluent from Leeton Sewage Treatment Plant (STP) (Fivebough Wetland only); and environmental water allocations. Southern parts of Fivebough Wetland are semi-permanent due to treated effluent from the STP. Land in the eastern and southern parts of the wetland are covered by shallow water following high rainfall periods (ephemeral and frequently wet). Land to the north and the far west is higher and only floods after very high rainfall (ephemeral and infrequently wet). Tuckerbil Wetland is ephemeral, usually drying out completely in late spring/early summer.

Prior to irrigation, regional groundwater levels were generally 20m below the surface. Groundwater data from NSW DLWC (1969-96) suggests the water table is now within 2.5m of the wetland basin and within 2m of the surface over approx. 85% of Fivebough Wetland. This is a critical zone for soil salinisation, waterlogging and related problems (DLWC 1996).

Fivebough and Tuckerbil Wetlands are eligible for environmental water allocations under the OEH annual environmental watering plans for the Murrumbidgee Valley. Watering at target sites is considered based on the availability of environmental water and likely ecological response to water at any given time. Fivebough and Tuckerbil Wetlands are potential recipients of flows under a variety of scenarios with the primary objective to protect and maintain waterbird habitat at both sites. Water levels at the wetlands are assessed visually, along with quarterly bird surveying, and a recommendation is made by the Advisory Committee on whether an environmental water allocation request is made to OEH. These allocations are delivered via Irrigation supply channels.

The CEWO provided 600 ML to Tuckerbil Wetland in 2017/18 and 610 ML in 2018/19. CEWO provided 794 ML to Fivebough Wetland in 2018/19.

(ECD) Connectivity of surface waters and of groundwater

(ECD) Stratification and mixing regime

4.4.5 - Sediment regime

Significant erosion of sediments occurs on the site ☐

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

Significant accretion or deposition of sediments occurs on the site ☐

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

Significant transportation of sediments occurs on or through the site ☐

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

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

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

Sediment regime unknown ☐

Please provide further information on sediment (optional):

(This field is limited to 1000 characters)

Course sand and fine gravel sediments have been observed along the western side of the wetland at depth of between 3 to 7 m below ground level indicating the presence of a prior stream deposit. Tuckerbil Wetland is bordered by an extensive sandy lunette dune on it's south-eastern margin.

(ECD) Water turbidity and colour

(ECD) Light - reaching wetland

(ECD) Water temperature

4.4.6 - Water pH

Acid (pH<5.5) ☐

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

Circumneutral (pH: 5.5-7.4) ☐

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

Alkaline (pH>7.4) ☐

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

Unknown ☐

Please provide further information on pH (optional):

(This field is limited to 1000 characters)

4.4.7 - Water salinity

Fresh (<0.5 g/l) ☒

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

Mxohaline (brackish)/Mixosaline (0.5-30 g/l) ☒

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

Euhaline/Eusaline (30-40 g/l) ☒

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

Hyperhaline/Hypersaline (>40 g/l) ☐

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

Unknown ☐

Please provide further information on salinity (optional):

(This field is limited to 1000 characters)

Piezometers deployed at nearby areas by Murrumbidgee Irrigation indicate mildly saline conditions (3,000 - 4,000 µS/cm, or approximately 1,920 -2,560 mg/L). The optimum salinity for freshwater plants and zooplankton is < 3,000 mg/L. Above this level decreases in zooplankton species begin. The optimum conditions for macroinvertebrates is < 5,000 mg/L with losses of species groups starting to occur at salinities above this (Neilsen & Brock 2006). Rice farming and horticulture are the principle users of irrigation water, and nutrient and chemical inflows potentially affect the water quality entering the wetland. Water quality within the wetlands should be closely monitored to identify any water quality issues.

(ECD) Dissolved gases in water

(This field is limited to 1000 characters)

4.4.8 - Dissolved or suspended nutrients in water

Eutrophic ☐

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

Mesotrophic ☐

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

Oligotrophic ☐

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

Dystrophic ☐

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

Unknown ☐

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

(This field is limited to 1000 characters)

(ECD) Dissolved organic carbon

(ECD) Redox potential of water and sediments

(ECD) Water conductivity

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 ☒

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

Surrounding area has greater urbanisation or development ☒

Surrounding area has higher human population density ☐

Surrounding area has more intensive agricultural use ☒

Surrounding area has significantly different land cover or habitat types ☐

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

(This field is limited to 2000 characters)

Fivebough Wetland is surrounded by urban development (Leeton township) and agricultural land. Tuckerbil Wetland is predominantly surrounded by agricultural land.

4.5 - Ecosystem services

4.5.1 - Ecosystem services/benefits

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

Provisioning Services

Ecosystem service	Examples	Importance/Extent/Significance
Fresh water	Drinking water for humans and/or livestock	High
Wetland non-food products	Reeds and fibre	Medium

Regulating Services

Ecosystem service	Examples	Importance/Extent/Significance
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)	High
Hazard reduction	Flood control, flood storage	Medium

Cultural Services

Ecosystem service	Examples	Importance/Extent/Significance
Recreation and tourism	Nature observation and nature-based tourism	Medium
Spiritual and inspirational	Cultural heritage (historical and archaeological)	Medium
Spiritual and inspirational	Contemporary cultural significance, including for arts and creative inspiration, and including existence values	Medium
Scientific and educational	Important knowledge systems, importance for research (scientific reference area or site)	Medium
Scientific and educational	Educational activities and opportunities	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	Low

Optional text box to provide further information

(This field is limited to 2500 characters)

Other ecosystem service(s) not included above:

(This field is limited to 2000 characters)

The seasonal wetting and drying of intermittent wetlands within the Murray Darling Basin drives the nutrient cycling which provides abundant invertebrates and microorganisms and supports numerous waterbirds (Kingsford et al. 2014). The distinct hydrological cycle of Fivebough and Tuckerbil Wetlands (as a function of the prevailing geomorphology and climate) drives wetland vegetation communities and provides a spatial and temporal diversity of habitats which support the significant numbers, species and activities of waterbirds.

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

Within the site: 500

Outside the site:

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

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

(This field is limited to 2500 characters)

4.5.2 - Social and cultural values

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

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

Description if applicable

(This field is limited to 2500 characters)

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

Description if applicable

(This field is limited to 2500 characters)

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

Description if applicable
(This field is limited to 2500 characters)

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

Description if applicable
(This field is limited to 2500 characters)

4.6 - Ecological processes

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

(ECD) Primary production	
(ECD) Nutrient cycling	Rice farming and horticulture are the principle users of irrigation water, and nutrient and chemical inflows potentially affect the water quality entering the wetland.
(ECD) Carbon cycling	
(ECD) Animal reproductive productivity	
(ECD) Vegetational productivity, pollination, regeneration processes, succession, role of fire, etc.	
(ECD) Notable species interactions, including grazing, predation, competition, diseases and pathogens	Grazing occurs under licence on parts of Fivebough Wetland and intermittently on Tuckerbil Wetland. Grazing of the wetlands is restricted by licence conditions to a management regime which assists to support the sites ecological character
(ECD) Notable aspects concerning animal and plant dispersal	
(ECD) Notable aspects concerning migration	
(ECD) Pressures and trends concerning any of the above, and/or concerning ecosystem integrity	

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"/>

Private ownership

Category	Within the Ramsar Site	In the surrounding area
Other types of private/individual owner(s)	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Other

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

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

(This field is limited to 1000 characters)

The Fivebough and Tuckerbil Wetlands were notified in the Government Gazette as Reserve 1030008 for 'Environmental Purposes and Public Recreation' on 3 December 2010. The land is owned and managed by New South Wales (NSW) Trade and Investment, Crown Lands. Both Fivebough and Tuckerbil Wetlands are managed pursuant to the Crown Lands Act 1989 for 'Environmental Protection and Public Recreation'.

Sections of the wetlands are held under grazing licence for the purpose of 'Environmental Protection and Sustainable Grazing' to limit negative impacts on the wetlands. Grazing is managed by NSW Trade and Investment, Crown Lands as an important tool to control wetland weeds in a broad-acre situation and to promote the variation of native wetland vegetation to maintain the diversity and abundance of wetland birds. The management plan for the site (Price et al. 2014) sets out an adaptive grazing management regime.

5.1.2 - Management authority

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

(This field is limited to 1000 characters)

As Crown Land, the site is administered by Land NSW, a business unit of DLWC. The Fivebough and Tuckerbil Wetlands Management Trust provides advice to Land NSW and DLWC with respect to management, and to undertake some of the actions set down in the Management Plan. The Trust also liaises with the lessees of the two sites in terms of their management activities, as specified in the respective conditions of lease.

The Fivebough and Tuckerbil Wetlands are located on Crown Land administered by NSW Department of Industry Lands (DOI Lands) as Reserve for Environmental Protection and Public Recreation under the Crown Lands Act 1989.

An Advisory Committee has been appointed to provide advice, local perspective and liaison with the project managers. The Advisory Committee is made up of 12 members comprising State Government, Local Government, local interest groups and community representatives.

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

Officeholders of the Fivebough and Tuckerbil Wetlands Management Trust: Mike Schultz (Chair), Phil Green (Secretary), Richard Faulder (Treasurer)

Postal address:

(This field is limited to 1000 characters)

PO Box 1030 Griffith NSW 2680

E-mail address:

cl.enquiries@crowland.nsw.gov.au

5.2 - Ecological character threats and responses (Management)

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

Human settlements (non agricultural)

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Commercial and industrial areas		Medium impact	<input type="checkbox"/>	unknown	<input checked="" type="checkbox"/>	unknown
Housing and urban areas		Medium impact	<input type="checkbox"/>	unknown	<input checked="" type="checkbox"/>	unknown
Tourism and recreation areas		Medium impact	<input checked="" type="checkbox"/>	unknown	<input type="checkbox"/>	unknown

Water regulation

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

Agriculture and aquaculture

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

Energy production and mining

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

Transportation and service corridors

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

Biological resource use

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

Human intrusions and disturbance

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

Natural system modifications

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Vegetation clearance/ land conversion		unknown impact	<input checked="" type="checkbox"/>	unknown	<input checked="" type="checkbox"/>	unknown
Fire and fire suppression		Medium impact	<input checked="" type="checkbox"/>	increase	<input checked="" type="checkbox"/>	unknown

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	<input checked="" type="checkbox"/>	No change	<input type="checkbox"/>	No change

Pollution

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Agricultural and forestry effluents	unknown impact	unknown impact	<input checked="" type="checkbox"/>	No change	<input checked="" type="checkbox"/>	unknown
Household sewage, urban waste water	Medium impact	Medium impact	<input checked="" type="checkbox"/>	No change	<input checked="" type="checkbox"/>	unknown
Industrial and military effluents	Medium impact	Medium impact	<input checked="" type="checkbox"/>	No change	<input checked="" type="checkbox"/>	unknown

Geological events

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

Climate change and severe weather

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Droughts		High impact	<input checked="" type="checkbox"/>	increase	<input checked="" type="checkbox"/>	increase
Temperature extremes		Medium impact	<input checked="" type="checkbox"/>	increase	<input checked="" type="checkbox"/>	increase
Habitat shifting and alteration		Medium impact	<input checked="" type="checkbox"/>	unknown	<input checked="" type="checkbox"/>	unknown
Storms and flooding		Low impact	<input checked="" type="checkbox"/>	decrease	<input checked="" type="checkbox"/>	decrease

Please describe any other threats (optional):

(This field is limited to 3000 characters)

Threats:

Hydrological changes:

Either an excess or lack of inflows may result in the loss of annual wetting and drying of intermittent wetland areas at Fivebough and Tuckerbil Wetlands and consequent loss of waterbird habitat. A lack of regular daily inflows of treated effluent water may result in the loss of a permanent wetland area at Fivebough Wetland and consequent loss of habitat.

Changes to native vegetation communities:

The suite of vegetative assemblages (a mosaic of densely vegetated areas sedgeland, such as grasslands, and salt tolerant communities, and sparsely vegetated or bare areas) is critical for ensuring habitat persistence at Fivebough and Tuckerbil Wetlands. Vegetation change may occur due to hydrological changes, inappropriate grazing regimes, weeds and fire.

Inappropriate grazing regimes:

Grazing is an important management tool to maintain the ecological character of the site playing a key role in shaping native vegetation communities and consequently in maintaining waterbird habitat. Overgrazing, however, can lead to a loss of shelter for species such as Australasian Bittern. Improper grazing of sensitive wetland areas may also create soil compaction and erosion, reduce water quality and disturb waterbirds.

Weeds:

Numerous introduced weed species have been identified at Fivebough and Tuckerbil Wetlands. Weeds are a significant problem for wetland ecology as they outcompete native aquatic, emergent and terrestrial species growing in the wetland basin, reducing habitat availability and food resources for native fauna including waterbirds.

Pest animals:

Foxes (*Vulpes vulpes*) and feral cats (*Felis catus*) are known to occur at Fivebough and Tuckerbil Wetlands. These predators are particularly damaging to the bird populations critical to the ecological character of the site. Breeding waterbirds may be particularly vulnerable to predation from pest animals. Uncontrolled domestic cats and dogs (*Canis familiaris*) also have the potential to impact waterbird populations.

Climate variation:

Climatic predictions point to a warming and drying trend over south eastern Australia and this has significant implications for the hydrology of Fivebough and Tuckerbil Wetlands. Hydrology is a key driver of the ecological character of the wetlands which is at risk from increased evaporation and reduced rainfall and environmental water for delivery to Fivebough and Tuckerbil Wetlands at critical times. Potential increases in water temperature pose a threat to the productivity of both Fivebough and Tuckerbil Wetlands and consequently to habitat quality for waterbirds.

Fire:

Increased fire frequency is a potential threat/risk to Fivebough and Tuckerbil Wetlands as it may alter vegetation communities and thus impact on wetland habitat.

Human disturbance:

Human access including recreational use can cause disturbance to waterbird feeding, roosting and breeding.

5.2.2 - Legal conservation status

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

Global legal designations

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

Regional (international) legal designations

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

National legal designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
Murray-Darling Basin Plan			whole
none			whole
Water Act 2007			whole

Non-statutory designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
Important Bird Area	Fivebough and Tuckerbil Swamps	https://birdlife.org.au/document/s/OTHPUB-IBA-suppl.pdf	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
Improvement of water quality	Partially implemented
Habitat manipulation/enhancement	Partially implemented
Hydrology management/restoration	Partially implemented

Species

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

Human Activities

Measures	Status
Management of water abstraction/takes	Partially implemented
Regulation/management of wastes	Partially implemented
Livestock management/exclusion (excluding fisheries)	Partially implemented
Regulation/management of recreational activities	Partially implemented
Communication, education, and participation and awareness activities	Partially implemented
Research	Partially implemented

Other:

(This field is limited to 3000 characters)

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

5.2.5 - Management planning

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

Is the management plan/planning implemented? Yes ☒ No ☐

The management plan covers All of Ramsar Site

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

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

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

(This field is limited to 500 characters)

DLWC, 2002. Draft Western Riverina Regional Vegetation Management Plan and Advisory Manual. Department of Land and Water Conservation, Sydney.

Price C., White, L. and Haigh, S., 2014. Fivebough and Tuckerbil Wetlands - Adaptive Environmental Management Plan. Compiled for NSW Trade and Investment, Crown Lands, WetlandCare Australia, Ballina, NSW.

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

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

(This field is limited to 1000 characters)

Fivebough Wetland is open to visitors and provides some visitor infrastructure including walking trails, interpretive signage, tables, bench seating and bird hides.

URL of site-related webpage (if relevant): <https://www.fiveboughwetlands.org.au/wetlands/>

5.2.6 - Planning for restoration

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

Has the plan been implemented? Yes ☐ No ☒

The restoration plan covers:

Is the plan currently being reviewed and updated? Yes ☐ No ☒

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

(This field is limited to 1000 characters)

Further information

(This field is limited to 2500 characters)

This site is subject to adaptive management that includes a regime of environmental watering.

5.2.7 - Monitoring implemented or proposed

Monitoring	Status
Water regime monitoring	Proposed
Water quality	Proposed
Plant community	Proposed
Plant species	Proposed
Birds	Implemented

Please indicate other monitoring activities:

(This field is limited to 3000 characters)

DPIE-BC Annual Waterbird surveys

There are DPIE-BC quarterly counts done each year (Jul, Oct, Jan and Apr). For this at period quarterly counts for Fivebough were done from July 2011-January 2018 and October 2011-January 2018 for Tuckerbil. The two areas are done on sequential days at roughly the same time of each survey month (towards the end of each month). Keith Hutton also visits Fivebough on days outside the quarterly counts and records notable species including less common birds including migratory shorebirds, threatened species and also does flock counts of glossy ibis and whiskered tern in the late afternoon when they come into roost.

6 - Additional material

6.1 - Additional reports and documents

6.1.1 - Bibliographical references

(This field is limited to 3000 characters)

Refer to Attachment 1.

6.1.2 - Additional reports and documents

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

 [AJ1224taxo.pdf](#)

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

 [AJ1224_ECD180312....pdf](#)

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

<no file available>

iv. relevant Article 3.2 reports

<no file available>

v. site management plan

<no file available>

vi. other published literature

 [AJ1224_lit191211_References_2018.docx](#)

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

6.1.3 - Photograph(s) of the Site

Please provide at least one photograph of the site:



Flocks of birds at Tuckerbil
Swamp near Leeton (OEH -
James Maguire, 26-06-
2013)

6.1.4 - Designation letter and related data

Designation letter

 [AJ1224_DesLet161128.pdf](#)

Date of Designation 2002-10-21