Ramsar Information Sheet

Published on 13 February 2025
Update version, previously published on : 1 January 2011

Australia

Pulu Keeling National Park

Designation date	17 March 1996
Site number	797
Coordinates	11°49'54"S 96°49'18"E
Area	2 603,00 ha

Color codes

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

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

1 - Summary

Summary

The Pulu Keeling National Park is a coral atoll that forms part of the Cocos (Keeling) Islands, located approximately 2,900 kilometres (km) north-west of Perth. It comprises approximately 221 hectares (ha) of land, including the enclosed central lagoon, and approximately 2,380 ha of surrounding coral reef and ocean. At the time of designation, the centre of the atoll contained a single, tidal lagoon with a narrow connection to the Indian Ocean on the eastern side. Natural processes have since closed this connection.

The Site is one of the few remaining relatively pristine tropical islands in the Indian Ocean region. It contains rare ecosystems and is the only largely undisturbed island in the Cocos (Keeling) Islands group that retains its original ecosystems and their species. Because of its isolation, evolution and relatively minimal human impacts, the Site is significant for studies of the distribution of oceanic island species and atoll formation.

The Park meets criteria 1, 2, 3, 4, 5, and 6 to be enlisted as a Wetland of International Importance:

1: The Island has never been permanently inhabited and this, coupled with its remote location has resulted in wetlands in near-natural condition.

2: The Site supports nationally and/or internationally listed threatened species, including Cocos buff-banded rail, green turtle, and hawksbill turtle.

3: The Site supports flora and fauna that no longer occurs on the southern atoll islands, and is important in maintaining biodiversity within the bioregion.

4: The Site supports 13 species of waterbirds listed as migratory under international treaties and 2 species of migratory turtles (green and hawksbill). It supports breeding of 15 species of waterbird, including the red-footed booby, lesser frigatebird, greater frigatebird, and common noddy.

5: The Site regularly supports more than 30,000 pairs of red-footed booby; up to 15,000 common noddy and 3,000 greater and lesser frigatebirds.

6: The Site regularly supports 6% of the global population of red-footed booby and 3% of the global population of lesser frigatebirds. The site is likely to support almost 100% of the global population of the Cocos buff-banded rail.

The Site may also meet criterion 7. The unique fish communities at the Cocos (Keeling) Islands may have the most recorded marine fish hybrids of any location in the world (Hobbs et al. 2009). The Site will be formally assessed against this criterion when more information is available.

2 - Data & location

2.1 - Formal data

2.1.1 - Name and address of the compiler of this RIS

Responsible compiler

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

National Ramsar Administrative Authority

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

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

From year	2011
To year	2021

2.1.3 - Name of the Ramsar Site

Official name (in English, French or Spanish)	Pulu Keeling National Park
Unofficial name (optional)	North Keeling Island

2.1.4 - Changes to the boundaries and area of the Site since its designation or earlier update

(Update) A. Changes to Site boundary	Yes ○ No ◉
(Update) B. Changes to Site area	No change to area
(Update) For secretariat only: This update is an extension	☐

2.1.5 - Changes to the ecological character of the Site

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

(Update) Optional text box to provide further information

The closure of the lagoon entrance in 2005 (due to the natural forces of deposition) has led to significant changes within the lagoon habitat. Whilst the water level of the lagoon varies, depending on rainfall and evaporation, less seawater enters the lagoon and levels are less affected by tidal fluctuation. Parks have observed a small area where seawater is entering the lagoon from underground at high tide, in the southern end of the lagoon. This is likely to only affect the salinity levels at the Site and not influence waters in the northern part of the lagoon (T. Flores pers.com.).

Without regular flushing of seawater, the lagoon may become further deoxygenated and brackish over time.

A positive impact of the lagoon closure is the colonisation of the lagoon entrance by plants and trees that provide additional habitat for breeding seabirds. Masked boobies have been observed nesting in this area and inside the lagoon where it once was sand inundated by seawater at high tide, since the closure of the lagoon (Hobbs 2009, T Flores pers.com.).

The Site has been subject to a changing climate. Australia has warmed by an average of 1.4°C (higher than the global average of 1°C) since national records began in 1910, leading to an increased frequency of extreme heat events. Further increases in temperature are projected, with most extremely hot days and fewer extremely cool days under all emissions scenarios (BoM and CSIRO 2020). These conditions will affect the critical components, processes, and services of the Site and will test the site's resilience.

Climate projections and the information to guide wetland management under a changing climate is continually evolving. Relevant sections of the RIS will be reviewed and updated as new information becomes available.

2.2 - Site location

2.2.1 - Defining the Site boundaries

b) Digital map/image
<1 file(s) uploaded>

Former maps	0

Boundaries description

The boundary of the Site is the same as the Pulu Keeling National Park as established by Proclamation made on 12 December 1995 and published in the Commonwealth of Australia Gazette Number GN 50 of 20 December 1995. A copy of the proclamation is included under Section 6.1.2, under the file name, " AU797_lit220625__park_boundary.pdf".

The centre of the Site is at Latitude: 11°49' S Longitude: 96° 49' E

2.2.2 - General location

a) In which large administrative region does the site lie? Pulu Keeling is part of the Cocos (Keeling) Islands, an external territory of Australia.

b) What is the nearest town or population centre? Pulu Keeling is in the Indian Ocean, approximately 2,768 km northwest of Perth, WA (population 1.985 million in 2016).

2.2.3 - For wetlands on national boundaries only

a) Does the wetland extend onto the territory of one or more other countries? Yes ○ No ◉

b) Is the site adjacent to another designated Ramsar Site on the territory of another Contracting Party? Yes ○ No ◉

2.2.4 - Area of the Site

Official area, in hectares (ha): 2603

Area, in hectares (ha) as calculated from GIS boundaries: 2601.912

2.2.5 - Biogeography

Biogeographic regions

Regionalisation scheme(s)	Biogeographic region
Marine Ecoregions of the World (MEOW)	Java transitional, Cocos-Keeling/ Christmas Island
Other scheme (provide name below)	Cocos (Keeling) Island Province

Other biogeographic regionalisation scheme

Commonwealth of Australia (2006). Integrated Marine and Coastal Regionalisation of Australia (IMCRA) Version 4 – Cocos (Keeling) Island Province (https://parksaustralia.gov.au/marine/management/resources/scientific-publications/guide-integrated- marine-and-coastal-regionalisation-australia-version-40-june-2006-imcra/)

3 - Why is the Site important?

3.1 - Ramsar Criteria and their justification

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

Other reasons	The 27 islands that comprise the Cocos (Keeling) Islands represent the only land within the Cocos (Keeling) Island Province bioregion. As the only land masses, Pulu Keeling and the southern atolls include all of wetland types found within the bioregion. As Pulu Keeling (the northern island) has never been permanently inhabited, the wetlands within the Site are in near-natural condition, and therefore represent the best examples within the bioregion. The southern atolls are inhabited and have been impacted by various human activities (Woodroffe and Berry 1994). Pulu Keeling contains 4 wetland types: • Marine subtidal aquatic beds (Wetland type B) – this historically included areas of seagrass within the lagoon, that may no longer be present. • Coral reefs (type C) – there are extensive coral reefs surrounding the atoll. • Rocky shores (type D) – the Site includes areas of rocky outcrops along the western and southern shores • Sand, shingle, or pebble shores (type E) – the atoll has an area of sandy beach on the north coast; and more extensive areas of pebble beaches around the remainder of the island It is unclear whether the lagoon at Pulu Keeling should be classified as wetland type B (due to the historic presence of seagrass), or if it should be classified as wetland type J (costal brackish/ saline lagoons). For this RIS update, the lagoon has been classified as type B, as per previous RIS updates. However, this classification should be reviewed when further information is available about the status of the lagoon in terms of the presence/ absence of seagrass, and whether there is any (continuous or intermittent) connection to the sea following the lagoon entrance closure in 2005. Studies being undertaken in 2022 should inform this.

☑ Criterion 2 : Rare species and threatened ecological communities

Optional text box to provide further information

The Site provides habitat for 4 fauna species that are listed as threatened either nationally under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), or internationally under the IUCN Red List:

• Cocos buff-banded rail (Gallirallus philippensis andrewsi) (EPBC – endangered)
• green turtle (Chelonia mydas) (EPBC – vulnerable, IUCN - endangered)
• hawksbill turtle (Eretmochelys imbricata) (EPBC – vulnerable, IUCN – critically endangered)
• robber crab (Birgus latro) (IUCN - vulnerable)

The Cocos buff-banded rail is a subspecies of the buff-banded rail (Gallirallus philippensis). The subspecies is endemic to the Cocos (Keeling) Islands. It was once widespread across the southern atoll, but has become limited to a single population within the Site. Surveys from 1999 to 2005 and 2017 of the Cocos buff-banded rail indicate mean densities of 4-9 birds/ ha, which equates to a population of approximately 422 to 711 birds (Director of National Parks 2020, Reid and Hill 2005). A second population of Cocos buff-banded rails was reintroduced in 2013 on Horsburgh Island in the southern part of the Cocos Keeling Island group (Department of the Environment 2022).

In Australia, nesting green turtles are distributed across nine genetically distinct stocks including the recently identified Cocos Keeling stock (Commonwealth 2017). The green turtle has been frequently observed nesting on the Pulu Keeling Island (Director of National Parks 2015).

Hawksbill turtles forage on the reefs of Cocos (Keeling), Christmas, and Norfolk Islands (Commonwealth 2017). There was an extensive harvest of hawksbill turtles from Cocos (Keeling) Islands in the 1800s and early 1900s, which likely depleted the population, but it appears to be recovering (Commonwealth 2017). There is no quantitative information on numbers of hawksbill turtles within the Site (Hale 2010).

A small number of loggerhead turtles had been described as foraging at Cocos (Keeling) islands that may be part of the Northern Indian Ocean stock. However, a long-term study of turtles foraging at the Cocos (Keeling) islands did not record loggerhead turtles foraging (Commonwealth 2017). It is unlikely that the Site forms important feeding habitat for loggerhead turtle.

☑ Criterion 3 : Biological diversity

Justification

Pulu Keeling supports flora and fauna that no longer occurs on the southern atoll islands. As such, it is important for maintaining biodiversity within the bioregion. It provides a source of seed material and a gene pool for re-colonisation of the southern atoll.

Sixty-one (61) plant species have been recorded on Cocos (Keeling) Islands. Forty (40) plant species have been recorded in the Site, with some species not found on the southern atoll islands.

The Site supports at least 26 species of crabs, including several species of hermit crabs (terrestrial and aquatic), red spider crabs (Schizophrys aspera) and swimmer crabs (Thalamitoides quadridens). Of note is the presence of the coconut or robber crab (Birgus latro) which was formerly abundant on the southern atoll, but now rare or absent (Bunce 1988). The Site supports a small number of red crabs (Gecarcoidea natalis), the only known population of this species outside Christmas Island (Director of National Parks 2004).

Approximately 60 species of birds recorded from the Cocos (Keeling) Islands, 24 of which have been seen on Pulu Keeling Island in the last 30 years. Sixteen (16) species breed on the island (Director of National Parks 2015). The island is the only seabird breeding colony within a radius of 900 km, providing key habitat within the central-eastern Indian Ocean. Birds remain in large numbers on Pulu Keeling Island due to its isolation, the difficulty of human access to the island, the absence of any feral predators and the availability of forest nesting habitat (Stokes 1994).

The Site supports 3 endemic species:
• Cocos buff-banded rail (Gallirallus philippensis andrewsi);
• Cocos sub-species of pandanus (Pandanus tectorius cocosensis); and
• angelfish (Centropyge joculator), which is only recorded from Christmas and the Cocos (Keeling) Islands (Woodroffe and Berry 1994).

About 550 species of fish have been recorded in the seas of the Cocos (Keeling) Islands (Allen and Smith-Vanis 1994). Compared with other oceanic atolls, the islands' fish fauna appears impoverished (Allen 1989). However, recent genetic research has shown some species to be hybridising. This is believed to be the result of the Cocos (Keeling) Islands' location at the confluence of the western Pacific and eastern Indian Ocean biogeographic provinces (Choat 2003, pers. comm.). Scientific surveys by James Cook University have identified a high degree of fish hybridisation around the Cocos (Keeling) Islands, which could ultimately result in the evolution of new species (Hobbs et al. 2009, Director of National Parks 2015).

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

Optional text box to provide further information

The Site provides habitat for migratory bird and turtle species. It supports seabird breeding and turtle nesting.

Up to 15 bird species breed at the Site, including the red-footed booby (Sula sula), lesser frigatebird (Fregata ariel), great frigatebird (Fregata minor) and common noddy (Anous stolidus). These species breed in significant numbers within the Site (Director of National Parks 2015).

Thirteen (13) bird species recorded on the island are listed as migratory under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), Convention on Migratory Species, Japan-Australia Migratory Birds Agreement (JAMBA), China-Australia Migratory Birds Agreement (CAMBA), and/ or Republic of Korea-Australia Migratory Birds Agreement (ROKAMBA).

Two (2) species of turtle, the green turtle (Chelonia mydas) and hawksbill turtle (Eretmochelys imbricata), occur within the Site. Nesting green turtles are frequently observed on Pulu Keeling Island, and form a globally unique genetic stock (Whiting 2006, Whiting et al 2014). A large proportion of green turtles remain resident (juvenile and adult), foraging around the southern atoll (Commonwealth 2017). A small proportion of green turtles foraging at Cocos Keeling may be from the North West Shelf genetic stock (Whiting et al 2014 cited in Commonwealth 2017)

Although hawksbill turtles are seen and are likely to reside around the island, nesting has not been recorded (Flores 2022 pers. comm.). Other turtle species (including olive ridley and loggerheads) have been recorded either within the marine waters of the National Park, or on the southern atoll, but have not been recorded within the Site (Flores 2022 pers. comm).

☑ Criterion 5 : >20,000 waterbirds

Overall waterbird numbers	60 000
Start year	1993
End year	2006
Source of data:	Baker and Cunningham 2007
Optional text box to provide further information	A mean population estimate of 30 000 breeding pairs (7700 standard deviation) was made for the years 1993 to 2006 (Baker and Cunningham 2007). This is considered to be conservative as it does not take into account approximately 16 hectares of low quality habitat within the Ramsar site. (https://www.dcceew.gov.au/sites/default/files/documents/46-ecd.pdf)

☑ Criterion 6 : >1% waterbird population

Optional text box to provide further information

IMPORTANT NOTE FROM THE SECRETARIAT OF THE CONVENTION ON WETLANDS:
3 species of birds are marked for Criterion 6 in Section 3.3. The occurrence (%) value has been calculated using 1% thresholds of other sources, and not from Waterbird Population Estimates (WPE) of Wetland International. Out of the 3, Gallirallus philippensis andrewsi and Sula sula are not listed in the Waterbirds Population Portal of Wetland International. Although usage of alternative sources for Criterion 6 was approved at COP14 (Resolution XIV.18), the guidance to use such sources is under preparation by the Scientific Technical and Review Panel (STRP) of the Convention. Once the guidance on the usage of alternative sources has been prepared, the application of Criterion 6 may change to some extent in the next update for this Site.

OPTIONAL INFORMATION FROM THE CONTRACTING PARTY:
Pulu Keeling Island is identified as an important bird area (BirdLife International 2022). It supports more than 1% of the world population of red-footed booby, lesser frigatebird and brown noddy.

The Site regularly supports 30,000 breeding pairs of red-footed booby (Sula sula) (6% of the global population; and 3,000 breeding pairs of lesser frigatebirds (Fregata ariel) (3% of the global population).

This is possibly the largest colony of red-footed booby in the world and the second largest population of lesser frigatebird in Australian territory and probably in the Indian Ocean (BirdLife International 2022).

Except for one small population that was reintroduced on Horsburgh Island in 2013, Pulu Keeling is the only known population of the Cocos buff-banded rail (Gallirallus philippensis andrewsi). As such, the Site is likely to support close to 100% of the population of this species.

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

Phylum	Scientific name	Criterion 2	Criterion 3	Criterion 4	IUCN Red List	CITES Appendix I	Other status	Justification
Plantae								
TRACHEOPHYTA / LILIOPSIDA	*Pandanus tectorius*	☐	☑	☐	LC	☐		The subspecies Pandanus tectorius cocosensis is endemic to Cocos (Keeling) Islands and contributes to the biodiversity of the site.

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

Phylum	Scientific name	Species qualifies under criterion				Species contributes under criterion				Pop. Size	Period of pop. Est.	% occurrence 1)	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
		2	4	6	9	3	5	7	8								
Others																	
CHORDATA / REPTILIA	*Chelonia mydas*	☑	☑	☐	☐	☐	☐	☐	☐				EN	☑	☑	Nationally listed (EPBC Act) – vulnerable, migratory.	Nationally and internationally listed threatened species. Uses the Site for foraging and regularly nests in the sand beaches.
CHORDATA / REPTILIA	*Eretmochelys imbricata*	☑	☑	☐	☐	☐	☐	☐	☐				CR	☑	☑	Nationally listed (EPBC Act) – vulnerable, migratory.	Nationally and internationally listed threatened species. Uses the Site for foraging.
Fish, Mollusc and Crustacea																	
CHORDATA / ACTINOPTERYGII	*Acanthurus mata*	☐	☐	☐	☐	☑	☐	☐	☐				LC	☐	☐		Within the Cocos (Keeling) islands, this species only occurs at Pulu Keeling. This species contributes to the biodiversity of the Site. This species may qualify under criterion 7.

Phylum	Scientific name	Species qualifies under criterion				Species contributes under criterion				Pop. Size	Period of pop. Est.	% occurrence 1)	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
		2	4	6	9	3	5	7	8								
ARTHROPODA / MALACOSTRACA	*Birgus latro*	☑	☐	☐	☐	☑	☐	☐	☐				VU	☐	☐		Internationally listed threatened species. This species contributes to the biodiversity of the Site.
CHORDATA / ACTINOPTERYGII	*Caracanthus maculatus*	☐	☐	☐	☐	☑	☐	☐	☐				LC	☐	☐		Within the Cocos (Keeling) islands, this species only occurs at Pulu Keeling. This species contributes to the biodiversity of the Site. This species may qualify under criterion 7.
CHORDATA / ACTINOPTERYGII	*Centropyge joculator*	☐	☐	☐	☐	☑	☐	☐	☐				LC	☐	☐	Endemic	This species is endemic to Christmas and Cocos (Keeling) islands. It contributes to the biodiversity of the Site.
CHORDATA / ACTINOPTERYGII	*Cephalopholis urodeta*	☐	☐	☐	☐	☑	☐	☐	☐				LC	☐	☐		Within the Cocos (Keeling) islands, this species only occurs at Pulu Keeling. This species contributes to the biodiversity of the Site. This species may qualify under criterion 7.
CHORDATA / ACTINOPTERYGII	*Cirripectes stigmaticus*	☐	☐	☐	☐	☑	☐	☐	☐				LC	☐	☐		Within the Cocos (Keeling) islands, this species only occurs at Pulu Keeling. This species contributes to the biodiversity of the Site. This species may qualify under criterion 7.
CHORDATA / ACTINOPTERYGII	*Forcipiger longirostris*	☐	☐	☐	☐	☑	☐	☐	☐				LC	☐	☐		Within the Cocos (Keeling) islands, this species only occurs at Pulu Keeling. This species contributes to the biodiversity of the Site. This species may qualify under criterion 7.
ARTHROPODA / MALACOSTRACA	*Gecarcoidea natalis*	☐	☐	☐	☐	☑	☐	☐	☐					☐	☐		Pulu Keeling is the only known population of this species outside Christmas Island. This species contributes to the biodiversity of the Site.
CHORDATA / ACTINOPTERYGII	*Lutjanus kasmira*	☐	☐	☐	☐	☑	☐	☐	☐				LC	☐	☐		Within the Cocos (Keeling) islands, this species only occurs at Pulu Keeling. This species contributes to the biodiversity of the Site. This species may qualify under criterion 7.
CHORDATA / ACTINOPTERYGII	*Ptereleotris zebra*	☐	☐	☐	☐	☑	☐	☐	☐				LC	☐	☐		Within the Cocos (Keeling) islands, this species only occurs at Pulu Keeling. This species contributes to the biodiversity of the Site. This species may qualify under criterion 7.
ARTHROPODA / MALACOSTRACA	*Schizophrys aspera*	☐	☐	☐	☐	☑	☐	☐	☐					☐	☐		This species contributes to the biodiversity of the Site.
CHORDATA / ACTINOPTERYGII	*Stegastes insularis*	☐	☐	☐	☐	☑	☐	☐	☐					☐	☐		Within the Cocos (Keeling) islands, this species only occurs at Pulu Keeling. This species contributes to the biodiversity of the site. This species may qualify under criterion 7.
ARTHROPODA / MALACOSTRACA	*Thalamitoides quadridens*	☐	☐	☐	☐	☑	☐	☐	☐					☐	☐		This species contributes to the biodiversity of the Site.
Birds																	
CHORDATA / AVES	*Anous stolidus*	☐	☑	☐	☐	☑	☐	☐	☐	15000	1984		LC	☐	☐		In 1984, Stokes et al reported more than 15,000 individuals at the Site. Stokes (1982) recorded between 500 to 750 breeding pairs at the Site. The breeding population is estimated at 625 pairs.
CHORDATA / AVES	*Egretta sacra*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds at the Site and contributes to the biodiversity of the Site.
CHORDATA / AVES	*Fregata ariel*	☐	☑	☑	☐	☑	☑	☐	☐	6000	2004	3	LC	☐	☐		This species breeds in large numbers at the Site. The breeding population is estimated at 3 000 pairs (6 000 individuals). The global population estimate for lesser frigatebird is 200 000 (Birdlife International 2009). Therefore the site supports 3% of the global population.

Phylum	Scientific name	Species qualifies under criterion				Species contributes under criterion				Pop. Size	Period of pop. Est.	% occurrence 1)	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
		2	4	6	9	3	5	7	8								
CHORDATA / AVES	*Fregata minor*	☐	☑	☐	☐	☑	☐	☐	☐	2000	2019		LC	☐	☐		This species breeds in large numbers at the Site. A 2019 survey estimated between 2000 and 3000 individuals at the Site in November and December (Clarke et al 2021).
CHORDATA / AVES	*Gallirallus philippensis andrewsi*	☑	☐	☑	☐	☑	☐	☐	☐	1000	2013	99		☐	☐	Nationally listed (EPBC Act) - endangered. Endemic.	This subspecies is endemic to Pulu Keeling and the Ramsar Site has the only known population (Director of National Parks 2015), with the exception of a small, reintroduced population on Horsburgh Island. The Site provides critical habitat for the survival of this species.
CHORDATA / AVES	*Gygis alba*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds at the Site and contributes to the biodiversity of the Site.
CHORDATA / AVES	*Nycticorax caledonicus*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds at the Site and contributes to the biodiversity of the Site.
CHORDATA / AVES	*Onychoprion fuscatus*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds at the Site and contributes to the biodiversity of the Site.
CHORDATA / AVES	*Phaethon lepturus fulvus*	☐	☑	☐	☐	☑	☐	☐	☐					☐	☐		This species breeds at the Site and contributes to the biodiversity of the Site.
CHORDATA / AVES	*Phaethon rubricauda*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		This species breeds at the Site and contributes to the biodiversity of the Site.
CHORDATA / AVES	*Puffinus pacificus*	☐	☑	☐	☐	☑	☐	☐	☐					☐	☐	Nationally listed (EPBC Act) - migratory (JAMBA)	This species breeds at the Site and contributes to the biodiversity of the Site.
CHORDATA / AVES	*Sula dactylatra*	☐	☑	☐	☐	☑	☐	☐	☐	10000			LC	☐	☐	Nationally listed (EPBC Act) - migratory (JAMBA, ROKAMBA)	This species breeds at the Site. The breeding population is estimated as less than 10,000.
CHORDATA / AVES	*Sula leucogaster*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐	Nationally listed (EPBC Act) - migratory (CAMBA, JAMBA, ROKAMBA)	This species breeds at the Site and contributes to the biodiversity of the Site.
CHORDATA / AVES	*Sula sula*	☐	☑	☑	☐	☐	☑	☐	☐	60000	2004	6	LC	☐	☐		The Site supports one of the world's largest populations of red-footed booby. This species breeds at the Site. The breeding population is estimated at 30 000 pairs. The global population estimate for red-footed booby is 1 000 000 (Birdlife International 2009). Therefore the Site supports 6% of the global population.

1) Percentage of the total biogeographic population at the site

The Cocos buff-banded rail (Gallirallus philippensis andrewsi) uses a variety of habitats, including foraging along the lagoon on Pulu Keeling; nesting in birdlime tree (Pisonia grandis) debris, grass tussocks or similar ground layer vegetation; the forks of birdlime trees; and the bases of coconut palms. Up to 40 birds at a time have been seen foraging on the lagoon shore on Pulu Keeling, suggesting that this is preferred feeding habitat (Reid & Hill 2005 cited in TSSC 2016).
There is some evidence to suggest that the Cocos buff-banded rail breeds year round on the island; with nests recorded in January, May and August and mating observed in May and November (Reid 2000). Nests have been observed in litter in the pisonia forest, debris, grass tussocks or similar ground layer vegetation, the forks of pisonia trees, and the bases of coconut palms (Garnett and Crowley 2000 cited in Hale 2010).

Comprehensive population surveys in 1985 estimated current breeding populations of red-footed booby (Sula sula) at 30,000 pairs, making it one of the largest colonies of red-footed boobies in the world (Director of National Parks 2015). Lesser and great frigatebirds (Fregata ariel and F. minor) also occur on the island in large numbers. Data from surveys (in 1987) indicate a population size of possibly 3,000 breeding pairs of lesser frigatebirds and a smaller number of great frigatebirds making it the second largest population of lesser frigatebirds in Australia and the Indian Ocean (Director of National Parks 2015).

The Round Island petrel (Pterodroma arminjoniana) was recorded on Pulu Keeling in 1986 by Stokes and Goh (1987). There have been no sightings in Pulu Keeling National Park since the 1986 record and there is insufficient evidence to show that the Round Island petrel is a frequent visitor to or breeding on the island. Extensive searches undertaken in the years following its initial discovery failed to detect any presence of the petrel (Director of National Parks 2015, Clarke et al 2021).

Garnett et al. (2011) postulate the bird found on Pulu Keeling Island and identified as P. arminjoniana by Stokes and Goh (1987) could have been P. heraldica. Until this is confirmed the Round Island petrel should be considered a vagrant or irregular visitor to the site (TSSC 2015).

Some of the information used in the table above for waterbird populations at the site has been taken from Birdlife Data Zone record for Pulu Keeling. See: http://datazone.birdlife.org/site/factsheet/north-keeling-island-iba-cocos-(keeling)-islands-(to-aus tralia)/details

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

<no data available>

Optional text box to provide further information

Whilst there are no nationally listed ecological communities at the site, the following ecological communities support breeding colonies of seabirds and therefore contribute to the ecological character of the site:

• pisonia (Pisonia grandis) and coconut (Cocos nucifera) forest - much of the island is dominated by the pisonia forest, mixed in many areas with coconut, with a few stands of pure coconut. Pisonia is particularly important for red-footed booby nesting (Flores 2022 pers.comm.).

• octopus bush (Argusia argentea) shrublands - octopus bush is common on the eastern shore, dominating the crest of the shingle or rubble ridges. In places it forms monospecific stands while north of the lagoon entrance it occurs with cabbage bush (Scaevola taccada).

• tea shrub (Pemphis acidula) thickets - around the margins of the lagoon, tea shrub forms dense thickets, replaced in some places by ironwood (Cordia subcordata). These thickets provide critical nesting habitat for lesser frigatebirds (Flores 2022 pers.comm.).

• open grassy areas - often have a covering of sea purslane (Sesuvium portulacastrum), such as the clearing to the north-west of the lagoon.

The richest floristic units, apart from the herblands, are the forest types found near the lagoon entrance and on the north-west side of the island. (Director of National Parks 2015).

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

4.1 - Ecological character

The ecological character description for the Pulu Keeling Ramsar site identifies the following critical components and processes:

• seagrass – there is no published information on the macroalgal communities or the seagrass within the lagoon, except that it was comprised of turtle grass (Thalassia hemprichii). The extent, cover, and distribution
of seagrass within the Ramsar site are knowledge gaps; although it is believed that seagrass was confined to the lagoon (Bunce 1988). The natural closure of the entrance to the lagoon in 2005 has significantly impacted on seagrass in the lagoon (Director of National Parks 2015).

• marine invertebrates – diversity and abundance of marine invertebrate communities is a knowledge gap within the Ramsar site. 99 species of coral are known to occur within the Cocos (Keeling) Islands, but it is unknown how many of these occur within the Ramsar site. One hundred and seventeen (117) species of mollusc, 11 echinoderm species, 2 barnacles and 26 decapod species have been recorded from within the Ramsar site. Four (4) of the decapod species do not occur at the southern atoll.

• fish – results of a 2008 survey recorded 193 fish species from 40 families within the Ramsar site (Hobbs 2009). The number of species present is likely to be higher, as this survey did not include cryptic species. Most of the species recorded are either cosmopolitan or common within the Indo-Pacific region (Allen and Smith-Vanz 1994). However, some Pacific and Indian Ocean species reach the edge of their distribution at Cocos (Keeling Islands). There is evidence of hybridisation of some species within the bioregion, which contributes to the uniqueness of the community (Hobbs and Salmond 2008).

The Director of National Parks (2004) reported substantial populations of butterfly fish (Chaetodontidae) and sharks within the Ramsar site. Shark species included black-tip (Carcharhinus loxodon), white-tip (Triaenodon obesus), and grey reef (Carcharhinus amblyrhynchos).

• turtles – two (2) species of marine turtle are known to occur within the Ramsar site: green turtle and hawksbill turtle. The site is considered an important rookery for the green turtle (Director of National Parks 2004). Moderate numbers of green turtle nest on the sandy northern beaches of the site (Whiting 2006).

• waterbirds – the site supports large numbers of waterbirds, both resident and migratory. 24 species of waterbird have been recorded from the Ramsar site, including 15 species listed under international migratory agreements and 2 threatened species.

The critical benefits and services of the site are:

• near natural wetland types – the site is regarded as one of the most pristine coal atolls in the Indian Ocean (Director of National Parks 2004) and supports largely unmodified wetland types.

• threatened species – the site provides habitat for threatened species. In the case of the Cocos buff-banded rail, the Ramsar site is critical to the survival of this species, as the only remaining breeding habitat.

• biodiversity – the site supports species that are no longer present in the southern atoll, making it significant in the Cocos Island bioregion. The site supports a diversity of fish and marine invertebrates, many at the edge of their distribution.

• waterbird breeding habitat – the site supports large colonies of nesting seabirds, including red-footed booby, lesser frigate bird and brown noddy. It is potentially the largest colony of breeding red-footed booby in the world.

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

Marine or coastal wetlands

Wetland types (code and name)	Local name	Ranking of extent (1: greatest - 4: least)	Area (ha) of wetland type	Justification of Criterion 1
B: Marine subtidal aquatic beds (Underwater vegetation)				
C: Coral reefs		2		Representative
D: Rocky marine shores		4		Representative
E: Sand, shingle or pebble shores		3		Representative
J: Coastal brackish / saline lagoons		1		

(ECD) Habitat connectivity	The entrance to the lagoon closed in 2005 (due to depositional processes), removing connectivity with the reef and associated marine environment. This area has since been colonised by terrestrial plant species and now provides nesting habitat for birds.

4.3 - Biological components

4.3.1 - Plant species

Other noteworthy plant species

Phylum	Scientific name	Position in range / endemism / other
TRACHEOPHYTA/MAGNOLIOPSIDA	*Allophylus cobbe*	Contributes to the biodiversity of the site and provides habitat for other species.
TRACHEOPHYTA/MAGNOLIOPSIDA	*Canavalia cathartica*	Contributes to the biodiversity of the site and provides habitat for other species.
TRACHEOPHYTA/LILIOPSIDA	*Cocos nucifera*	Part of the dominant terrestrial vegetation on the island. This species provides waterbird nesting and roosting habitat.
TRACHEOPHYTA/MAGNOLIOPSIDA	*Erythrina variegata*	Contributes to the biodiversity of the site and provides habitat for other species.
TRACHEOPHYTA/MAGNOLIOPSIDA	*Gynandropsis gynandra*	Contributes to the biodiversity of the site and provides habitat for other species.
TRACHEOPHYTA/MAGNOLIOPSIDA	*Heliotropium foertherianum*	Part of the dominant terrestrial vegetation on the island. This species provides waterbird nesting and roosting habitat.
TRACHEOPHYTA/MAGNOLIOPSIDA	*Laportea aestuans*	Contributes to the biodiversity of the site and provides habitat for other species.
TRACHEOPHYTA/LILIOPSIDA	*Paspalum vaginatum*	Contributes to the biodiversity of the site and provides habitat for other species.
TRACHEOPHYTA/MAGNOLIOPSIDA	*Pemphis acidula*	Part of the dominant terrestrial vegetation, this species provides waterbird nesting and roosting habitat
TRACHEOPHYTA/MAGNOLIOPSIDA	*Pisonia grandis*	Part of the dominant terrestrial vegetation, this species provides critical waterbird nesting and roosting habitat.

Invasive alien plant species

Phylum	Scientific name	Impacts	Changes at RIS update
TRACHEOPHYTA/MAGNOLIOPSIDA	*Acalypha lanceolata*	Potential	unknown
TRACHEOPHYTA/MAGNOLIOPSIDA	*Carica papaya*	Potential	unknown
TRACHEOPHYTA/MAGNOLIOPSIDA	*Physalis lagascae*	Potential	unknown
TRACHEOPHYTA/MAGNOLIOPSIDA	*Portulaca oleracea*	Potential	unknown
TRACHEOPHYTA/MAGNOLIOPSIDA	*Rivina humilis*	Actual (minor impacts)	unknown
TRACHEOPHYTA/MAGNOLIOPSIDA	*Triphasia trifolia*	Potential	unknown

Optional text box to provide further information

Noteworthy flora:
Thirty-three (33) species of native vascular plants have been recorded within the Ramsar site. Pulu Keeling Island has several species not found on the southern atoll, including:
• African cabbage (Cleome gynandra)
• maunaloa (Canavalia cathartica)
• Indian coral tree (Erythrina variegata)
• saltwater couch (Paspalum vaginatum)
• tit-berry (Allophylus cobbe)
• West Indian woodnettle (Laportea aestuans).
(Director of National Parks 2015).

The forests of the Ramsar site provide an example of the original vegetation for the region with many of the plant species no longer found on the other 26 islands in the Cocos group (Woodroffe 1994). The island still has extensive stands of ironwood (Cordia subcordata), which apparently once formed extensive stands of forest on the southern atoll but has now been reduced to a few small clumps because its wood was sought after for building (Bunce, 1988). The Cocos sub-species of pandanus (Pandanus tectorius cocosensis) is considered endemic to the Cocos (Keeling) Islands (Williams, 1990).

One species of seagrass (Thalassia hemprichii) previously occurred within the lagoon (Director of National Parks 2004). However, the lagoon entrance closed in 2005 (due to natural deposition processes), leading to local extinction of extensive seagrass beds, which have been replaced by cyanobacteria mats (Hobbs 2009). Further monitoring is required to determine the long-term impacts of the closure.

One positive impact of the lagoon closure is the colonisation of the lagoon entrance by plants and trees that provide additional habitat for breeding seabirds. Masked boobies have been observed nesting in this area and inside the lagoon in areas once inundated by saltwater at high tide, since the closure of the lagoon (Hobbs 2009, Flores 2022 pers.comm.).

Invasive species:
There are few weeds present within the Ramsar site and most are not considered to pose a serious threat. In a 2017 survey, coral berry was found to extend over much of the island. Acalypha lanceolata, pigweed, pawpaw, lime berry, and goose berry all occurred in isolated or restricted distributions (DNP 2020) .

4.3.2 - Animal species

Other noteworthy animal species

Phylum	Scientific name	Pop. size	Period of pop. est.	%occurrence	Position in range /endemism/other
ARTHROPODA/MALACOSTRACA	*Cardisoma carnifex*				This species is abundant, particularly in the saltmarsh and on the fringes of the lagoon.
CHORDATA/ACTINOPTERYGII	*Cheilinus undulatus*				One of the few known predators of crown-of-thorns starfish, which could decimate the coral reefs.
ARTHROPODA/MALACOSTRACA	*Coenobita brevimanus*				This species is present in large numbers at the site.
ARTHROPODA/MALACOSTRACA	*Coenobita perlatus*				This species is present in large numbers at the site
ARTHROPODA/MALACOSTRACA	*Coenobita rugosus*				This species is present in large numbers at the site
ARTHROPODA/MALACOSTRACA	*Geograpsus crinipes*				This species is typically found in the supralittoral (supratidal) zone.
ARTHROPODA/MALACOSTRACA	*Geograpsus grayi*				Commonly occurs under the pisonia forest and contributes to biodiversity.
ARTHROPODA/MALACOSTRACA	*Grapsus tenuicrustatus*				This species is common on rocky sections of the coast within the site.
ARTHROPODA/MALACOSTRACA	*Ocypode ceratophthalmus*				This species commonly found on the north-western beaches of the site
CHORDATA/AVES	*Arenaria interpres*				This species is listed nationally (EPBC Act) as migratory.
CHORDATA/AVES	*Calidris alba*				This species is listed nationally (EPBC Act) as migratory.
CHORDATA/AVES	*Gallinago stenura*				This species is listed nationally (EPBC Act) as migratory
CHORDATA/AVES	*Onychoprion anaethetus*				This is vagrant species that may breed at the site.

Invasive alien animal species

Phylum	Scientific name	Impacts	Changes at RIS update
ARTHROPODA/INSECTA	*Anoplolepis gracilipes*	Actual (minor impacts)	unknown

Optional text box to provide further information

Noteworthy fauna:
The island supports a diverse crab population. Crabs are the most conspicuous and probably the most plentiful inhabitants of the forest floor and beach fringe of the island. Six (6) species of land crab occur on Pulu Keeling including the robber crab (Bigros latro), the largest land crab in the world (Director of National Parks 2015). The Christmas Island red crab is endemic to Christmas Island, but Pulu Keeling also supports a population as a result of opportunistic arrival of larvae in ocean currents.

The island is of very high importance for Indian Island seabird populations, supporting the most diverse populations in this ocean. Nineteen (19) species are found on the island, 12 of which breed here. This is significant as the island is the only rookery within 900 km (Director of National Parks 2015).

Invasive species:
Yellow crazy ants occur within the Ramsar site in areas of Pisonia forest (Neville et al. 2008). An increase in ant numbers would be likely to affect nesting bird species such as the red-footed booby, which rely on the forest habitat for breeding (Hale 2010). Crabs could also be affected by yellow crazy ants if numbers were to increase.

Pulu Keeling Island is one of the few seabird colonies in the Indian Ocean not yet affected by vertebrate pests, such as cats and rats. The vulnerability of seabird colonies to introduced animals is well documented. The protection of the island against the accidental introduction of exotic animals or diseases is paramount (Director of National Parks 2015).

4.4 - Physical components

4.4.1 - Climate

Climatic region	Subregion
A: Tropical humid climate	Am: Tropical monsoonal (Short dry season; heavy monsoonal rains in other months)

The Cocos (Keeling) Islands are situated in the humid, tropical zone, at the southern edge of the equatorial low-pressure belt. The islands are subject to north-west monsoons from January to May, which are moderated by oceanic conditions. Relatively strong, constant south-east trade winds blow for much of the year, during and outside the monsoon season. (Director of National Parks 2015).

Annual rainfall varies between 855 and 3,490 mm, with an average of 1,979 mm per annum. The site has relatively uniform temperatures, with an average daily maximum temperature of 29°C and average daily minimum temperature of 24.5°C. (Director of National Parks 2015).

According to CSIRO climate change projections for the Cocos (Keeling) Islands, average temperatures will continue to increase in all seasons. Rainfall is projected to decrease. Mean sea level will continue to rise, and the height of extreme sea-level events will also increase (CSIRO unpublished data 2021, BoM and CSIRO 2020).

4.4.2 - Geomorphic setting

a) Minimum elevation above sea level (in metres): 0

a) Maximum elevation above sea level (in metres): 4

- [ ] Entire river basin
- [ ] Upper part of river basin
- [ ] Middle part of river basin
- [ ] Lower part of river basin
- [ ] More than one river basin
- [x] Not in river basin
- [x] Coastal

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

Pulu Keeling is part of the Cocos (Keeling) Islands, in the Indian Ocean.

4.4.3 - Soil

- [x] Mineral

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

- [x] Organic

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

- [ ] No available information

Are soil types subject to change as a result of changing hydrological conditions (e.g., increased salinity or acidification)? Yes ○ No ◉

Please provide further information on the soil (optional)

The island is comprised mostly of calcareous sand and rubble of coral origin, with a broad sandy beach along the north shore. The lagoon sediments are predominantly composed of sands and sandy mud, with a broad intertidal sand area near the connection to the Indian Ocean. There are areas of beach rock and shingle along the eastern and southern shore and areas of coral conglomerate platform. A reef crest surrounds the island on all but the northwestern shore (Woodroffe and McLean 1994).

4.4.4 - Water regime

Water permanence

Presence?	Changes at RIS update
Usually permanent water present	No change

Source of water that maintains character of the site

Presence?	Predominant water source	Changes at RIS update
Marine water	☑	No change

Water destination

Presence?	Changes at RIS update
Marine	No change

Stability of water regime

Presence?	Changes at RIS update
Water levels fluctuating (including tidal)	No change

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

Tides at Pulu Keeling are diurnal with a range of 1 to 1.5 m.

The non-marine water resources of the Cocos (Keeling) Islands consist essentially of groundwater and rainwater. Where conditions are favourable, fresh groundwater on coral islands occurs in the form of shallow lenses beneath the ground surface. Due to the generally porous nature of the soils and underlying geology, there is no significant surface run-off. Preliminary investigations on Pulu Keeling Island (Falkland 1988, 1992) indicate the presence of a very thin freshwater lens on at least part of the island. It is not known whether this lens is permanent.

The closure of the lagoon entrance in 2005 (due to natural forces of deposition) has led to significant changes within the lagoon habitat. Whilst the water level of the lagoon varies, depending on rainfall and evaporation, less seawater enters the lagoon and levels are less affected by tidal fluctuation.

Parks have observed a small area where seawater is still entering the lagoon from underground at high tide, in the southern end of the lagoon. This is likely to only affect the salinity levels at the site and not influence waters in the northern part of the lagoon (T. Flores pers.com.).

4.4.5 - Sediment regime

Sediment regime unknown ☑

4.4.6 - Water pH

Unknown ☑

4.4.7 - Water salinity

Euhaline/Eusaline (30-40 g/l) ☑

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

Unknown ☐

Please provide further information on salinity (optional):

The Lagoon at Pulu Keeling is brackish. Gibson-Hill (1948) states that the Pulu Keeling Island wells were sunk to a depth of 3.6– 4.5m before World War II when between 40 and 60 Cocos-Malay people lived there for up to three months at the end of each year, collecting coconuts and timber. The water in the wells was reported to be brackish, and was used for washing and cooking rather than drinking (Director of National Parks 2015).

4.4.8 - Dissolved or suspended nutrients in water

Unknown ☑

4.4.9 - Features of the surrounding area which may affect the Site

Please describe whether, and if so how, the landscape and ecological characteristics in the area surrounding the Ramsar Site differ from the site itself: i) broadly similar ○ ii) significantly different ◉

Surrounding area has greater urbanisation or development ☐

Surrounding area has higher human population density ☐

Surrounding area has more intensive agricultural use ☐

Surrounding area has significantly different land cover or habitat types ☐

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

The Ramsar site is a coral atoll comprising of approximately 155 ha of land above high water mark (221 ha including the lagoon) and the surrounding coral reef and sea. This makes the site quite different to the surrounding ocean landscape.

The forests of Pulu Keeling Ramsar site provide an example of the original vegetation for the region with many of the plant species no longer found on the other 26 islands in the Cocos group (Woodroffe 1994). The island still has extensive stands of ironwood (Cordia subcordata), which apparently once formed extensive stands of forest on the southern atoll but has now been reduced to a few small clumps (Bunce, 1988).

Two of the southern atoll islands are permanently inhabited and much of the southern islands was extensively cleared. The primary land use on these islands was (until 1987) the production of copra through the cultivation of Cocos palms (Director of National Parks 2015).

4.5 - Ecosystem services

4.5.1 - Ecosystem services/benefits

Cultural Services

Ecosystem service	Examples	Importance/Extent/Significance
Recreation and tourism	Recreational hunting and fishing	Medium
Recreation and tourism	Nature observation and nature-based tourism	Medium
Recreation and tourism	Water sports and activities	Medium
Spiritual and inspirational	Cultural heritage (historical and archaeological)	Medium
Spiritual and inspirational	Spiritual and religious values	Medium
Scientific and educational	Important knowledge systems, importance for research (scientific reference area or site)	Medium
Scientific and educational	Educational activities and opportunities	Medium

Optional text box to provide further information

Ecosystem services and benefits include:

• recreation and tourism – although the site is remote and access is restricted, the site is important for
passive recreation such as diving and bird watching. Licensed tour operators conduct day trips to the site for bird watching, diving, snorkelling and sightseeing (Hale 2010).

• cultural heritage – previous human activity in the park has included visits by Cocos-Malay workers and actions associated with the two world wars. These activities have left various relics of value and interest.

The graves of a Malay woman and girl who died from beri-beri, a dietary deficiency, in the late 19th century are located near the southern shore. There is a third grave on the island, that of a man who died in an accident (Bunce 1988).

The resting place of the World War I German raider SMS Emden is located on the reef off the southern end of the island. The Emden is a historic shipwreck under the Underwater Cultural Heritage Act 2018 and a protected zone has been declared around it under that Act (Director of National Parks 2015).

• scientific and educational – the remote nature of the Ramsar site and its near pristine nature provide a rare opportunity in the Indian Ocean to collect baseline information on coral reef and atoll ecology. Regular surveys of red-footed booby have been conducted since 1986; turtle monitoring has been conducted on green and hawksbill Turtles (Whiting 2006; Whiting et al. 2008) and a reef condition monitoring site has been established (Commonwealth of Australia 2005).

Within the site: 100s

Outside the site: 100s

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

4.5.2 - Social and cultural values

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

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

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

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

<no data available>

4.6 - Ecological processes

<no data available>

5 - How is the Site managed? (Conservation and management)

5.1 - Land tenure and responsibilities (Managers)

5.1.1 - Land tenure/ownership

Public ownership

Category	Within the Ramsar Site	In the surrounding area
National/Federal government	☑	☑
Local authority, municipality, (sub)district, etc.	☑	☑

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

The entire Pulu Keeling National Park Ramsar site is a declared Commonwealth National Park on lease from the Cocos (Keeling) Shire Council to the Director of National Parks. The surrounding waters are the territorial waters of the Commonwealth of Australia.

5.1.2 - Management authority

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

Director of National Parks

Postal address:

GPO Box 858
Canberra, ACT 2601
Australia

5.2 - Ecological character threats and responses (Management)

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

Biological resource use

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Hunting and collecting terrestrial animals	Medium impact	Medium impact	☑	No change	☑	No change

Human intrusions and disturbance

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Recreational and tourism activities	Low impact	Medium impact	☑	No change	☐	No change

Natural system modifications

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Unspecified/others	unknown impact	unknown impact	☑	unknown	☐	unknown

Invasive and other problematic species and genes

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Invasive non-native/ alien species	Medium impact	Medium impact	☑	No change	☐	No change

Climate change and severe weather

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Storms and flooding	Medium impact	Medium impact	☐	No change	☑	No change
Unspecified		High impact	☐	No change	☑	No change

Please describe any other threats (optional):

Threats to the site include:

• fishing and hunting seabirds is part of the culture of the Cocos Malay people (Bunce 1988). Fishing occurs within the Ramsar site by residents of the southern atoll under a permit system managed by Parks Australia. The only approved method is trolling (towing a lure behind a boat to catch pelagic fish). This protects reef fish and limits the catch to predatory fish. If recreational fishing were to be expanded to include resident reef fish, the potential effects on the ecological character are more serious. Hunting of seabirds was once a common practice on the islands (Bunce 1988). Hunting in the Ramsar site is prohibited. Poaching may still pose a threat to seabird populations. It is estimated that 2,000 to 3,000 birds are illegally taken from the site each year (Director of National Parks 2004).

• recreation –visitor access can result in the disturbance of breeding seabirds (with subsequent reductions in recruitment), damage to reef by boats and anchors and accidental introduction of exotic species. Access to the Ramsar site is controlled by a strict permit system administered by Parks Australia. Recreational activities include fishing, diving and surfing from boats. Commercial tourism activities are restricted to passive pursuits such as bird watching and limited snorkelling and diving. All forms of fishing charter are prohibited. Visitors to the site can only go ashore in the company of Parks staff (Director of National Parks 2004).

• weeds – few weeds occur in the Ramsar site. Numerous weeds occur on the southern atoll, including Cenchrus echinatus, Brachiaria mutica, Cenchrus ciliaris, and Chromolaena odorata (Director of National Parks 2004). Introduction of these weed species to the Ramsar site could severely impact terrestrial vegetation and affect fauna supported by the current vegetation communities. This may result in a loss of seabird breeding sites, and a disruption of the food chain for herbivorous species

• yellow crazy ants – a survey in 2009 detected yellow crazy ants over 59 ha of the island and super-colonies at 11% of survey sites (unpublished data from Parks Australia). The impact of the ants on the character of the site is not known, but may prove significant (Neville et al. 2008).

• cats and black rats - may impact birds by predation (cats) and competition for food (rats).

• climate change - sea level and sea surface temperatures are predicted to increase. The intensity of tropical storms could also increase (McInnes et al. 2008). An increase in sea level could result in an increase in submerged areas and intertidal sands at the expense of terrestrial vegetation. Tropical cyclones have the potential to cause direct physical damage to the vegetation at the site. An increase in sea surface temperature could have significant impacts to the reef and coral communities within the Ramsar site. Increase in sand temperatures could skew the ratio of male and female egg production.
(Hale 2010).

5.2.2 - Legal conservation status

National legal designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
National Park	Pulu Keeling National Park	https://parksaustralia.gov.au/pu lu-keeling/	whole

Non-statutory designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
Important Bird Area	Cocos (Keeling) Islands	http://datazone.birdlife.org/sit e/factsheet/north-keeling-island -iba-cocos-(keeling)-islands-(to -australia)	whole

5.2.3 - IUCN protected areas categories (2008)

- [x] Ia Strict Nature Reserve
- [ ] Ib Wilderness Area: protected area managed mainly for wilderness protection
- [x] II National Park: protected area managed mainly for ecosystem protection and recreation
- [ ] III Natural Monument: protected area managed mainly for conservation of specific natural features
- [ ] IV Habitat/Species Management Area: protected area managed mainly for conservation through management intervention
- [ ] V Protected Landscape/Seascape: protected area managed mainly for landscape/seascape conservation and recreation
- [ ] VI Managed Resource Protected Area: protected area managed mainly for the sustainable use of natural ecosystems

5.2.4 - Key conservation measures

Legal protection

Measures	Status
Legal protection	Implemented

Other:

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

The Pulu Keeling National Park is divided into two zones:
• A strict nature reserve zone (IUCN category Ia) – this area consists of the terrestrial part of the park down to the low water mark and includes the lagoon area.
• A marine reserve zone (IUCN category II) – this area consists of the marine component of the park from the low water mark.

5.2.5 - Management planning

Is there a site-specific management plan for the site?	Yes
Has a management effectiveness assessment been undertaken for the site?	Yes ○ No ◉
If the site is a formal transboundary site as indicated in section Data and location > Site location, are there shared management planning processes with another Contracting Party?	Yes ○ No ◉

5.2.6 - Planning for restoration

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

Further information

Whilst a site-specific restoration plan has not been developed, Australia has a National Invasive Ant Biosecurity Plan, see: https://www.awe.gov.au/environment/biodiversity/threatened/publications/tap/invasive-ants

This plan identifies the yellow crazy ant (Anoplolepis gracilipes) as a high priority invasive species. A threat abatement plan was in place for this species between 2006 and 2016. The Biosecurity plan replaces the Threat Abatement Plan and outlines a means to manage the threat (Environment and Invasives Committee 2019).

5.2.7 - Monitoring implemented or proposed

Monitoring forms part of the Pulu Keeling National Park Management Plan. Please refer to the management plan for details.

6 - Additional material

6.1 - Additional reports and documents

6.1.1 - Bibliographical references

This RIS has been prepared using information from the Pulu Keeling Ecological Character Description; Pulu Keeling National Park Management Plan; past Ramsar Information Sheets; and other key information sources. Additional references are included in separate bibliography, attached under Section 6.1.2 vi.

6.1.2 - Additional reports and documents

i. taxonomic lists of plant and animal species occurring in the site (see section 4.3)
<no file available>

ii. a detailed Ecological Character Description (ECD) (in a national format)
<1 file(s) uploaded>

iii. a description of the site in a national or regional wetland inventory
<no file available>

iv. relevant Article 3.2 reports
<no file available>

v. site management plan
<1 file(s) uploaded>

vi. other published literature
<2 file(s) uploaded>

6.1.3 - Photograph(s) of the Site

Please provide at least one photograph of the site:

x (*c, 01-01-1970*)

Shallow waters off the coast in Pulu Keeling National Park. Photo by Robert Thorn (date unknown). (*Department of Environment and Robert Thorn, 01-01-1970*)

Plate coral in the Pulu Keeling National Park. Photo by Robert Thorn (date unknown). (*Department of Environment and Robert Thorn, 01-01-1970*)

Masked booby with eggs in the Pulu Keeling National Park. Photo by Robert Thorn (date unknown). (*Department of Environment and Robert Thorn, 01-01-1970*)

Green turtle in the Pulu Keeling National Park. Photo by Robert Thorn (date unknown). (*Department of Environment and Robert Thorn, 01-01-1970*)

6.1.4 - Designation letter and related data

Designation letter
<1 file(s) uploaded>

Date of Designation: 1996-03-17