Information Sheet on Ramsar Wetlands (RIS) – 2009-2012 version

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

1. Name and address of the compiler of this form:

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Designation date

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Site Reference Number

2. Date this sheet was completed/updated:

April 2013

3. Country:

Australia

4. Name of the Ramsar site:

The precise name of the designated site in one of the three official languages (English, French or Spanish) of the Convention. Alternative names, including in local language(s), should be given in parentheses after the precise name.

Coongie Lakes

5. Designation of new Ramsar site or update of existing site:

This RIS is for (tick one box only)**:**
a) Designation of a new Ramsar site ❑; or
b) Updated information on an existing Ramsar site ☒

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area

The Ramsar site boundary and site area are unchanged: ❑

or

If the site boundary has changed:
i) the boundary has been delineated more accurately ❑; or
ii) the boundary has been extended ❑; or
iii) the boundary has been restricted** ❑

and/or

If the site area has changed:
i) the area has been measured more accurately ☒; or
ii) the area has been extended ❑; or
iii) the area has been reduced** ❑

** **Important note**: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in

the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

There has been no change to the ecological character of the Ramsar site since the previous Ramsar Information Sheet (1998). In the previous RIS the site was considered to have met Criteria 1–6. On the basis of additional information available for the site, it now also meets Criterion 8 as it supports a significant native fish fauna. At the time of listing in 1987, the site was identified as meeting Criterion 2 on the basis of state-listed species only; the site still meets this criterion however its application has been limited to nationally and/or internationally listed species of conservation significance (see Section 14 below).

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7. Map of site:

Refer to Annex III of the *Explanatory Note and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:

i**) a hard copy** (required for inclusion of site in the Ramsar List): ☒;

ii**) an electronic format** (e.g. a JPEG or ArcView image) ☒;

iii) **a GIS file providing geo-referenced site boundary vectors and attribute tables** ❑.

b) Describe briefly the type of boundary delineation applied:

e.g. the boundary is the same as an existing protected area (nature reserve, national park, etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

The boundary of the site is a triangle; it does not follow any jurisdictional or natural boundary. The triangle is demarcated by Lake Moorayepe in the north (26° 19' 28.56" south and 139° 59' 50.28" east), Marion Hill in the south (28° 44' 11.04" south and 138° 49' 32.88" east) and the South Australia-Queensland border to the east (27° 40' 01.92" south and 141° 00' 00.0" east). Coordinates used are Global Positioning System (GPS) coordinates which are based on the geocentric datum World Geocentric System 1984 (WGS84). The projection is geographic.

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8. Geographical coordinates (latitude/longitude, in degrees and minutes):

Provide the coordinates of the approximate centre of the site and/or the limits of the site. If the site is composed of more than one separate area, provide coordinates for each of these areas.

Latitude: 27º 34' 33.72"S Longitude: (approx) 139º 56' 26.15" E

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9. General location:

Include in which part of the country and which large administrative region(s) the site lies and the location of the nearest large town.

The Coongie Lakes Ramsar site is located in the north-east corner of South Australia near the town of Innamincka, approximately 1046 kilometres north of Adelaide. The boundary of the site is a triangle and includes the Cooper Creek system from the South Australia-Queensland border downstream to Lake Hope (Lake Pando), the northwest branch of Cooper Creek, the northern overflow and their many waterholes and terminal lakes. The site lies within the Lake Eyre Basin.

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10. Elevation: (in metres: average and/or maximum & minimum)

Approximately 25 – 120 metres Above Sea Level (ASL)

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11. Area: (in hectares)

2 178 952 hectares

12. General overview of the site:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

The Coongie Lakes Ramsar site includes a diverse range of wetlands in an arid environment. The site encompasses a large intact floodplain and areas beyond the floodplain which support rain fed wetlands. The hydrological regime is predominantly natural with the Cooper Creek being one of the largest dryland rivers in Australia which has not had its flow significantly regulated. A critical feature of the site is the presence of permanent water. The site has a series of permanent and semi-permanent waterholes in the channels and near permanent lakes along the northwest branch, persisting in an arid environment and supporting obligate aquatic species. The waterholes in particular act as refuges in dry periods. The wetlands display the classic boom and bust ecology of large dryland rivers with spectacular congregations of waterbirds occurring during large floods. The site is also significant for its native fish fauna and for supporting high levels of regional terrestrial biodiversity. The site has high cultural values, both Indigenous and European.

13. Ramsar Criteria:

Tick the box under each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11). All Criteria which apply should be ticked.

1	2	3	4	5	6	7	8	9
☒	☒	☒	☒	☒	☒	❑	☒	❑

14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Criterion 1: A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.

The Coongie Lakes Ramsar site lies within the Lake Eyre Basin Drainage Division bioregion. The site encompasses a wide diversity of wetlands which are representative of wetlands of the Channel Country. Cooper Creek is one of the largest unregulated river systems remaining in Australia and is recognised internationally as a significant inland river system. Wetland types found within the site include near permanent waterholes, permanent lakes, intermittently filled flood outs and channels, fresh and saline wetlands, and interdunal wetlands and swamps. The lower Cooper Creek floodplain meets two of the attributes for meeting hydrological importance: it is a major natural floodplain, and is also important in seasonally retaining water for other wetland systems downstream including Kati Thanda-Lake Eyre.

Criterion 2: A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.

The site supports eight nationally or internationally listed species of conservation significance as shown below.

Common name	Scientific name	IUCN	CITES	CMS	National Status
Australian painted snipe	*Rostratula australis*	Endangered	–	–	Endangered
Greater bilby	*Macrotis lagotis*	Vulnerable	Appendix I	–	Vulnerable
Dusky hopping-mouse	*Notomys fuscus*	Vulnerable	–	–	Vulnerable
Plains rat	*Pseudomys australis*	Vulnerable	–	–	Vulnerable

Woma python	*Aspidites ramsayi*	Endangered	Appendix II	–	–
Fawn hopping-mouse	*Notomys cervinus*	Vulnerable	–	–	–
Yellow swainson-pea	*Swainsona pyrophila*	–	–	–	Vulnerable
Mt Finke grevillea	*Grevillea treueriana*	–	–	–	Vulnerable

IUCN = International Union on Conservation of Nature Red List; CITES = Convention on International Trade in Endangered Species of Wild Fauna and Flora; CMS = Convention on the Conservation of Migratory Species of Wild Animals (also known as the Bonn Convention); National Status = threatened status under the *Environment Protection and Biodiversity Conservation Act 1999*.

Criterion 3: A wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.

The Coongie Lakes Ramsar site exhibits a concentration of arid zone biodiversity due to the presence of water on a semi regular basis. Water is present long enough and in sufficient amounts to sustain wetland dependent species including obligate aquatic species. Species richness is comparatively high for most biota with 83 wetland dependent birds, 10 frogs, 13 fish, over 350 plants and one wetland dependent mammal recorded from within the site (DEHAA 1999). Coongie Lakes is amongst the most species diverse system in the Lake Eyre Basin in terms of wetland dependent species (Hale 2010). The site supports a number of wetland types (nine Ramsar wetland types), land systems and vegetation communities that are characteristic of the bioregion. The site is considered of high value for its fish fauna as well as for supporting large numbers of waterbirds in an arid environment. In addition, the diversity of terrestrial species is high, as species concentrate along the waterways taking advantage of the water supply and habitat. For example, dryland bird species richness, particularly for raptors, is high.

Criterion 4: A wetland should be considered internationally important if it supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.

The Coongie Lakes Ramsar site supports a significant number of migratory species including 18 species listed under international migratory bird agreements (Japan-Australia Migratory Bird Agreement (JAMBA), China-Australia Migratory Bird Agreement (CAMBA), Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA) and/or Convention on the Conservation of Migratory Species of Wild Animals (known as CMS or Bonn Convention)). Seventeen of these species are also listed as migratory under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The presence of perennial water in an arid environment provides a critical refuge for these water-dependent migratory species. In addition, the site is important for the critical life stage of breeding. The site supports the substantial breeding of waterbirds, with 55 species having been recorded breeding at the site since listing. The most significant breeding of waterbirds (in terms of numbers) occurs following large scale flood events. The record is 50 000 Australian pelican nests on the islands of Goyder Lake in 1990/91. In May 2004 there were 1700 great cormorant nests recorded.

Criterion 5: **A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds.**

Most bird counts represent only a portion of the site; however, they illustrate the importance of the Coongie Lakes Ramsar site for supporting a diversity and abundance of waterbirds. For example, in October 2003 Lake Hope supported over 80 000 waterbirds. There are large numbers of birds at the site year round, with peaks in abundance following extensive inundation. Data from 1987 to 2004 (Birds Australia unpublished; Kingsford *et al.* 1999; Kingsford *et al.* 2003; Porter *et al.* 2006; Reid and Puckridge 2000; Reid and Gillen 1988; Reid and Jaensch 1999, Reid *et al.* 2004) show that in excess of 20 000 waterbirds were recorded for each survey event, ranging from just over 20 000 to more than 130 000 individuals.

Survey year	**1987**	**1992**	**1997**	**2000**	**2002**	**2004**
Bird Count	34 000	52 000	133 000	79 000	101 000	136 000

Criterion 6: A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.

The site regularly supports one percent of the population of two species: pink-eared duck (*Malacorhynchus membranaceus*) and red-necked avocet (*Recurvirostra novaehollandiae)*. Available data from published surveys (Kingsford *et al.* 1999; Kingsford *et al.* 2003; Porter *et al.* 2006; Reid and Puckridge 2000; Reid and Gillen 1988; Reid and Jaensch 1999; Reid and Jaensch 2004; Reid *et al.* 2004) provide good evidence of the Ramsar site "regularly" supporting greater than one percent of the population of pink-eared duck. The one percent population threshold was exceeded in ten separate surveys spanning two decades. There are seven counts above the one percent threshold for the red-necked avocet, which includes four of the five comprehensive surveys that have been conducted across the entire Ramsar site as well as during the 1997 partial count (Reid and Puckridge 2000) and during 1983 and 1992, where the extent of survey is unknown.

English name	Latin name	Individual number (survey year)				1% level
		1987	1992	1998	2004	
Red-necked Avocet	*Recurviorstra novaehollandiae*	2800	1980	3000	4100	1100
Pink-eared Duck	*Malacorhynchus membranaceus*	18 500	15 200	17 100	40 500	10 000

Criterion 8: A wetland should be considered internationally important if it is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.

Coongie Lakes supports fish populations of at least 12 native species (Pritchard *et al.* 2004) which breed and undergo migration within the site and on which other wetlands depend for colonists. The unregulated hydrological regime and persistence of permanent waterholes supports a largely intact dryland river native fish fauna for the lower Cooper Creek in South Australia. Fish respond to floods to migrate and breed within different habitats within the site. Fish within the site are also a source of colonists for Kati Thanda-Lake Eyre in large flood events. This is supported by the presence of a commercial fishery at Lake Hope in the lower reaches of the site. Lake Hope only receives water 1 in 31 years but once full retains water for some time. In the period May 1992 to March 1994, 309 tonnes of Kati Thanda-Lake Eyre callop (*Macquaria ambigua* sp. B) were harvested (DEHAA 1998). This fishery is supported by colonists from upstream within the site.

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15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:

Lake Eyre Basin Drainage Division

b) biogeographic regionalisation scheme (include reference citation):

Australian Drainage Divisions.
Commonwealth of Australia (Bureau of Meteorology), 2011, Australian Hydrological Geospatial Fabric.

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16. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

The Coongie Lakes Ramsar site incorporates the majority of the lower Cooper Creek and associated floodplain as well as non floodplain areas in the northern section of the site. The floodplain is a complex mosaic of channels, floodplain lakes, floodouts and backwaters. The main channel from upstream of Innamincka to Coongie Lakes supports a number of permanent and semi-permanent waterholes. These are self perpetuating scour zones which are often wider and deeper than the rest of the channel. The northwest branch is the main flow path delivering annual inflows to Coongie Lakes after it splits from the main branch of the Cooper Creek approximately 25 kilometres downstream of Innamincka. The Cooper Creek is predominantly unregulated and as a result has a highly variable hydrological regime.

The Cooper Creek catchment has low relief and stream gradients of 0.1– 0.2 metres per kilometre. The lower Cooper is located on a complex sequence of nested, gently warped basins and associated near-horizontal sedimentary sequences that date from the Early Palaeozoic to the Cenozoic Lake Eyre (geological) Basin (Nanson *et al.* 2008; Cohen *et al.* 2010). As the Cooper Creek enters South Australia, and the Ramsar site, it passes along the southern side of the Innamincka Dome which is located near Nappa Merrie. In this reach, the river is constrained by bedrock with floods being restricted, in places, from a few hundred metres to one kilometre (Nanson *et al.* 2008; Cohen *et al.* 2010). Once the Cooper passes the Innamincka Dome it emerges onto the Cooper Creek Fan immediately downstream of Innamincka, into the Strzelecki Desert where linear dunes interrupt the path of the Cooper (Cohen *et al.* 2010).

The Cooper Creek Fan is approximately 30 by 20 kilometres, alluvial, and with a maximum westward regional slope of 0.00027 metres per metre, which is almost twice the slope of the adjacent alluvial plains (Cohen *et al.* 2010). East-west trending source-bordering dunes located on the northern margins of abandoned watercourses and contemporary floodways are a characteristic feature of the fan. Flow moves along distributary channels including the Cooper Creek channel which meanders westward with the northwest branch draining to Coongie Lakes. The second major distributary channel is Strzelecki Creek which flows southward on the western margin of the fan and ultimately feeds into Lake Blanche and Lake Frome. Strzelecki Creek only flows during high flows (gauge height of nine metres at Cullyamurra gauge), which is approximately a one in ten year event (Cohen *et al.* 2010). Floodplain morphology within the fan is extremely flat with low relief gilgai occurring in areas with shrink-swell clays. The dunes, which are mainly spaced 400 to 600 metres apart, are linear dunes with some isolated irregular shaped dunes. The linear dunes reach 15 to 20 metres above the floodplain and are sparely vegetated (Cohen *et al.* 2010).

The northwest branch of the Cooper Creek is also influenced by dunes, with the dunes in this part of the Ramsar site trending north-northwest. Costelloe (2004) suggests the lakes along the northwest branch may have formed in the dune swales as they widened over time. Small to medium floods terminate in the Coongie Lakes with flows passing into the northern overflow only during large flood events (Costelloe 2004).

Distributary floodplain channels connect the lakes allowing them to fill sequentially. The channels are typically narrow, being less than 100 metres wide in the deeper sections, but in floods can expand considerably (Costelloe 2004). The lakes are described as having similar shallow saucer shaped forms and range from 2 to 2.5 metres in depth (Costelloe 2004).

As the wetlands within the Ramsar site are sub-terminal with the occasional overflow into Kati Thanda-Lake Eyre during very large flood events, the wetlands remain predominantly fresh, as salts are flushed from the system on a regular basis (Timms 2001). Turbidity is relatively high in both the channels and lakes, whereas salinity (as indicated by electrical conductivity) is generally higher in lakes than channels (Puckridge 2000). Salinity increases as lake systems dry and lakes with lower inundation frequency and extent (e.g. Lake Maroopootanie) experience the greatest range in salinity. Importantly, these floodplain wetlands, although variable in inundation frequency and water quality over time, are "reset" during a large flood event, when water moves across the floodplain and water quality in all lakes is similar (Puckridge 2000).

The landscape of the Ramsar site is of low relief with the underlying geology reflecting the major forces that shaped the land, with a dominance of alluvial/fluvial sediments on the floodplain systems and sediments of aeolian origins surrounding the floodplain. The land systems mapping for the Coongie Lakes Ramsar site indicates that the site is dominated by floodplain and dune fields.

Coongie Lakes are situated in the desert region of north-eastern South Australia. The climate is arid with hot dry summers and cold winters. The climate is highly variable both inter-annually (between years) and intra-annually (within a year). The aspects of climate that most directly affect wetland ecology are rainfall (both local and in the catchment), temperature and evaporation as these all fundamentally affect wetland hydrology and the water budget. The nearest weather station is at Moomba near the southern border of the Ramsar site.

Rainfall is very low year round with median monthly rainfall generally greater than 13 millimetres. However, there is considerable variability in rainfall as evidenced by the 10th and 90th percentiles, which range from no rainfall in a month (recorded at least once in each month from 1973 to 2005) to more than 430 millimetres per month in January 1974. Annual average rainfall at Moomba is in the order of 200 millimetres per year. However, there is high inter-annual variation with annual rainfalls ranging from less than 50 millimetres to more than 800 millimetres in the past 30 years. Season has a strong influence on the biota and ecology of the Ramsar site with winter minima being correlated with low fish activity and reduced algal growth, two key factors in the productivity of the site.

17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, and climate (including climate type).

Coongie Lakes Ramsar site lies within the Lake Eyre Basin (LEB). Lake Eyre Basin is one of the world's largest internally draining river basins covering approximately 1.14 million square kilometres and 15 percent of Australia (Kotwicki 1986). The LEB is characterised by very low topographic relief, with 70 percent of the basin elevated less than 250 metres above sea level (Kotwicki 1986). The basin lies within the arid climatic zone of Australia, characterised by hot dry conditions and low rainfall. It is estimated that 40 percent of the basin receives less than 150 millimetres of rainfall on average, with higher average rainfall (approximately 400 millimetres) occurring in the northern and eastern margins (Kotwicki 1986). Average annual evaporation is an order of magnitude greater than rainfall and estimated to be between 2400 and 3600 millimetres a year. A dominant characteristic of rainfall is the very high inter-annual variability.

The site lies within the Cooper Creek system which rises in the Warrego Range in Queensland and terminates in the north-eastern corner of Kati Thanda-Lake Eyre. Approximately 35 000 of the 103 000 square kilometres of Cooper Creek floodplain occur in South Australia (Wainwright *et al.* 2006). The catchment area of the South Australian portion of the Cooper system is approximately 296 000 square kilometres (SA Department of Environment and Heritage 1998) and flows through areas of dune fields and gibber plains.

18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

The Cooper Creek is one of the largest unregulated rivers in Australia and has a highly variable hydrological regime (McMahon *et al.* 2008). Specifically, the Cooper Creek is more variable than 53 other arid zone rivers in the world, as well as being more variable than the Diamantina and Paroo (Puckridge *et al.* 1998; Puckridge 1999 cited in Timms 2001). The variability characteristic of the Cooper Creek is related to El Nino Southern Oscillation (ENSO) events as well as having much of the northern part of the Lake Eyre Basin bordering the southern margin of the tropical zone (Allan 1988; Timms 2001). Inflows are predominantly sourced from the upper catchment in Queensland and are dominated by a summer autumn rainfall pattern. In the upper section of the site, the main channel carries water in most years to the Coongie Lakes but flows less frequently in the lower reaches. The Cooper is recognised as one of the largest rivers in the world that is still in a natural state. Groundwater interactions are limited with surface water inflows being the major water source of these wetlands (Costelloe *et al.* 2009; Puckridge *et al.* 2010). The role of sedimentation within the site is not known. Due to very high evaporation rates transmission losses are high therefore only in very large floods do waters flow throughout the whole site and ultimately into Kati Thanda-Lake Eyre.

19. Wetland Types

a) presence:

Circle or underline the applicable codes for the wetland types of the Ramsar "Classification System for Wetland Type" present in the Ramsar site. Descriptions of each wetland type code are provided in Annex I of the *Explanatory Notes & Guidelines*.

Marine/coastal: A • B • C • D • E • F • G • H • I • J • K • Zk(a)

Inland: L • M • N • O • P • Q • R • Sp • Ss • Tp Ts • U • Va •

Vt • W • Xf • Xp • Y • Zg • Zk(b)

Human-made: 1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9 • Zk(c)

b) dominance:
List the wetland types identified in a) above in order of their dominance (by area) in the Ramsar site, starting with the wetland type with the largest area.

The extent of each wetland type is not known at this stage but the following is judged the order of likely dominance: Ts, P, N, Xf, W, Tp, O, R, Ss.

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20. General ecological features:
Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

The Coongie Lakes Ramsar site includes a vast array of temporary and near permanent wetlands, plays an important role in hydrological functioning of wetlands in the region and supports significant ecological values. The drivers of the character of the Ramsar site are climate, geomorphic setting and hydrology. The ecology is driven by periods of boom, associated with the arrival of floodwaters from the upper catchment of the Cooper Creek and through local rainfall events, followed by the bust period of extreme aridity (Kingsford *et al.* 1999). The flooding triggers a spectacular concentration of waterbirds which reflect the incredible productivity of the wetlands and the availability of both abundant food resources and habitat. The bust period, when the wetlands dry can result in large numbers of fish and waterbird deaths (Kingsford *et al.* 1999).

The key feature of the site is the high variability in the hydrological regime with the ecology of each wetland being influenced by the historic pattern of inundation. Biota are adapted to the variability with many species being temporary wetland specialists capable of dispersing or setting seeds and eggs into the sediments to await the next flood. The site supports wetland dependent vegetation which has a very close association to flood inundation levels with many terrestrial species, especially dryland birds, utilising this habitat as well.

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21. Noteworthy flora:
Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 14, Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

The previous RIS (SA Department of Environment and Heritage 1998) did not list any noteworthy flora. However there are a number of listed non-wetland dependent plant species found within the site including: yellow swainson-pea (*Swainsona pyrophila*) and Mt Finke grevillea (*Grevillea treueriana*) which are listed as vulnerable under the EPBC Act. An additional 15 flora species are listed as threatened in South Australia.

Vegetation communities not found on the floodplain of the Cooper Creek, but which occur within the site include two chenopod shrublands (dominated by old man saltbush; *Attriplex nummalaria* and cotton bush; *Maireana aphylla*), a low shrubland (dominated by curious saltbush, *Dissocarpus paradoxus*) and cane grass grassland (*Eragrostis australasica*). The majority of the chenopod shrublands dominated by *Atriplex spongiosa* and *Atriplex vesicaria* are found in the non floodplain regions of the site.

There are 795 flora species that have been recorded within the site, of which approximately 135 could be considered wetland dependent. Riparian associations fringing the river, channels and wetlands include coolibah (*Eucalyptus coolabah*), river red gum (*E. camaldulensis*), lignum (*Muehlenbeckia florulenta*), sedges (*Cyperus gymnocaulos*) and the water primose (*Ludwigia peploides)* (Timms 2001). The narrow band of river red gum dominated riparian woodland along the northwest branch of the Cooper supports a very rich bird community notable in the district (Reid 1988).

Distribution of riparian species reflects their water requirements, being influenced by water level and flow conditions. Coolibah occur near the highest flood levels, often close to the bank tops, river red gum occurs lower down thus being inundated more frequently and lignum lower still (Costelloe *et al.* 2004). *Cyperus gymnocaulos* and *Polygonum* occur below the lignum belt and the current water level. These two species have adaptations to deal with fluctuating water levels. *Cyperus* has rhizomes, capable of rapid growth, that traverse a wide band thus allowing plants to establish at different water levels and maintaining its position at the water's edge. *Polygonum* is also able to track water level rises and falls (Costelloe *et al.* 2004).

Assessment of aquatic macrophytes (defined as those adapted to growing in water, Roberts 1988) within the Ramsar site is limited. Roberts (1988) reported low diversity with only eleven species recorded during the December 1986 Coongie Lakes study. These species included two Charophytes (*Chara* sp., *Nitella* sp.) and two large green algae (*Spirogyra* sp. and *Hydrodictyon reticulatum*), as well as one introduced species and two amphibious grasses. Associations in the main channel and in the lakes were structurally distinct with the lakes being characterised more by robust generalists than the river habitat (Roberts 1988).

There are relatively few invasive plant species found within the site, with approximately only six percent of the species recorded within the site considered invasive (DEHAA 1999). Weeds of National Significance present at the site include Mesquite spp. (*Prosopis spp.*), Mexican poppy (*Argemone ochroleuca*), parkinsonia (*Paarkinsona* arculeta) and prickly acacia (*Acacia nilotica*) (DENR 2011).

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 14. Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

One hundred and ninety-eight species of birds have been recorded within the Coongie Lakes Ramsar site, 83 of which are wetland birds. Fifty five species of waterbird have been recorded breeding within the site. The Australian painted snipe (*Rostratula australis*), which is listed as endangered on the IUCN Red List and under the EPBC Act, occurs at the site. Eighteen species of waterbird are listed under international treaties (JAMBA, CAMBA, ROKAMBA or CMS) and 39 species are listed as migratory or marine under the EPBC Act. The Coongie Lakes Ramsar site supports a significant number of raptors with 18 species reported in the region, 16 of which breed at the site (DEHAA 1999). The night parrot (*Pezoporus occidentalis*) is known to have occurred at the site in the past, but not recently (DEHAA 1998).

The site is rich in fauna for an arid zone area (Reid 1988). Most arid zone birds require drinking water, often daily in the warmer months, with the number and diversity of dryland bird fauna decreasing with distance from water (Reid 1988). Reid (1988) reported that 44 dryland bird species breed within the site. The river red gum riparian woodland is important habitat for these birds and is a stronghold for breeding populations of several raptors, including the black falcon (*Falco subniger*), grey falcon (*Falco hypoleucos*), Australian hobby (*Falco longipennis*), whistling kite (*Haliastur sphenurus*), black-breasted buzzard (*Hamirostra melanosternon*), little eagle (*Hieraaetus morphnoides*) and letter-winged kite (*Elanus scriptus*) (Reid 1988). Eleven dryland species found at the site are listed as vulnerable within South Australia. The barking owl (*Ninox connivens*), which is listed as rare in South Australia, is considered to be a wetland dependent species as its core habitat is river red gum woodland lining the upper reaches of the Cooper Creek.

Puckridge (2000) lists 15 species of fish from 10 families and two introduced species occurring in the Cooper Creek system, with 12 of these recorded in the site plus two introduced species (DEHAA 1999; Puckridge *et al.* 2010). A thirteenth native species may represent a hybrid of species, which is yet to be confirmed (Pritchard *et al.* 2004). Native species dominate the fish fauna representing 99 percent of the catch. The Cooper Creek catfish (*Neosiluroies cooperensis*) is considered rare in South Australia (Hammer *et al.* 2009). The catfish is one of only three of the native species which is relatively sedentary, remaining in waterholes, the rest are highly mobile migrating and moving onto floodplains to breed.

Ten species of frogs have been recorded within the Coongie Lakes Ramsar site with two listed at the state level as rare: knife-footed frog (*Cyclorana cultripes*) and small-headed toadlet (*Uperoleia capitulata*). The frog

community is considered one of the richest in central Australia (Morton *et al.* 1995). Fifty-six species of reptiles occur within the site, three of which are listed at the state level. These are the rare woma python (*Aspidites ramsayi*), and black-soil skink (*Proablepharus kinghorni*) and the vulnerable Cooper Creek turtle (*Emydura macquarii emotti)*.

The Cooper Creek turtle is adapted to the boom and bust ecology of dryland rivers utilising permanent waterholes as refugia (White 2002). Adult turtles dominate the permanent waterholes, with juveniles and smaller adults being found in semi permanent waterholes in low numbers and densities (White 2002; Marshall 2005). Large adult turtles have been collected from deeper waterholes of the northwest branch of the Cooper Creek as well as at Cullyamurra Waterhole. Cullyamurra is the deepest waterhole within the site and supports a large turtle population (White 2004).

Twenty-eight species of native mammal have been recorded within the site. Of these, only the water rat (*Hydromys chrysogaster*) is wetland dependent, and is abundant in the upper reaches of the site. Five species of mammal are listed as endangered under the EPBC Act including dusky hopping-mouse (*Notomys fuscus*), golden bandicoot (*Isoodon auratus auratus*), greater bilby (*Macrotis lagotis*), plains rat (*Pseudomys australis*) and the kowari (*Dasycerus byrnei*). Yellow-bellied sheathtail bats (*Saccolamus flaviventis*) and fawn hopping mouse (*Notomys cervinus*) are listed as threatened in South Australia and also occur at the site.

Roberts (1988) identified rabbits as a possible threat to the vegetation of the Coongie Lakes, suggesting that grazing pressure was evident in some areas fringing the lakes. Feral pigs are present within the site and have the potential to impact on waterbird breeding through predation and degrade wetland habitat. Cane toads and their biological impacts are listed as a Key Threatening Process under the EPBC Act.

23. Social and cultural values:

a) Describe if the site has any general social and/or cultural values e.g., fisheries production, forestry

The nominated wetland area contains extensive aboriginal archaeological sites and a number of important European historical sites. The Cooper Creek has also long been recognised for its cattle production and more recently as a destination for people seeking outdoor recreation. The area also contains the largest mainland oil and gas production field in Australia (SA Department of Environment and Heritage 1998).

A commercial fishery at Lake Hope occurs in the lower reaches of the site at Lake Hope. Lake Hope only receives water 1 in 31 years but once full retains water for some time. In the period May 1992 to March 1994 309 tonnes of Kati Thanda-Lake Eyre callop (*Macquaria ambigua* sp. B) was harvested (DEHAA 1998). This fishery is supported by colonists from upstream within the site.

b) Is the site considered of international importance 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 Yes, tick the box ❑ and describe this importance under one or more of the following categories:

i) sites which provide 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) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:

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

iv) sites where 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:

24. Land tenure/ownership:

a) within the Ramsar site:

Three dominant land tenures occur within the site: Crown land – pastoral lease, Crown land – National Park and regional reserve as well as land covered by petroleum exploration licences. Lands managed by National Parks and Wildlife South Australia account for 38 percent of the site and petroleum leases cover 15 percent of the site.

b) in the surrounding area:

Crown Land – Pastoral Lease.

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25. Current land (including water) use:
a) within the Ramsar site:

The area is used primarily for cattle grazing and for oil and gas production with 97 percent of the site under pastoral leases. Pastoral activity occurs within the regional reserve, which is co-managed by National Parks and Wildlife South Australia and private pastoral companies. In total, National Parks and Wildlife South Australia manage reserves covering 38 percent of the site. The area is becoming increasingly important for recreation and tourism as access roads are upgraded. Scientific research is undertaken by universities and research agencies on a regular basis.

b) in the surroundings/catchment:

The dominant land use is pastoralism combined with petroleum exploration.

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26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:
a) within the Ramsar site:

Invasive species impacts are poorly understood, however feral pigs are considered a problem within the site as is the potential for invasion by cane toads (*Bufo marinus*). Rabbits are considered a problem with extremely high numbers within the site. Known impacts include: loss of vegetation, lack of plant recruitment and increased soil erosion. Recreational activities are increasing and this is putting pressure on waterholes as these tend to be sites visited the most. Pollution impacts from petroleum exploration and production are possible, with barriers to ecological and hydrological connectivity also associated with this land use. Grazing impacts are considered to be low except in areas surrounding waterholes where a concentration effect is evident. Cullyamurra waterhole and Coongie Lakes are key areas which are no longer grazed.

b) in the surrounding area:

There is potential for significant impacts to occur if upstream water development leads to a significant change in the natural hydrological regime. Climate change impacts also have the potential to influence the ecology of the site. In such an arid environment relatively small changes to the hydrological regime can have significant impacts.

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27. Conservation measures taken:
a) List national and/or international category and legal status of protected areas, including boundary relationships with the Ramsar site:
In particular, if the site is partly or wholly a World Heritage Site and/or a UNESCO Biosphere Reserve, please give the names of the site under these designations.

A significant portion (38%) of the declared wetlands, including the Coongie Lake system has been reserved under the South Australian *National Parks and Wildlife Act 1972*; comprising National Park and Regional Reserve.

b) If appropriate, list the IUCN (1994) protected areas category/ies which apply to the site (tick the box or boxes as appropriate):

Ia ❑;Ib ❑; II ☒; III ❑; IV ❑; V ❑; VI ☒

c) Does an officially approved management plan exist; and is it being implemented?:

A draft plan of management for the site was prepared in 1999. New management plans are being drawn up for both Coongie Lakes National Park and the Innamincka Regional Reserve. The Coongie Lakes Management Plan will be completed by the end of 2013, with the Innamincka plan to follow.

d) Describe any other current management practices:

Current management activities include:

- Invasive pest monitoring and management – feral pigs, rabbits, cane toads.
- Weed monitoring and management – i.e. Buffel grass, *Acacia farnesiana*, Mexican poppy.
- Post-flooding aerial and ground surveys for waterbirds.
- North-East Biodiversity Action Plan – an internal South Australian government document that guides on-ground conservation and management practices.

28. Conservation measures proposed but not yet implemented:
e.g. management plan in preparation; official proposal as a legally protected area, etc.

District Biodiversity Action Plans are an ongoing conservation measure. In 2011 a Caring for Our Country project commenced with a focus on pest plant and animal management. A separate project investigating the impacts of the Innamincka causeway on fish migration has also commenced. The deliverables of this project include options for modifying the causeway to improve fish passage.

29. Current scientific research and facilities:
e.g., details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

No site specific facilities, however scientific research is undertaken by universities and research agencies on a regular basis. Waterbird and fish monitoring is also undertaken on a regular basis.

30. Current communications, education, participation and awareness (CEPA) activities related to or benefiting the site:
e.g. visitors' centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

Both pre-visit and on-site information and education material is available through the South Australian National Parks and Wildlife Service. Information includes access routes, access guides and descriptions of the habitats and wildlife. A visitor centre is located at Innamincka.

31. Current recreation and tourism:
State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

It is estimated that up to 30 000 visitors use the area annually on a seasonal basis; most recreational use is centred along the river frontage adjacent to the township of Innamincka and to a lesser extent, the Coongie Lakes (SA Department of Environment and Heritage 1998).

32. Jurisdiction:
Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept of Agriculture/Dept. of Environment, etc.

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Adelaide SA 5001
Phone +61 8 8204 1910
dewnr.ramsar@sa.gov.au

33. Management authority:
Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the

Department of Environment, Water and Natural Resources
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Port Augusta SA 5700
Phone +61 8 8648 5300
dewnr.ramsar@sa.gov.au

34. Bibliographical references:
Scientific/technical references only. If biogeographic regionalisation scheme applied (see 15 above), list full reference citation for the scheme.

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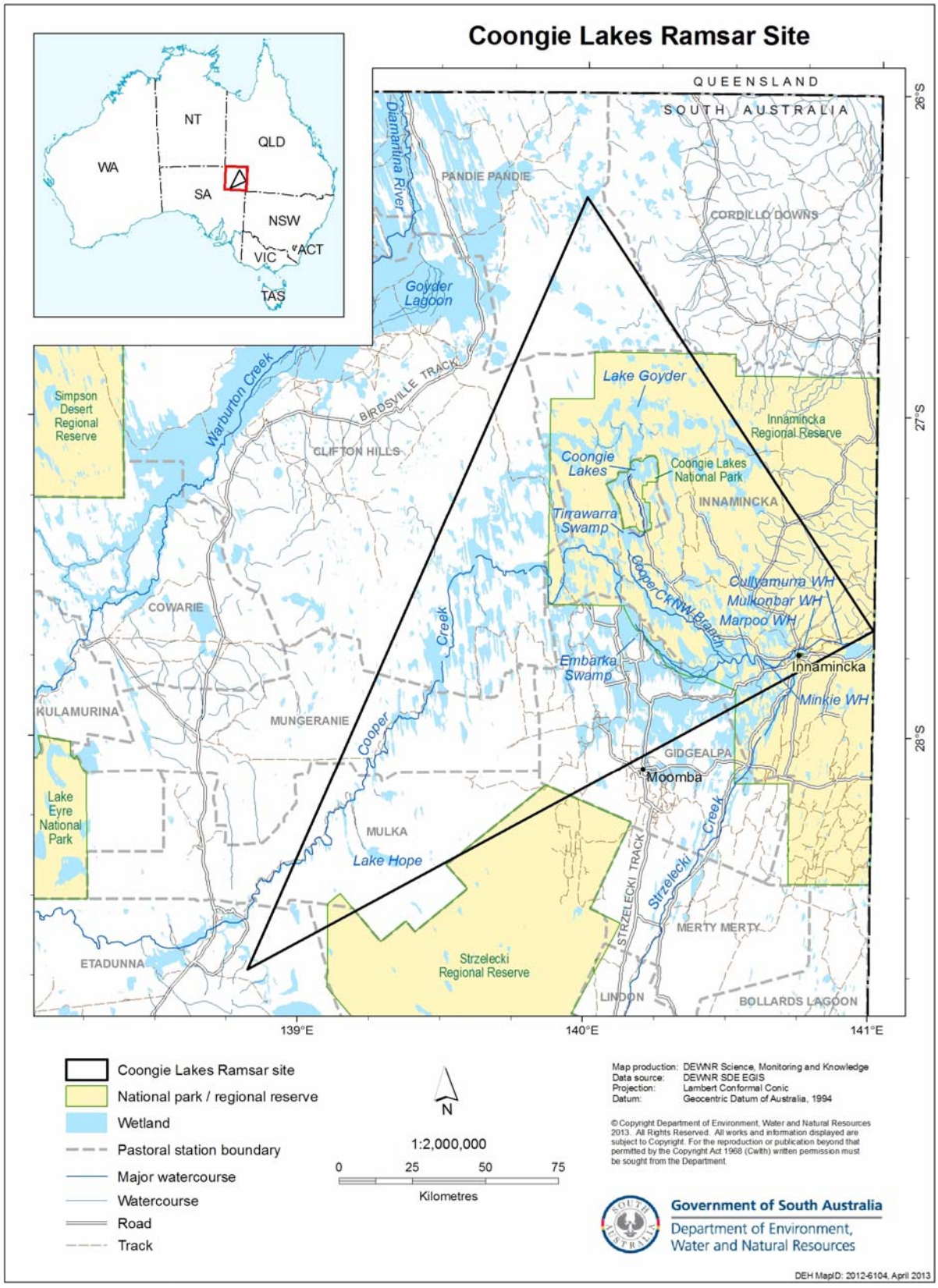
Coongie Lakes Ramsar Site
NT
QLD
WA
SA
NSW
ACT
VIC
TAS
QUEENSLAND
SOUTH AUSTRALIA
Diamantina River
PANDIE PANDIE
CORDILLO DOWNS
Goyder Lagoon
Warburton Creek
BIRDSVILLE TRACK
Simpson Desert Regional Reserve
CLIFTON HILLS
Lake Goyder
Innamincka Regional Reserve
Coongie Lakes
Coongie Lakes National Park
INNAMINCKA
Tirrawarra Swamp
Cooper Ck NW Branch
Cullyamurra WH
Mulkonbar WH
Marpoo WH
COWARIE
Cooper Creek
Embarka Swamp
Innamincka
Minkie WH
KULAMURINA
MUNGERANIE
GIDGEALPA
Moomba
Lake Eyre National Park
MULKA
Lake Hope
Strzelecki Creek
STRZELECKI TRACK
MERTY MERTY
ETADUNNA
Strzelecki Regional Reserve
LINDON
BOLLARDS LAGOON
139°E
140°E
141°E
26°S
27°S
28°S
Coongie Lakes Ramsar site
National park / regional reserve
Wetland
Pastoral station boundary
Major watercourse
Watercourse
Road
Track
N
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0 25 50 75
Kilometres
Map production: DEWNR Science, Monitoring and Knowledge
Data source: DEWNR SDE EGIS
Projection: Lambert Conformal Conic
Datum: Geocentric Datum of Australia, 1994
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