

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:

Rhonda Butcher on behalf of the South Australian
Department of Environment, Water and Natural Resources
South East Region, PO Box 1046
Mount Gambier, South Australia, 5290

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Designation date

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Site Reference Number

2. Date this sheet was completed/updated:

July 2011

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.

Piccaninnie Ponds Karst Wetlands

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: N/A

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 site being nominated for Ramsar listing comprises the Piccaninnie Ponds Conservation Park (Attachment 1). The site includes the adjoining beach areas to the mean low tide mark. The initial gazettal included Sections 598 and 692 (Hundreds of Caroline) declared as Conservation park and named Piccaninnie Ponds Conservation Park, under the National Parks Act 1966 in Gazette 16/10/1969 and covered 397 hectares. Two reserve additions were made on the 26/11/2010 expanding the Conservation Park to that of the nominated site. The additions included the Lapatha Property (Piccaninnie Grasslands) in the north-eastern corner of the site, and Pick Swamp property on the western boundary of the site. The nominated area covers 862 hectares, consisting of sections 598, 692, 694 and 695 of Hundred Plan H4203000, and Allotments 1 and 2 (Deposited Plan 31601), 50, 51 and 52 (Deposited Plan 83130) and 100, 101 and 102 (Deposited Plan 76229) in the Hundred of Caroline, County of Grey.

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.

38° 03' S, 140° 57' E

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.

Piccaninnie Ponds Karst Wetlands is located in the South East of the State of South Australia. The site is situated 30 kilometres south east of Mount Gambier, population 24 000. The site is bounded by the South Australia – Victoria border to the east, the Southern Ocean to the south and privately owned cropping and grazing lands to the north and west.

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

0-20 ASL

11. Area: (in hectares)

862 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 site is an exceptional example of karst spring wetlands, with the largest and deepest of the springs reaching a depth of more than 110 metres. The karst springs support unique macrophyte and algal associations, with macrophyte growth extending to 15 metres. In addition, a number of different wetland types surround the karst wetlands, receiving surface runoff from the overflow of groundwater discharge. A large area of peat fens is also present. The geomorphic and hydrological features of the site produce a complex and biologically diverse ecosystem which supports considerable biodiversity, including a significant number of species of conservation value. The site is internationally renowned as a cave diving destination.

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: The site represents an outstanding example of two rare wetland types within the South East Coast Drainage Division. Karst and other subterranean hydrological systems have a range of conservation and cultural values and are recognised as being globally important. Fen peatlands are one of the most vulnerable wetland types being highly susceptible to degradation. The Piccaninnie Ponds Karst Wetlands is a unique combination of karst and coastal fen wetlands in good condition. The site includes a series of rising spring karst systems as well as several substantial groundwater beach springs along the foreshore of the beach. The continual discharge of groundwater has led to the water logging of soils and the formation of extensive peatland fens. The hydrological and geomorphic combination of karst wetland, fen wetland and beach springs, all in very good condition, makes this site truly unique at the bioregion, if not national scale, thus clearly meeting this criterion.

Criterion 2: The site supports seven nationally or internationally listed species of conservation significance as shown below.

Common name	Scientific name	IUCN	CITES	CMS	National Status
Fish					
Yarra pygmy perch	<i>Nannoperca obscura</i>	VU	-	-	Vulnerable (EPBC Act, 1999)
Dwarf galaxias	<i>Galaxiella pusilla</i>	VU	-	-	Vulnerable (EPBC Act, 1999)
Birds					
Australasian bittern	<i>Botaurus poiciloptilus</i>	EN	-	-	Endangered (EPBC Act, 1999)
Orange-bellied parrot	<i>Neophema chrysogaster</i>	CR	App I	-	Critically Endangered (EPBC Act, 1999)
Crustaceans					
Glenelg spiny freshwater crayfish	<i>Euastacus bispinosus</i>	VU	-	-	Endangered (EPBC Act, 1999)
Plants					
Maroon leek-orchid	<i>Prasophyllum frenchii</i>	-	-	-	Endangered (EPBC Act, 1999)
Swamp greenhood	<i>Pterostylis tenuissima</i>	-	-	-	Vulnerable (EPBC Act, 1999)

The variegated pygmy perch (*Nannoperca variegata*), which is listed as Vulnerable under the EPBC Act (1999) and Vulnerable on the IUCN Red List of Threatened Animals (IUCN 2006), does not appear to

regularly occur at Piccaninnie Ponds Karst Wetlands. There is only one historic and unverified record of this species at the site.

Criterion 3: The site is a unique karst wetland system which provides habitat for an extensive and diverse assemblage of endangered, rare and other flora and fauna, highly representative of the pre-European biodiversity of the Lower Limestone Coast region of South Australia. The karst wetland system on which this biodiversity is dependent, is rare within the bioregion, and represents one of the few remaining areas of permanent freshwater in the South East of South Australia. The biota of the subterranean areas of the karst wetlands are believed to be significant and contribute a unique element to the regional biodiversity. The site falls within a national biodiversity 'hotspot'. The site is species rich supporting similar or greater numbers of waterbirds compared to larger nearby coastal wetlands and Bool and Hacks Lagoons Ramsar site to the north of Mount Gambier. Over 30 floral associations and 250 plant species have been recorded from the site, a number of which are used by six butterfly species which are of conservation concern. The site supports 10 of the 21 native fish species found in the drainage division. Listed species and communities of conservation significance within the Piccaninnie Ponds Karst Wetlands are at Attachment 2.

Criterion 4: The site is a known winter roosting and feeding location for the Critically Endangered orange-bellied parrot (*Neophema chrysogaster*). The site also provides habitat for 79 bird species including 24 species listed under international agreements: CAMBA (20), JAMBA (19), ROKAMBA (16), BONN (17) and 50 Australian migratory or marine species (see Attachment 3). Native fish populations include seven species which are diadromous and three freshwater obligate species (see below) which rely on permanent freshwater. This site represents one of the few remaining permanent freshwater wetlands in the lower South East of South Australia and is believed to be a drought refuge.

- Climbing Galaxias (*Galaxias brevipinnis*) - Amphidromous – adults live in fresh water but larvae may be washed out to sea for several months before returning inland.
- Congolli (*Pseudaphritis urvillii*) - Catadromous
- Dwarf galaxias (*Galaxiella pusilla*) - Obligate freshwater
- Pouched lamprey (*Geotria australis*) - Anadromous
- Short finned eel (*Anguilla australis australis*) - Catadromous
- Small-mouthed hardyhead (*Atherinosoma microstoma*) - Amphidromous
- Southern pygmy perch (*Nannoperca australis*) - Obligate freshwater
- Spotted galaxias (*Galaxias truttaceus*) - Amphidromous
- Variegated pygmy perch (*Nannoperca variegata*) - Obligate freshwater
- Yarra pygmy perch (*Nannoperca obscura*) - Obligate freshwater

Criterion 8: The site is an important spawning ground for the Yarra pygmy perch (*Nannoperca obscura*) and dwarf galaxias (*Galaxiella pusilla*), both of which are classified as Vulnerable by IUCN, in South Australia. Despite the karst system being relatively isolated, this system supports species that spawn both within the freshwater wetlands as well as in the nearby marine environment including spotted galaxias (*Galaxias truttaceus*), climbing galaxias (*Galaxias brevipinnis*) and pouched lamprey (*Geotria australis*).

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:

South East Coast Drainage Division (DEWHA 2007).

b) biogeographic regionalisation scheme (include reference citation):

Australia's River Basins (DEWHA 2007).

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 Piccaninnie Ponds Karst Wetlands comprises of four distinct areas:

1. Piccaninnie Main Ponds, which consists of three connected waterbodies: First Pond (10 metres deep), the Chasm (> 110 metres deep) and Turtle Pond (six metres deep). Surrounding these spring fed ponds is an area of shrub dominated swamp.
2. Western wetland lies to the west of the Piccaninnie Ponds and consists of dense closed tea-tree and paperbark shrubland over shallow dark clay on limestone soils.
3. Eastern wetland lies to the east of the Piccaninnie Ponds and includes the spring-fed Hammerhead Pond (four metres deep).
4. Pick Swamp, which lies to the extreme west of the site and includes areas of fen, marshes and sedgeland as well as the spring fed Crescent Pond (86 metres deep) on peat soils.

The ponds (First Pond, the Chasm, Turtle Pond, Hammerhead Pond and Crescent Pond) are all karst spring formations which act as discharge points for the unconfined aquifer (Gambier Limestone). Groundwater is the dominant water source for the karst rising spring wetlands, which are all permanent waterbodies. However, the rates of groundwater inflows, fluctuations in water levels and the relative contributions of surface water are complex and the subject of on-going investigations.

Natural drainage channels are largely absent over much of the region. However, there has been extensive modification to surface water drainage in the past (Clarke 2006). The area that now comprises the Piccaninnie Ponds Conservation Park, including Pick Swamp and adjoining farmland, was once a continuous wetland complex with large areas of surface water. Originally a natural drainage channel, Freshwater Creek drained the system eastward into the Glenelg estuary. In 1906 the course of the creek changed as it broke through a depression in the dunes and flowed out to the sea approximately 1.2 km west of the Glenelg River (Scholz 1987). Sometime in the period 1917-1945 the Western wetland became separated from the Main Ponds, and a drain was subsequently cut through the dunes from the Main Ponds (Scholz 1987). During the 1970s a large number of drainage channels were added to the Pick Swamp area, resulting in much of this being converted to terrestrial environments and used for agricultural purposes (Clarke 2006). A substantial investment has been made to reverse the impacts of drainage across the whole system. With the construction of a weir, fishway and levee in 2010, the depth of water held in Pick Swamp has increased significantly and the site now supports extensive areas of open water and aquatic vegetation. During the restoration program approximately 3 kms of drains were decommissioned. The restoration works have resulted in surface water levels, and hence wetland habitat, across the Piccaninnie Ponds Karst Wetlands steadily increasing, even during periods of lower than average rainfall.

Until recently water quality within the site was largely unstudied, with the exception of data collected from the Piccaninnie Main Ponds. Within Main Ponds, water is fresh 1 to 2 ppt salinity (Fairweather unpublished) and relatively high in bicarbonate, due to the limestone groundwater source. Total inorganic nitrogen levels within Piccaninnie Ponds were generally between one and three milligrams per litre (December 2005 to December 2007), with a maximum recording of 5.7 milligrams per litre (Fairweather unpublished). This data also indicates the nitrogen is mostly (60 – 100%) in dissolved, inorganic form and available for immediate uptake by plants and algae. Higher levels of up to 4.5 milligrams per litre of nitrate have been recorded at Main Ponds between July 2008 to March 2011, with only 0.05 milligrams per litre at Pick Swamp. All areas sampled had relatively stable and low recordings for phosphate (DENR unpublished).

17. Physical features of the catchment area:

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

The Ramsar site lies within the Lower South East of South Australia within the Gambier Embayment portion of the Otway Basin. The surface geology comprises predominantly Tertiary limestone (Gambier Limestone) with low relief and a gentle seaward gradient (Hallam and Thurgate 1992). Gambier Limestone is mainly composed of porous bryozoan limestone and was deposited in a shallow marine embayment that was flooded in the early Miocene (Grimes 1994). The Gambier Limestone forms the main unconfined aquifer in the area and is separated from a deeper, confined aquifer (Dilwyn Formation) by a layer of impervious black clay.

The area is characterised by a Mediterranean climate with warm, dry summers and cool, wet winters. Total annual rainfall is approximately 700mm per year and approximately 80% of the rain falls between May and October. The climate is relatively stable and relatively predictable with low inter-annual (between year) variation.

18. Hydrological values:

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

The springs within the site (Piccaninnie Ponds, Crescent Pond and Hammerhead Pond plus several unnamed springs) are groundwater discharge points for the regional unconfined Gambier Limestone aquifer.

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.

Estimate W, U, Tp, E, Ts, Zk(b), 9

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 Piccaninnie Ponds Karst Wetlands provides a number of ecosystem services and benefits including recreation and tourism, indigenous foods, cultural and spiritual services, maintenance of hydrological regimes, and biodiversity conservation.

The site provides a number of habitat types for a range of wetland-dependent fauna and flora. The karst springs all support distinctive aquatic vegetation communities owing to the exceptional water clarity. The composition and cover of the submergent species vary between the springs but significant growth occurs to 15 metres depth in the Piccaninnie Main Ponds. Epiphytic algae are a major feature of the system, cloaking the submergent macrophytes. Beyond the macrophyte zone the springs have a benthic macroalgae zone which ultimately gives way to benthic algal mats. The extent of submergent macrophyte growth is not limited by light penetration but rather sediment composition, with the upper slopes of the springs having peat soils in which the macrophytes take root (Scholz 1987, Hallam and Thurgate 1992; Thurgate 1995).

Elsewhere in the site the groundwater discharge from the springs has produced other significant vegetation associations including peat fens, silky tea tree tall shrubland (*Leptospermum lanigerum*), *Gahnia* sedgeland, *Typha* rushlands and *Leucopogon* shrubland. Many of the vegetation associations represent remnant patches and support a high number of threatened species. The diversity of habitat supports 79 waterbird species, over 250 native species of plants including 63 wetland plant species, eight species of threatened Lepidoptera, and 10 native freshwater fish.

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 karst vegetation has a mixed submergent species (*Triglochin*, *Myriophyllum*, *Ranunculus*, *Nasturtium*, *Potamogeton*) with a characteristic zone of emergent species (*Typha*, *Phragmites*, *Eleocharis*, *Baumea*, *Juncus*, *Schoenus*, *Cyperus*) on the edges of the ponds. Water clarity is a key feature of the springs and plant growth is extensive, with the species growing larger than seen in other wetland habitats. Macroalgae found in the springs include *Chara globularis*, *Chaetomorpha linum*, *Vaucheria*, *Porphyropsis*, and *Enteromorpha prolifera*. *Cladophora aegagropila* is found on the underside of rock ledges. The channel between Turtle Pond and the Chasm supports a number of macroalgae in summer including *Monostoma*, *Spirogyra*, *Cladophora glomerata* and others (Thurgate 1995). In the Chasm, the macroalgae *Oscillatoria* and the moss *Distichophyllum microcarpum* are dominant in the zone below 15 metres.

The site supports a number of rare orchids which are associated with the silky tea tree tall shrubland (*Leptospermum lanigerum*) including the late helmet orchid (*Corybas* sp. aff. *diemenicus*) and swamp greenhood and maroon leek-orchid (see section 14). The nationally endangered maroon leek-orchid (*Prasophyllum frenchii*) is found within the site occurring on seasonally inundated grassy sedgeland and is part of one of only 12 populations remaining in the wild. The population at Piccaninnie Ponds Karst Wetlands is part of the only known population in the Lower South East of South Australia. The population of swamp greenhood (*Pterostylis tenuissima*) which occurs within the site is the largest known population across its entire range.

Bridal creeper (*Asparagus asparagoides*) is found at the site in low numbers, and although not considered to be a major threat to the site, is controlled annually.

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.*

The site is a known winter roosting and feeding location for the critically endangered orange-bellied parrot (*Neophema chrysogaster*). The orange-bellied parrot migrates annually from its breeding grounds in Tasmania into Victoria and South Australia. It is a critically endangered species under the EPBC Act with only an estimated 150 adults remaining in the wild (Commonwealth of Australia 2005). Records have shown that Piccaninnie Ponds Karst Wetlands regularly supports one percent of its population as the species moves through its wintering grounds, and it is likely that the proportion of the population that migrates into South Australia all use the site as an important resting site.

The site supports secure breeding populations of the Yarra Pygmy Perch (*Nannoperca obscura*) and Dwarf Galaxias (*Galaxiella pusilla*), which are listed species under the EPBC Act. Other fish species found at the site of conservation significance within South Australia include the pouched lamprey (*Geotria australis*), shortfinned eel (*Anguilla australis*) and congolli (*Pseudaphritis urvilli*). Spotted galaxias (*Galaxias truttaceus*) have recently recorded from the site. This represents one of only two known South Australian locations, potentially representing the western limit of this species distribution. The Piccaninnie Ponds sighting consisted of the greatest numbers ever recorded in South Australia, and prior to its recording this species was believed to be heading for local extinction (Hammer 2002).

The Glenelg spiny freshwater crayfish (*Euastacus bispinosus*) is recorded at the site, however the size of the population within the site is not known. This species is listed as endangered under the EPBC Act. *Euastacus* crayfish are endemic to south-eastern Australia, and are characteristic of the region's aquatic fauna (TSSC 2011b).

The swamp antechinus (*Antechinus minimus*) and swamp skink (*Egernia coventryi*), which are both endangered in South Australia, also occur at the site.

The introduced European fox (*Vulpes vulpes*) occurs in low numbers at the site and is regularly controlled.

23. Social and cultural values:

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

Due to exceptional water clarity, the site is an internationally renowned cave diving destination, with over 20,000 visitors annually and as such has high recreational and tourism value.

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:

Piccaninnie Ponds Karst Wetlands is Crown land, managed by the South Australian Government as a Conservation Park, constituted under the *National Parks and Wildlife Act 1972* (South Australia).

b) in the surrounding area:

Surrounding areas are mostly freehold (privately owned) land. On the eastern boundary the site partially adjoins the Discovery Bay Coastal Park.(listed under the *National Parks Act 1975* (Victoria).

25. Current land (including water) use:

a) within the Ramsar site:

Conservation Park/nature conservation, passive nature-based recreation, cave diving, snorkeling and camping.

b) in the surroundings/catchment:

The areas immediately adjacent to the site are used for livestock grazing, with some areas irrigated and others grazing on native vegetation. In the north of the catchment, land use is dominated by forestry with large areas of softwood plantation and smaller parcels of hardwood forestry.

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:

Within the site there are three factors that have affected the site's ecological character:

1. Drainage – The Ramsar site has a long history of altered hydrology. Original surveys of the Piccaninnie Ponds area in 1896 indicated a larger, wetter wetland system than at present, which extended from Green Point (approximately 5 kilometres to the west) to the Glenelg River near the Victorian border. The wetland included drainage via Stony Creek to the sea at the western end of the system and via Freshwater Creek to the Glenelg River estuary to the east (SENRC 2004; Department of Environment and Planning 1992). Between 1906 and 1917, water levels were affected by various actions, such as the damming and diversion of Freshwater Creek.

By 1944, changes in hydrology, due to changes to the original Freshwater Creek, excavation of Stony Creek to accommodate drains in that area, and excavation of an outlet from the Main Ponds area to the sea had altered the inundated area of the wetland system. While the northern extent of the wetland system remained similar to that surveyed in 1896, changes to hydrology and mobilisation of sand dunes resulted in large areas along the southern boundary of the wetland system being in-filled (SENRC 2004). In the 1960s, excavation of the main outlet drain to the sea resulted in further lowering of water levels and subsequent drying across the wetland system. Since then, local vegetation patterns have responded to an increased area of dryland and reduced area of permanent inundation (e.g. increased area of terrestrial species such as coastal wattle, *Acacia longifolia ssp. sophorae*). Bachmann and van Weenen (2001) note that the reduced flow has the potential to have a significant impact on the Silky Tea Tree Tall Closed Shrubland, a vegetation community of considerable conservation value.

2. Land clearing and livestock grazing – Fencing of the central part of the Piccaninnie Ponds Conservation Park since its inception in 1972 has seen the exclusion of livestock and maintenance of largely native vegetation. However, Pick Swamp's history as pastoral land means that land clearance and grazing by livestock have impacted on the condition and values of the wetland for many decades. The physical disturbance, introduced plant species, grazing pressure, weeds and potential pathogens expected on grazing land have affected (plant and animal) habitat availability and condition, native vegetation patterns and species richness. Many of these impacts have been reversed with the reinstatement of the hydrology of the Pick Swamp portion of the site and the subsequent ecological response.

3. Invasive species – The site supports few invasive species. The European Fox (*Vulpes vulpes*) is present in low numbers; active control of fox numbers to manage impacts on nesting birds is undertaken. Few invasive plant species are found at the site, Bridal Creeper (*Asparagus asparagoides*) is found in low numbers in dryland vegetation communities, however its ability to invade intact vegetation appears to be constrained by the density of the coastal dune vegetation, regular control is undertaken with the overall aim being to eradicate the species from the site.

b) in the surrounding area:

The hydrology of south-east South Australia has been altered by a combination of drainage schemes, land clearance and water extraction. While the regional hydrology, and that of the Piccaninnie Ponds Karst Wetlands is complex and a topic of ongoing research, extraction of groundwater across the region for industry and agriculture is thought to have resulted in a decline in groundwater discharge rates through the wetland complex. Regional groundwater levels are generally declining, except in the vicinity of the Ramsar site where they are stable. However monitoring of flow from the springs confirms the observation of declining discharge pressure in recent decades. The manipulation of how water is held at the site now achieved has ensured that surface water levels have continued to rise at the site since 2006, even as other sites have dried out during drought years.

Contamination of the unconfined groundwater aquifer by point and diffuse pollution sources in the region has long been recognised (e.g. Emmett and Telfer 1993) and the disposal of wastewater point-sources to the aquifer is now prohibited (EPA 2003, EPA http://www.epa.sa.gov.au/water_se.html accessed in June 2008). However, nutrients and other contaminants remain in regional groundwater as a legacy of past practices and due to recharge from urban, industrial and agricultural land.

The latest climate projection models for the South East of South Australia suggest that by 2030 it is likely that average temperatures will increase 0.2 to 1.4°C by 2030 and 0.6 to 4.4°C by 2070 (McInnes et al. 2003), and there will be a tendency towards lower rainfall across the year. Any reduction in rainfall, runoff and groundwater recharge associated with climate change and its effect on regional temperature and rainfall patterns increases the potential to exacerbate effects such as the decline in groundwater discharge from Piccaninnie Ponds. The risk of water quality impacts may also increase as existing contaminants (e.g. nutrients, salt) become less 'diluted' with any decrease in recharge.

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.

The Piccaninnie Ponds Conservation Park is listed on the Register of the National Estate by the Australian Heritage Commission as a place of Australian environmental heritage significance.

This area is also listed in *A Directory of Important Wetlands in Australia* (Environment Australia 2001).

The site is registered to form part of the biodiversity hotspot – “South Australia’s South East & Victoria’s South West (#6)”. In 2003, the Australian Government’s Threatened Species Scientific Committee coordinated a process that identified 15 national biodiversity Hotspots.

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 Ramsar Management Plan for Piccaninnie Ponds Karst Wetlands was finalised in 2012.

d) Describe any other current management practices:
There is an existing management plan for the Piccaninnie Ponds Conservation Park (Department of Environment and Planning 1992).

28. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

The Piccaninnie Ponds Karst Wetlands are recognised and afforded particular protection under the Lower Limestone Coast Water Allocation Plan (WAP) (Draft in prep). This document guides the allocation of groundwater for extractive use (such as irrigation or plantation forestry). The document establishes a buffer zone around the site in which forest plantation is prohibited. The WAP and the provisions of the *Groundwater (Border) Agreement Act 1985* will jointly prevent the further allocation of groundwater for extractive uses in the management area in which the site sits. The WAP is expected to come into effect in 2013.

29. Current scientific research and facilities:

e.g., details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Limited research has been undertaken at the site. Currently there are a number of State Government Departments as well as universities undertaking research and assessment work. Included in these are investigations benchmarking flora and fauna of the site, long term vegetation monitoring, mammal and bird surveys associated with restoration projects, fish and larval monitoring in the fishway and a National Water Initiative project investigation trends in regional groundwater resources.

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.

Activities include:

Signage is currently being used in the Conservation Park with further interpretive signs currently being designed.

Media coverage – the site has received a large amount of media attention – in particular the ecological restoration of the Pick Swamp area has been reported in a large number of journals, interviews and newspaper articles.

School educational sessions – a range of educational and interpretive programs are undertaken at the sites. School groups from the region (both primary and secondary) visit the site to learn about the values of the area and are also involved in on-ground restoration activities such as planting trees, weed control and restoring native grasslands. School groups regularly utilize the camping facilities at the site and undertake snorkeling and diving activities.

The *Friends of Parks* are a group of community volunteers who regularly undertake on-ground management and restoration activities at the site. These activities range from conducting regular hydrological and ecological monitoring of the site to participating in restoration activities (weed control, tree planting etc).

The site is very popular with bird watchers, in particular the Birds South East Group regularly utilise the site and contribute monthly bird watching figures to the overall monitoring program for the site.

31. Current recreation and tourism:

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

Recreational use of the ecosystem is restricted to regulated snorkel and cave diving in Piccaninnie Ponds and bushwalking. Limited camping is available under permit and limited four wheel drive beach access is available for fishing.

32. Jurisdiction:

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

Territorial: The State Government of South Australia.

Functional: South Australian Department of Environment, Water and Natural Resources, South East Region

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

South Australian Department of Environment, Water and Natural Resources,
South East Region PO Box 1046
Mount Gambier,
South Australia, 5290
Phone: 08 87351177
Email: DENRRamsar@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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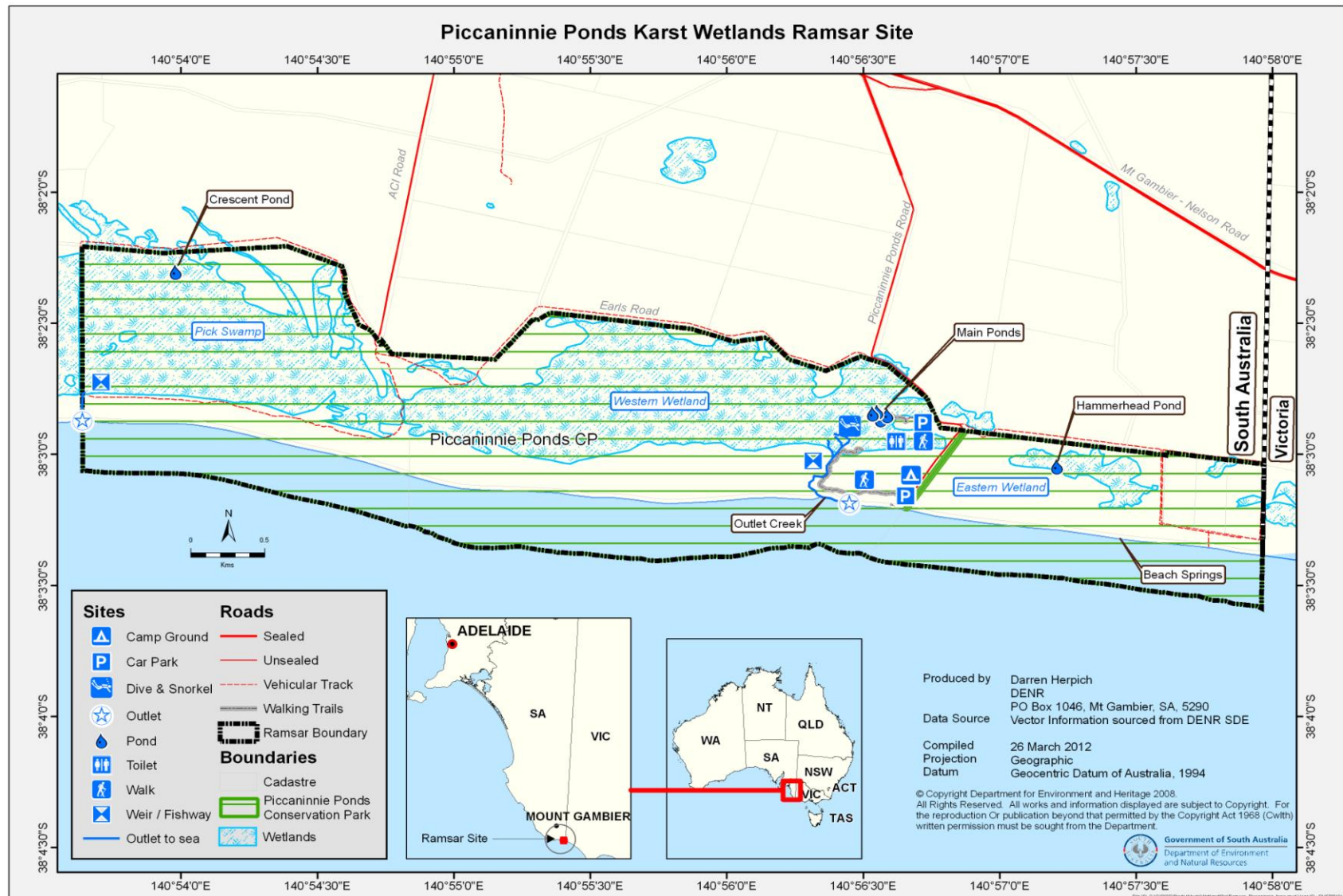
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Attachment 1: Map of location and boundary of Piccaninnie Ponds Karst Wetlands Ramsar Site



Attachment 2: Listed species and communities of conservation significance

Plant species conservation status based on Barker *et al.* (2005) and regionally threatened communities based on Croft *et al.* (1999). Fish species conservation status at the State level is based on Hammer *et al.* (2007). Invertebrate species conservation status based on Sands and New (2002).

R = rare, V = vulnerable, E = endangered, CE = critically endangered, P = protected, LC = Least concern.

National = *Environment Protection and Biodiversity Conservation Act 1999*, State = *National Parks and Wildlife Act 1972*.

Group	Common Name	Scientific Name	National	State
Waterbirds				
	Magpie Goose	<i>Anseranas semipalmata</i>		E
	Musk Duck	<i>Biziura lobata</i>		R
	Australasian Bittern	<i>Botaurus poiciloptilus</i>	E	V
	Latham's Snipe	<i>Gallinago hardwickii</i>		V
	Brolga	<i>Grus rubicunda</i>		V
	Lewin's Rail	<i>Lewinia pectoralis</i>		V
	Eastern Curlew	<i>Numenius madagascariensis</i>		V
	Little Tern	<i>Strenula albifrons</i>		R
	Hooded Plover	<i>Thinornis rubricollis</i>		V
Wetland associated non waterbirds				
	Azure Kingfisher	<i>Ceyx azureus</i>		E
	Sea Eagle	<i>Haliaeetus leucogaster</i>		E
	Orange-bellied Parrot	<i>Neophema chrysogaster</i>	CE	E
Fish				
	Short Finned Eel	<i>Anguilla australis australis</i>		R
	Climbing Galaxias	<i>Galaxias brevipinnis</i>		R
	Dwarf Galaxias	<i>Galaxiella pusilla</i>	V	V
	Spotted Galaxias	<i>Galaxias truttaceus</i>		E
	Pouched Lamprey	<i>Geotria australis</i>		V
	Southern Pygmy Perch	<i>Nannoperca australis</i>		E, P
	Yarra Pygmy Perch	<i>Nannoperca obscura</i>	V	E, P
	Variegated Pygmy Perch*	<i>Nannoperca variegata</i>	V	E, P
	Congolli	<i>Pseudaphritis urvillii</i>		R
Mammals				
	Swamp Antechinus	<i>Antechinus minimus</i>		E
Reptiles				
	Swamp skink	<i>Egernia coventryi</i>		E
Invertebrates – Lepidoptera with wetland plant species as host plants				
	Sedge-skipper	<i>Hesperilla chrysotricha</i>		LC
	Flame Sedge-	<i>Hesperilla idothea</i>		V

Group	Common Name	Scientific Name	National	State
	skippers			
	Bright-eyed Brown butterfly	<i>Heteronympha cordace wilsoni</i>		CE
Parastacidae				
	Glenelg Spiny Crayfish	<i>Eustacus bispinosus</i>	E	
Plants				
		<i>Baumea laxa</i>		R
	Grass Daisy	<i>Brachyscome graminea</i>		R
	Leafy Twig Rush	<i>Cladium procerum</i>		R
		<i>Carex gunniana</i>		R
	Heath Bent Grass	<i>Deyeuxia densa</i>		R
	Sun Dew	<i>Drosera whittakeri</i> ssp. <i>aberrans</i>		R
	Tall Sawsedge	<i>Gabnia clarkei</i>		R
	Mountain Gentain	<i>Gentianella gunniana</i>		V
		<i>Glycine latrobeana</i>		V
		<i>Haloragis brownii</i>		R
	Branching Rush	<i>Juncus prismatocarpus</i>		V
	Creeping Cotula	<i>Leptinella reptans</i> (syn. <i>Cotula reptans</i>)		R
		<i>Luzula flaccida</i>		V
	Bottlebrush Tea-tree	<i>Melaleuca squarrosa</i>		R
	Slender Mint	<i>Mentha diemenica</i>		R
	Scented Onion Orchid	<i>Microtis rara</i>		R
	Varied Milfoil	<i>Myriophyllum variifolium</i>		R
	Entire Marshwort	<i>Nymphoides gemmata</i>		V
	Scaly Poa	<i>Poa fax</i>		R
	Maroon Leek-orchid	<i>Prasophyllum frenchii</i>	E	E
	Swamp Greenhood	<i>Pterostylis tenuissima</i>	V	V
	River Buttercup	<i>Ranunculus inundatus</i>		R
	Scented Fan Flower	<i>Scaevola calendulacea</i>		V
Regionally Threatened Communities with South Australia				
	Swamp Gum	<i>Eucalyptus ovata</i> Woodland		E
	Silky Teatree	<i>Leptospermum lanigerum</i> Tall Closed Shrubland (Wet Shrubland)		E

* The variegated pygmy perch (*Nannoperca variegata*) does not appear to regularly occur at Piccaninnie Ponds Karst Wetlands; there is only one historic and unverified record of this species at the site.

Attachment 3: Waterbirds

Species listing: M-EPBC = Listed as migratory or marine under the EPBC Act; V-EPBC = Vulnerable under the EPBC Act; E-EPBC = Endangered under the EPBC Act; CE-EPBC = Critically Endangered under the EPBC Act; C= CAMBA; J = JAMBA; R = ROKAMBA, B = BONN Convention; CE-IUCN = listed as Critically Endangered by the IUCN; EN-IUCN = listed as Endangered by the IUCN; V-IUCN = listed as Vulnerable by the IUCN (2012).

Species records based on data supplied by Birds South East survey data 2007-2011, Biodiversity Database of South Australia up to 2006.

Common name	Scientific name	Listed
Australasian bittern	<i>Botaurus poiciloptilus</i>	EN-IUCN, E-EPBC
Australasian grebe	<i>Tachybaptus novaehollandiae</i>	
Australasian shoveler	<i>Anas rhynchos</i>	M-EPBC
Australian pelican	<i>Pelecanus conspicillatus</i>	M-EPBC
Australian reed warbler	<i>Acrocephalus australis</i>	B
Australian shelduck	<i>Tadorna tadornoides</i>	M-EPBC
Australian spotted crake	<i>Porzana fluminea</i>	
Australian white ibis	<i>Threskiornis molucca</i>	M-EPBC, J
Australian wood duck	<i>Chenonetta jubata</i>	M-EPBC
Azure kingfisher	<i>Ceyx azureus</i>	
Black swan	<i>Cygnus atratus</i>	M-EPBC
Black-fronted dotterel	<i>Euseiornis melanops</i>	
Black-tailed godwit	<i>Limosa limosa</i>	M-EPBC, C, J, R, B
Black-tailed native-hen	<i>Tribonyx ventralis</i>	
Black-winged stilt	<i>Himantopus himantopus</i>	M-EPBC
Blue-billed duck	<i>Oxyura australis</i>	M-EPBC
Brolga	<i>Grus rubicunda</i>	
Buff-banded rail	<i>Gallirallus philippensis</i>	
Caspian tern	<i>Hydroprogne caspia</i>	M-EPBC, C, J
Cattle egret	<i>Ardea ibis</i>	M-EPBC, C, J
Chestnut teal	<i>Anas castanea</i>	M-EPBC
Common greenshank	<i>Tringa nebularia</i>	M-EPBC, C, J, R, B
Crested tern	<i>Thalasseus bergii</i>	
Curlew sandpiper	<i>Calidris ferruginea</i>	M-EPBC, C, J, R, B
Double-banded plover	<i>Charadrius bicinctus</i>	M-EPBC, B
Dusky moorhen	<i>Gallinula tenebrosa</i>	
Eastern curlew	<i>Numenius madagascariensis</i>	M-EPBC, C, J, R, B
Eurasian coot	<i>Fulica atra</i>	
Glossy ibis	<i>Plegadis falcinellus</i>	M-EPBC, C, B
Great cormorant	<i>Phalacrocorax carbo</i>	
Great crested grebe	<i>Podiceps cristatus</i>	
Great egret	<i>Ardea alba</i>	M-EPBC, C, J
Grey plover	<i>Pluvialis squatarola</i>	M-EPBC, C, J, R, B

Common name	Scientific name	Listed
Grey teal	<i>Anas gracilis</i>	M-EPBC
Gull-billed tern	<i>Gelochelidon nilotica</i>	M-EPBC
Hardhead	<i>Aythya australis</i>	M-EPBC
Hoary headed grebe	<i>Poliocephalus poliocephalus</i>	
Hooded plover	<i>Thinornis rubricollis</i>	M-EPBC
Intermediate egret	<i>Ardea intermedia</i>	
Kelp gull	<i>Larus dominicanus</i>	
Latham's snipe	<i>Gallinago hardwickii</i>	M-EPBC, C, J, R, B
Lewin's rail	<i>Levinia pectoralis</i>	
Little black cormorant	<i>Phalacrocorax sulcirostris</i>	
Little egret	<i>Egretta garzetta</i>	M-EPBC
Little penguin	<i>Eudyptula minor</i>	M-EPBC
Little pied cormorant	<i>Microcarbo melanoleucos</i>	
Little tern	<i>Sternula albifrons</i>	M-EPBC, C, J, R, B
Magpie goose	<i>Anseranas semipalmata</i>	M-EPBC
Marsh sandpiper	<i>Tringa stagnatilis</i>	M-EPBC, C, J, R, B
Masked lapwing	<i>Vanellus miles</i>	M-EPBC
Musk duck	<i>Biziura lobata</i>	M-EPBC
Orange-bellied parrot	<i>Neophema chrysogaster</i>	CE-IUCN, CE-EPBC, M-EPBC
Pacific Black duck	<i>Anas superciliosa</i>	M-EPBC
Pacific gull	<i>Larus pacificus</i>	M-EPBC
Pied oystercatcher	<i>Haematopus longirostris</i>	
Pink-eared duck	<i>Malacorhynchus membranaceus</i>	M-EPBC
Purple swamphen	<i>Porphyrio porphyrio</i>	
Red-capped plover	<i>Charadrius ruficapillus</i>	M-EPBC
Red-kneed dotterel	<i>Erythronyx cinctus</i>	M-EPBC
Red-necked avocet	<i>Recurvirostra novaehollandiae</i>	M-EPBC
Red-necked stint	<i>Calidris ruficollis</i>	M-EPBC, C, J, R, B
Royal spoonbill	<i>Platalea regia</i>	
Ruddy turnstone	<i>Arenaria interpres</i>	M-EPBC, C, J, R, B
Sacred kingfisher	<i>Todiramphus sanctus</i>	
Sanderling	<i>Calidris alba</i>	M-EPBC, C, J, R, B
Sharp-tailed sandpiper	<i>Calidris acuminata</i>	M-EPBC, C, J, R, B
Short-tailed shearwater	<i>Ardenna tenuirostris</i>	M-EPBC, J, R
Silver gull	<i>Chroicocephalus novaehollandiae</i>	M-EPBC
Sooty oystercatcher	<i>Haematopus fuliginosus</i>	
Straw-necked ibis	<i>Threskiornis spinicollis</i>	
Swamp harrier	<i>Circus approximans</i>	M-EPBC
Whimbrel	<i>Numenius phaeopus</i>	M-EPBC, C, J, R, B
Whiskered tern	<i>Chlidonias hybridus</i>	M-EPBC

Common name	Scientific name	Listed
White-bellied sea eagle	<i>Haliaeetus leucogaster</i>	M-EPBC, C
White-faced heron	<i>Egretta novaehollandiae</i>	
White-necked heron	<i>Ardea pacifica</i>	
White-winged black tern	<i>Chlidonias leucopterus</i>	M-EPBC, C, J, R
Wood sandpiper	<i>Tringa glareola</i>	M-EPBC, C, J, R, B
Yellow-billed spoonbill	<i>Platalea flavipes</i>	