



Ramsar Information Sheet

Published on 15 December 2025

Update version, previously published on : 21 October 2002

Australia

Ashmore Reef



Designation date	21 October 2002
Site number	1220
Coordinates	12°14'25"S 123°05'35"E
Area	58 300,00 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 Site comprises the area proclaimed as the Ashmore Reef Marine Park. Ashmore Reef is the largest of three emergent oceanic reefs in the north-eastern Indian Ocean and the only one with vegetated islands.

The Site does not support a permanent human population, but traditional Indonesian fishers are permitted to use and visit designated areas under a Memorandum of Understanding (1974) between the Australian and Indonesian Governments. Activities allowed under this agreement include subsistence fishing using traditional methods and access to land at West Island to obtain freshwater and visit cultural sites within the marine parks' Recreational Use Zone.

Ashmore Reef meets Ramsar criteria 1, 2, 3, 4, 5 and 6:

1. Ashmore Reef is the largest of three emergent oceanic reefs in the north-eastern Indian Ocean and the only one with vegetated islands. Each of the wetland types present is in near natural condition, with low densities of coral predators and disease (Richards et al. 2009).
2. The Site supports over 60 threatened species listed nationally (under the EPBC Act) and/or internationally (under the IUCN redlist), including hard and soft corals, giant clams, sea cucumbers, fish, reptiles and a mammal.
3. The Site is a biodiversity hotspot, supporting a range of pelagic and benthic marine species, internationally significant populations of migratory shorebirds and breeding seabirds, as well as providing important habitat for turtles and dugong.
4. Ashmore Reef provides important habitat for significant numbers of seabirds and shorebirds. Fifteen seabird and 4 heron species breed on the islands and cays within the Site. Twenty-nine species of migratory shorebirds overwinter at the Site.
5. Over 100,000 breeding seabirds and 10,000 migratory waterbirds have been recorded at the Site. The Site is known to regularly support over 20,000 seabirds.
6. The Site supports over 1% of the flyway population of 6 species of migratory shorebirds and may support over 1% of the global population of 4 seabird species.

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	203 Channel Hwy Kingston TAS 7050

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	2014
To year	2020

2.1.3 - Name of the Ramsar Site

Official name (in English, French or Spanish)	Ashmore Reef
Unofficial name (optional)	Ashmore Reef Marine Park

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?	Uncertain
(Update) Optional text box to provide further information	
Data suggests some seabird species have expanded their breeding territories to include West Island, thus making greater use of the Site. Some species appear to have shifted breeding location from East and/or Middle Islands to West Island. Adult numbers of many of the seabird species have increased or are showing recovery from estimates in 2010 or 2014. Historical depletion of invertebrates, particularly holothurians, trochus and clams, have resulted in low population levels and some species of holothurians and clams are unlikely to recover. Cessation of illegal fishing appears to have had a positive impact on populations of sharks and large predatory fish at the Site, although densities remain low in comparison to many coral reefs within the Indo-Pacific.	

2.2 - Site location

2.2.1 - Defining the Site boundaries

b) Digital map/image

<1 file(s) uploaded>

Former maps	0
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Boundaries description

Ashmore Reef is situated at 12°20'S, 123°0'E.
The boundary of the Ramsar Site is the same as Ashmore Reef Marine Park.
The marine park was originally proclaimed in 1983 under the National Parks and Wildlife Conservation Act 1975 as the Ashmore Reef National Nature Reserve. This was later replaced by a declaration under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The nature reserve was renamed Ashmore Reef Marine Park (Ashmore Reef) in 2017.

2.2.2 - General location

a) In which large administrative region does the site lie?	The Site is on the outer edge of the continental shelf in the Indian Ocean and Timor Sea. It is 840 km west of Darwin, NT and approximately 630 km north of Broome, WA.
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b) What is the nearest town or population centre?

Nembrala, Rote Island, Indonesia is approximately 110 km north of the Ramsar Site.

2.2.3 - For wetlands on national boundaries only

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

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

2.2.4 - Area of the Site

Official area, in hectares (ha): 58300

Area, in hectares (ha) as calculated from GIS boundaries 58342.137

2.2.5 - Biogeography

Biogeographic regions

Regionalisation scheme(s)	Biogeographic region
Marine Ecoregions of the World (MEOW)	Temperate Shelf and seas ecoregions
Other scheme (provide name below)	Indian Ocean, Timor Province bioregion (IMCRA)

Other biogeographic regionalisation scheme

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

Commonwealth of Australia (2006). Integrated Marine and Coastal Regionalisation of Australia (IMCRA) Version 4 - Indian Ocean, Timor Province bioregion. (<https://parksaustralia.gov.au/marine/management/resources/scientific-publications/guide-integrated-marine-and-coastal-regionalisation-australia-version-40-june-2006-imcra/>)

The Integrated Marine and Coastal Regionalisation of Australia (IMCRA v4.0) is a spatial framework for classifying Australia's marine environment into bioregions that make sense ecologically and are at a scale useful for regional planning.

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

Ashmore Reef is the largest of three emergent oceanic reefs in the Timor Province biogeographic region and has been managed for the purposes of conservation for nearly four decades. Wetland types found at the Site include:

- permanent shallow marine waters (A),
- marine subtidal aquatic beds (B),
- coral reefs (C),
- sand, shingle or pebble shores (E) and
- intertidal mud, sand or salt flats (G).

Each of these wetland types are in near natural condition (Richards et al. 2009).

The Site has the highest seagrass cover in the bioregion (Russell et al. 2005). The four cays or islands within the Site (West, Middle, East and Splittgerber) represent the only low vegetated islands within the Timor Province bioregion (DEWHA 2008). These islands support bioregionally unique examples of wetland type E (sand, shingle or pebble shores).

☒ Criterion 2 : Rare species and threatened ecological communities

Optional text box to provide further information

The Site supports over 60 species listed as threatened nationally (EPBC Act) and/or internationally (IUCN Red list), including:

- over 40 species of hard and soft corals
- 2 species of giant clam
- at least 5 species of sea cucumber
- 10 fish species
- 6 reptile species (3 turtles and 3 sea snakes)
- 6 shorebird species and
- 1 mammal species.

See Section 3.3 for a full list of species.

☒ Criterion 3 : Biological diversity

Justification

Ashmore Reef represents a biodiversity hotspot within the Timor Province bioregion and broader northwest marine region (Wells and Allen 2005).

Compared to other reefs in the region, the Site supports the highest cover of seagrass (Keesing et al. 2020) which is critical for the small population of resident dugong (Whiting 1999, Whiting and Guinea 2005).

This Site supports the highest diversity of hermatypic (reef building) corals (Vernon 1993, Griffith 1997, Richards and Hobbs 2014) and non-reef building corals (Marsh 1993) on the West Australian coast. Hard corals dominate, with the highest cover generally recorded on the southern reef edges (Keesing et al. 2020). Extensive turf algae covered reef with sparser hard coral cover and sand areas are found within the lagoons (Keesing et al. 2020). These habitats support a diverse range of species. Up to 275 species from 51 genera and 14 families have been recorded (Ceccarelli et al. 2011).

Mollusc diversity is higher than at other reefs in the bioregion, with over 600 species recorded (Wells 1993, Willan 2005). Forty-seven species of sea cucumber have been recorded at the Site, higher than at other reefs in the bioregion (Skewes et al. 1999a; Marsh et al. 1993) with 18 species recorded during the 2019 survey (Keesing et al., 2020). Ninety-nine species of decapod crustacean have been recorded at Ashmore Reef and nearby Cartier Island, nearly twice that recorded at Scott and Seringapatam Reefs (Morgan and Berry 1993). Recent data suggests species richness is not as high as it once was (Keesing et al. 2020). Species richness at the Site may be correlated to the diversity of benthic habitats present (Keesing et al. 2020).

The diversity of fish is higher than other comparable reefs in the bioregion. Over 760 species have been recorded with particularly high diversity of small, cryptic species (Russell et al. 2005, Kospartov et al. 2006, 809 spp. in Moore et al. 2014, 164 spp. in Edgar et al. 2017, Edgar et al. 2020). In the 2019 survey, 349 species from 43 families were recorded (Keesing et al. 2020). There has been a recent increase in the relative abundance of reef sharks observed from 2004 to 2016. During this period, communities of large predatory fish also increased significantly (Speed et al. 2018).

Prior to the time of listing, the Site was globally significant in terms of sea snake abundance and diversity. At that time, 17 species of sea snake were recorded at Ashmore Reef (Keesing et al. 2020), nine of which were considered breeding residents and eight were vagrant. At the time of listing, sea snake populations were significantly declining, and this trajectory has continued. In 2017, olive sea snakes (*Aipysurus laevis*) were observed in extremely low abundance (1-4 a year), and only a single specimen of olive sea snake was observed in 2019 (Keesing et al. 2020).

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

Optional text box to provide further information

The Ramsar Site provides important habitat for internationally significant numbers (>100,000) of seabirds and migratory shorebirds. Fifteen seabird species and four heron species breed on the islands and cays within the Site. More than 30 migratory shorebirds have been observed overwintering there (Keesing et al 2020).

The Site provides important habitat for dugongs (*Dugong dugong*) (Whiting and Guinea 2005b) and for three species of migratory turtle: green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*), and loggerhead (*Caretta caretta*) (Whiting and Guinea 2005a).

Green turtles are known to nest at West Island, with occasional records of hawksbill turtle nests. There are unconfirmed records of two loggerheads and one flatback turtle nest from the Ramsar Site (Whiting and Guinea 2005, cited in Hale and Butcher 2013).

☒ Criterion 5 : >20,000 waterbirds

Overall waterbird numbers	50,000
Start year	2002
End year	2019
Source of data:	Department of Agriculture, Water and the Environment, Keesing et al. 2020
Optional text box to provide further information	Seabird and migratory shorebird survey data for Ashmore Reef from surveys between 2002 to 2010 (Clarke et al. 2011) recorded total seabird counts greater than 20,000 in six out of nine counts, surveyed generally outside the peak breeding season for the seabirds. Approximately 50,000 waterbirds, on average, were counted during these surveys, however, the survey did not cover the whole Ramsar Site and did not include all shorebirds. Surveys between 2010 and 2014 recorded over 100,000 breeding seabirds and 10,000 migratory waterbirds (Clarke and Herrod 2016). More recently, a comprehensive ecological survey undertaken in 2019 confirmed that this Site continues to support internationally significant numbers of seabirds (Keesing et al. 2020) and that generally numbers appear to be increasing. The surrounding ocean regions are biodiversity hotspots for foraging seabirds, including species that breed on the islands (Lavers et al. 2014).

☒ Criterion 6 : >1% waterbird population

Optional text box to provide further information	Using count data from Clarke and Herrod (2016) and Keesing et al (2020), against the EAAFP CSR 1 population estimates, the Site meets the 1% threshold for the flyway population of 7 species: • bar-tailed godwit (<i>Limosa lapponica</i>), • grey-tailed tattler (<i>Tringa brevipes</i>), • grey plover (<i>Pluvialis squatarola</i>), • greater sand plover (<i>Charadrius leschenaultii</i>), • ruddy turnstone (<i>Arenaria interpres</i>), • sanderling (<i>Calidris alba</i>), and • common or brown noddy (<i>Anous stolidus</i>). Against the AEWA CSR 8 estimates population estimates, the lesser frigatebird (<i>Fregata ariel</i>) also meets the 1% population threshold. Survey data from 2019 (Keesing et al. 2020) indicates the following species of seabirds may also meet the 1% threshold for the global population, however the appropriate population, or population estimate, is not currently available: • brown booby (<i>Sula leucogaster</i>), and • crested tern (<i>Thalasseus bergii</i>). The status of these species against criterion 6 will be reviewed when a suitable dataset becomes available.
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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	<i>Halophila ovalis</i>	☐	☒	☐	LC	☐		Seagrass supports marine biodiversity including threatened marine species.
TRACHEOPHYTA / LILIOPSIDA	<i>Thalassia hemprichii</i>	☐	☒	☐	LC	☐		Seagrass supports marine biodiversity including threatened marine species. It is the food source for nesting green turtles and the only known food source for Dugong at Ashmore Reef.

The marine flora of Ashmore Reef is not well studied. There are significant seagrass beds comprising of *Thalassia hemprichii* and, to a lesser extent, *Halophila ovalis*. These provide important habitat for a number of marine animal species. Three other seagrass species were recorded from Ashmore Reef: *Thalassodendron ciliatum*, *Halophila decipiens* and *Halodule pinifolia* (Pike and Leach, 1997), but were not observed in 2019. In the 2019 survey, *T. hemprichii* mean cover was 8.6%. Benthic surveys recorded 5-30% cover on the western reef flat, and less than 5% along the southern and eastern reef flat. *H. ovalis* occurred at 1 Site, comprising 8.5% of total seagrass cover for the Site.

Algae mapping in 1999 indicated a total cover of 3,292 ha, comprising about 30% of the reef habitat (Skewes et al. 1999b, Kospartov et al. 2006). Marine algae collected from Ashmore Reef in 2013 indicated 73 species.

31 terrestrial plant species have been recorded within the Site, comprising 22 native and 9 alien species (Russell et al. 2004; Dept. Agriculture 2015b). These numbers are under review, due to incorrect identifications, updated synonymy and species extirpations (Keesing et al. 2020). The native plant diversity is typical of remote coral reef cays. The relatively high number of alien species reflects historic human occupancy and resource extraction (guano mining). Species turnover is likely to remain dynamic, as new species are introduced through seed dispersal from wind and ocean currents, seabirds and humans, and others lost due to cyclones, high tides, beach erosion and the actions of animals (Bellio et al. 2007).

The interior of all 4 islands consist of grasslands dominated by Poaceae, and herb fields dominated by annual species (mostly wind dispersed). Some species are important for the overall integrity and resilience of these communities. On West Island, the woody octopus bush (*Heliotropium foertherianum*) grows in a band within 15 m of the shore, forming the dominant structural layer and reaching heights of up to 6 m. Middle and East Islands have lower vegetation only. Shrubs on these two islands have all but died out (one sick individual remains on Middle Island), leaving only a grass layer (including *Eragrostis cumingii*, *Lepturus repens* and *Digitaria mariannensis*) and low shrub/herb layer (including *Sesbania cannabina* and *Amaranthus interruptus*; Keesing et al. 2020). Splitterber Cay has stabilized in the past 10-15 years and is now vegetated with a low grass layer dominated by *Lepturus repens* (Clarke et al. 2011; Keesing et al. 2020).

Introduced weeds, including *Cenchrus ciliaris* (buffel grass), threaten the integrity of the terrestrial vegetation communities, and the stability of the shrub layer. The risk of introduction of new weed species from Indonesia or Australia (e.g. *Chromolaena odorata*) could alter vegetation structure from herb fields to dense shrubland and reduce suitable habitat for breeding seabirds (Dept Agriculture 2015b).

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																	
CNIDARIA / ANTHOZOA	<i>Acropora abrolhosensis</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity 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								
CNIDARIA / ANTHOZOA	<i>Acropora aculeus</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Acropora anthocercis</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Acropora aspera</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Acropora caroliniana</i>	☒	☐	☐	☐	☒	☐	☐	☐				VU	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Acropora horrida</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Acropora listeri</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Acropora microclados</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Acropora paniculata</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Acropora solitaryensis</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Acropora spicifera</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Acropora verweyi</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Acropora willisae</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
ECHINODERMATA / HOLOTHUROIDEA	<i>Actinopyga echinites</i>	☒	☐	☐	☐	☒	☐	☐	☐				VU	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
ECHINODERMATA / HOLOTHUROIDEA	<i>Actinopyga mauritiana</i>	☒	☐	☐	☐	☒	☐	☐	☐				VU	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the Site. 2 individuals were found during the 2019 survey.
ECHINODERMATA / HOLOTHUROIDEA	<i>Actinopyga miliaris</i>	☒	☐	☐	☐	☒	☐	☐	☐				VU	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site. 1 individual was found during the 2019 survey.
CHORDATA / REPTILIA	<i>Aipysurus apraefrontalis</i>	☒	☐	☐	☐	☒	☐	☐	☐				DD	☐	☐	nationally listed (EPBC Act) - critically endangered, marine	Nationally listed threatened species. This species contributes to the biodiversity of the site. No individuals were sighted in 2019 survey.
CHORDATA / REPTILIA	<i>Aipysurus foliosquama</i>	☒	☐	☐	☐	☒	☐	☐	☐				DD	☐	☐	nationally listed (EPBC Act) - critically endangered, marine	Nationally listed threatened species. This species contributes to the biodiversity of the site. No individuals were sighted in 2019 survey.

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 / REPTILIA	<i>Aipysurus fuscus</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐	nationally listed (EPBC Act) - marine	Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site. No individuals were sighted in 2019 survey.
CHORDATA / REPTILIA	<i>Aipysurus laevis</i>	☐	☐	☐	☐	☒	☐	☐	☐				LC	☐	☐	nationally listed (EPBC Act) - marine	This species contributes to the biodiversity of the site. One individual was sighted in 2019 survey.
CNIDARIA / ANTHOZOA	<i>Alveopora fenestrata</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Alveopora verrilliana</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
CHORDATA / REPTILIA	<i>Caretta caretta</i>	☒	☒	☐	☐	☒	☐	☐	☐				VU	☒	☒	nationally listed (EPBC Act) - endangered, migratory	Internationally and Nationally listed threatened and migratory species (CMS). This species contributes to the biodiversity of the site. It was not sighted in 2019 survey.
CHORDATA / REPTILIA	<i>Chelonia mydas</i>	☒	☒	☐	☐	☒	☐	☐	☐				EN	☒	☒	nationally listed (EPBC Act) - vulnerable, marine, migratory	Internationally and Nationally listed threatened and migratory species (CMS). Regularly nest on West island. This species was observed in the 2019 survey, but a quantitative assessment was not made.
CHORDATA / MAMMALIA	<i>Dugong dugon</i>	☒	☒	☐	☐	☒	☐	☐	☐				VU	☒	☐	nationally listed (EPBC Act) - migratory, marine	Internationally listed threatened species (IUCN). Nationally listed threatened and migratory species (CMS). This species breeds at the site. No individuals were sighted in 2019 survey.
CNIDARIA / ANTHOZOA	<i>Echinopora ashmorensis</i>	☐	☐	☐	☐	☒	☐	☐	☐				LC	☐	☐		This species contributes to the biodiversity of the Site.
CHORDATA / REPTILIA	<i>Eretmochelys imbricata</i>	☒	☒	☐	☐	☒	☐	☐	☐				CR	☒	☒	nationally listed (EPBC Act) - vulnerable, marine, migratory	Internationally and nationally listed threatened and migratory species (CMS). Occasionally nest on West island. This species was observed in the 2019 survey, but a quantitative assessment was not made
CNIDARIA / ANTHOZOA	<i>Fimbriaphyllia ancora</i>	☐	☐	☐	☐	☒	☐	☐	☐				LC	☐	☐		This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Galaxea astreata</i>	☐	☐	☐	☐	☒	☐	☐	☐				LC	☐	☐		This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Heliofungia actiniformis</i>	☐	☐	☐	☐	☒	☐	☐	☐				LC	☐	☐		This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Heliopora coerulea</i>	☐	☐	☐	☐	☒	☐	☐	☐				LC	☒	☐		This species contributes to the biodiversity of the site.
ECHINODERMATA / HOLOTHUROIDEA	<i>Holothuria fuscogilva</i>	☒	☐	☐	☐	☒	☐	☐	☐				VU	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site. 3 individuals were found during the 2019 survey.
ECHINODERMATA / HOLOTHUROIDEA	<i>Holothuria lessoni</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
ECHINODERMATA / HOLOTHUROIDEA	<i>Holothuria nobilis</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site. 2 individuals were found during the 2019 survey.
ECHINODERMATA / HOLOTHUROIDEA	<i>Holothuria scabra</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Homophyllia bowerbanki</i>	☐	☐	☐	☐	☒	☐	☐	☐				LC	☐	☐		This species contributes to the biodiversity 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								
CNIDARIA / ANTHOZOA	<i>Leptoseris yabei</i>	☐	☐	☐	☐	☒	☐	☐	☐				LC	☐	☐		This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Lobophyllia diminuta</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Lobophyllia flabelliformis</i>	☐	☐	☐	☐	☒	☐	☐	☐				LC	☐	☐		This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Montipora calcarea</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Montipora calculata</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Montipora crassituberculata</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Pachyseris rugosa</i>	☐	☐	☐	☐	☒	☐	☐	☐				LC	☐	☐		This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Pavona cactus</i>	☒	☐	☐	☐	☒	☐	☐	☐				VU	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Pavona decussata</i>	☐	☐	☐	☐	☒	☐	☐	☐				LC	☐	☐		This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Pavona venosa</i>	☐	☐	☐	☐	☒	☐	☐	☐				LC	☐	☐		This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Pectinia alcorni</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Pectinia lactuca</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Physogyra lichtensteini</i>	☐	☐	☐	☐	☒	☐	☐	☐				LC	☐	☐		This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Platygyra yaeyamaensis</i>	☐	☐	☐	☐	☒	☐	☐	☐				LC	☐	☐		This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Porites nigrescens</i>	☐	☐	☐	☐	☒	☐	☐	☐				LC	☐	☐		This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Seriatopora aculeata</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
ECHINODERMATA / HOLOTHUROIDEA	<i>Stichopus herrmanni</i>	☒	☐	☐	☐	☒	☐	☐	☐				VU	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site. 9 individuals were found during the 2019 survey.
ECHINODERMATA / HOLOTHUROIDEA	<i>Thelenota ananas</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site. 1 individual was found during the 2019 survey.
CNIDARIA / ANTHOZOA	<i>Turbinaria peltata</i>	☐	☐	☐	☐	☒	☐	☐	☐					☐	☐		This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Turbinaria reniformis</i>	☐	☐	☐	☐	☒	☐	☐	☐				LC	☐	☐		This species contributes to the biodiversity of the site.
CNIDARIA / ANTHOZOA	<i>Turbinaria stellulata</i>	☐	☐	☐	☐	☒	☐	☐	☐				LC	☐	☐		This species contributes to the biodiversity of the site.
Fish, Mollusc and Crustacea																	

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								
MOLLUSCA/ GASTROPODA	<i>Amoria spenceriana</i>	☐	☒	☐	☐	☒	☐	☐	☐					☐	☐		The site supports the entire lifecycle of this mollusc species, as it is endemic to Ashmore Reef.
CHORDATA/ ACTINOPTERYGII	<i>Bolbometopon muricatum</i>	☒	☐	☐	☐	☒	☐	☐	☐				VU	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site. It was not sighted in 2019 survey.
CHORDATA/ ELASMOBRANCHII	<i>Carcharhinus amblyrhynchos</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
CHORDATA/ ELASMOBRANCHII	<i>Carcharhinus melanopterus</i>	☒	☐	☐	☐	☒	☐	☐	☐				VU	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
CHORDATA/ ELASMOBRANCHII	<i>Carcharias taurus</i>	☒	☐	☐	☐	☒	☐	☐	☐				CR	☐	☐	nationally listed (EPBC Act) - EPBC listed vulnerable	Internationally and nationally listed threatened species This species contributes to the biodiversity of the site. It was not sighted in 2019 survey.
CHORDATA/ ACTINOPTERYGII	<i>Cheilinus undulatus</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☒	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site. It was not recorded in 2019 survey.
MOLLUSCA/ GASTROPODA	<i>Cymbiola bairdii</i>	☐	☒	☐	☐	☒	☐	☐	☐					☐	☐		The site supports the entire lifecycle of this mollusc species, as it is endemic to Ashmore Reef.
CHORDATA/ ELASMOBRANCHII	<i>Galeocerdo cuvier</i>	☐	☐	☐	☐	☒	☐	☐	☐				NT	☐	☐		Internationally listed near-threatened species (IUCN). This species contributes to the biodiversity of the site.
CHORDATA/ ELASMOBRANCHII	<i>Hemipristis elongata</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site. It was not recorded in 2019 survey.
CHORDATA/ ACTINOPTERYGII	<i>Plectropomus areolatus</i>	☒	☐	☐	☐	☒	☐	☐	☐				VU	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site. It was not sighted in 2019 survey.
CHORDATA/ ELASMOBRANCHII	<i>Sphyrna lewini</i>	☒	☐	☐	☐	☒	☐	☐	☐				CR	☐	☐	nationally listed (EPBC Act) - EPBC listed conservation dependent	Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site. It was not sighted in 2019 survey.
CHORDATA/ ELASMOBRANCHII	<i>Sphyrna mokarran</i>	☒	☐	☐	☐	☒	☐	☐	☐				CR	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site. It was not sighted in 2019 survey.
CHORDATA/ ELASMOBRANCHII	<i>Triaenodon obesus</i>	☒	☐	☐	☐	☒	☐	☐	☐				VU	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site.
MOLLUSCA/ BIVALVIA	<i>Tridacna derasa</i>	☒	☐	☐	☐	☒	☐	☐	☐				EN	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site. 7 individuals were found during the 2019 survey.
MOLLUSCA/ BIVALVIA	<i>Tridacna gigas</i>	☒	☐	☐	☐	☒	☐	☐	☐				CR	☐	☐		Internationally listed threatened species (IUCN). This species contributes to the biodiversity of the site. 5 individuals were found during the 2019 survey.
Birds																	

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	<i>Actitis hypoleucos</i>	☐	☒	☐	☐	☐	☒	☐	☐	11	2014		LC	☐	☐	nationally listed (EPBC Act) – migratory, marine	Nationally listed migratory species (C, J, RK, CMS). The population of this species that migrates to Australia breeds in the Russian far east. The site provides important habitat for the species during its annual migration. This species contributes to the abundance and diversity of wetland birds supported by the site.
CHORDATA/AVES	<i>Anous minutus</i>	☐	☒	☐	☐	☐	☒	☐	☐	5126	2019		LC	☐	☐	nationally listed (EPBC Act) - marine	Regularly breeds on Middle and East Islands.
CHORDATA/AVES	<i>Anous stolidus</i>	☐	☒	☒	☐	☐	☒	☐	☐	40383	2019	2.02	LC	☐	☐	nationally listed (EPBC Act) - marine	Regularly breeds on Middle and East Islands. The pileatus population estimate for this species is 100,000 to 1 million individuals (EAAFP CSR 1), with a 1% threshold of 20,000. The site supports 2.02% of the population of this species.
CHORDATA/AVES	<i>Anous tenuirostris</i>	☐	☒	☐	☐	☐	☒	☐	☐	40	2019		LC	☐	☐	nationally listed (EPBC Act) - marine	Occasionally breeds on Middle and East Islands.
CHORDATA/AVES	<i>Ardea modesta</i>	☐	☒	☐	☐	☐	☒	☐	☐					☐	☐	nationally listed (EPBC Act) - marine	Occasionally breeds on Middle Island. This species contributes to the abundance and diversity of wetland birds supported by the site.
CHORDATA/AVES	<i>Arenaria interpres</i>	☐	☒	☒	☐	☐	☒	☐	☐	1708	2014	5.6	NT	☐	☐	nationally listed (EPBC Act) - migratory	Nationally listed migratory species (C, J, RK, CMS). The Interpres, Pacific & SE Asia (non-breeding) population estimate for this species is 30,000 individuals (EAAFP CSR 1), with a 1% threshold of 300. The site supports 5.6% of the population of this species.
CHORDATA/AVES	<i>Calidris acuminata</i>	☒	☒	☐	☐	☐	☐	☐	☐	19	2014		VU	☐	☐	nationally listed (EPBC Act) – vulnerable, migratory, marine	Nationally and internationally listed threatened species. Nationally listed migratory species (C, J, RK, CMS).
CHORDATA/AVES	<i>Calidris alba</i>	☐	☒	☒	☐	☐	☒	☐	☐	1181	2014	3.9	LC	☐	☐	nationally listed (EPBC Act) - migratory	Nationally listed migratory species (C, J, RK, CMS). The Rubida E & SE Asia, Australia, New Zealand (non-breeding) population estimate for this species is 30,000 individuals (EAAFP CSR 1), with a 1% threshold of 300. The site supports 3.9% of the population of this species.
CHORDATA/AVES	<i>Calidris canutus</i>	☒	☒	☐	☐	☐	☒	☐	☐	55	2014		NT	☐	☐	nationally listed (EPBC Act) - endangered, migratory, marine	Nationally listed threatened and migratory species (C, J, RK, CMS).
CHORDATA/AVES	<i>Calidris ferruginea</i>	☒	☒	☐	☐	☐	☒	☐	☐	850	2014	0.94	VU	☐	☐	nationally listed (EPBC Act) - critically endangered, migratory, marine	Internationally and nationally listed threatened and migratory species (C, J, RK, CMS). The E, SE Asia & Australia (non-breeding) population estimate for this species is 90,000 individuals (EAAFP CSR 1), with a 1% threshold of 900. The site supports 0.94% of the Australian population.
CHORDATA/AVES	<i>Calidris ruficollis</i>	☐	☒	☐	☐	☐	☒	☐	☐	1530	2014		NT	☐	☐	nationally listed (EPBC Act) - migratory, marine	Nationally listed migratory species (C, J, RK, CMS). This species contributes to the abundance and diversity of wetland birds supported by the site.
CHORDATA/AVES	<i>Calidris tenuirostris</i>	☒	☒	☐	☐	☐	☒	☐	☐	1592	2014		EN	☐	☒	nationally listed (EPBC Act) - critically endangered, migratory, marine	Internationally and nationally listed threatened and migratory species (C, J, RK, CMS).
CHORDATA/AVES	<i>Charadrius leschenaultii</i>	☒	☒	☒	☐	☐	☒	☐	☐	2559	2014	1.06	LC	☐	☐	nationally listed (EPBC Act) – vulnerable, migratory, marine	Nationally listed threatened and migratory species (C, J, RK, CMS). The Leschenaultii, SE Asia, Australia (non-breeding) population estimate for this species is 200,000-300,000 individuals (EAAFP CSR 1), with a 1% threshold of 2400. The site supports 1.06% of the population of this species.
CHORDATA/AVES	<i>Charadrius mongolus</i>	☒	☒	☐	☐	☐	☐	☐	☐	32	2014		EN	☐	☐	nationally listed (EPBC Act) - endangered, migratory	Internationally and nationally listed threatened and migratory species (C, J, RK, CMS).

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	<i>Charadrius veredus</i>	☐	☒	☐	☐	☐	☒	☐	☐				LC	☐	☐	nationally listed (EPBC Act) – migratory, marine	Nationally listed migratory species (J, CMS). This species breeds in Mongolia, Manchuria and Siberia, and migrates to Australia during its non-breeding season. The site provides important non-breeding habitat for the species during its annual migration through the East Asian – Australasian Flyway. This species contributes to the abundance and diversity of wetland birds supported by the site.
CHORDATA / AVES	<i>Egretta garzetta</i>	☐	☒	☐	☐	☐	☒	☐	☐				LC	☐	☐	nationally listed (EPBC Act) - marine	Occasionally breeds on West, Middle and East Islands. This species contributes to the abundance and diversity of wetland birds supported by the site.
CHORDATA / AVES	<i>Egretta sacra</i>	☐	☒	☐	☐	☐	☒	☐	☐				LC	☐	☐	nationally listed (EPBC Act) - marine	Regularly breeds on West, Middle and East Islands. This species contributes to the abundance and diversity of wetland birds supported by the site.
CHORDATA / AVES	<i>Fregata ariel</i>	☐	☒	☒	☐	☐	☐	☐	☐	7848	2019	33.1	LC	☐	☐	nationally listed (EPBC Act) - migratory, marine	Nationally listed migratory species (C, J, RK) Regularly breeds on Middle and East Islands. The iredalei, W Indian Ocean population estimate for this species is 23,700 individuals, with a 1% threshold of 240 (based on AEWA CSR 8 estimates). This species meets criterion 6 as the site supports 33.1% of the iredalei, W Indian Ocean population estimate.
CHORDATA / AVES	<i>Fregata minor</i>	☐	☒	☐	☐	☐	☒	☐	☐	245	2019		LC	☐	☐	nationally listed (EPBC Act) - migratory, marine	Nationally listed migratory species (C, J). Regularly breeds on Middle Island. Occasionally breeds on East Island.
CHORDATA / AVES	<i>Gallinago megala</i>	☐	☒	☐	☐	☐	☒	☐	☐				LC	☐	☐	nationally listed (EPBC Act) – migratory, marine	Nationally listed migratory species (C, J, RK, CMS). Swinhoe's Snipe is migratory, breeding in central Siberia and Mongolia and moving south for the boreal winter. The site provides important non-breeding habitat for the species during its annual migration through the East Asian – Australasian Flyway. This species contributes to the abundance and diversity of wetland birds supported by the site.
CHORDATA / AVES	<i>Glareola maldivarum</i>	☐	☒	☐	☐	☐	☒	☐	☐	1043	2014		LC	☐	☐	nationally listed (EPBC Act) - migratory	Nationally listed migratory species (C, J, RK, CMS).
CHORDATA / AVES	<i>Limicola falcinellus</i>	☐	☒	☐	☐	☐	☒	☐	☐					☐	☐	nationally listed (EPBC Act) - migratory	Nationally listed migratory species (C, J, RK, CMS). The subspecies sibirica, which occurs in Australia breeds in eastern Siberia. The site provides important non-breeding habitat for the species during its annual migration through the East Asian – Australasian Flyway. This species contributes to the abundance and diversity of wetland birds supported by the site.
CHORDATA / AVES	<i>Limnodromus semipalmatus</i>	☒	☒	☐	☐	☐	☐	☐	☐				NT	☐	☐	nationally listed (EPBC Act) - vulnerable, migratory	Nationally listed threatened and migratory species (C, J, RK, CMS).
CHORDATA / AVES	<i>Limosa lapponica</i>	☐	☒	☒	☐	☐	☒	☐	☐	4560	2014	3.8	NT	☐	☐	nationally listed (EPBC Act) - migratory, marine	Nationally listed migratory species (C, J, RK, CMS). The Menzbieri population estimate for this species is 100,000-150,000 individuals and the Anadyrensis population 6,300-7,400 individuals (EAAFP CSR 1), with a 1% threshold of 1200 and 70. Using the larger Menzbieri population, this site supports 3.8% of the Australian population.
CHORDATA / AVES	<i>Limosa limosa</i>	☒	☒	☐	☐	☐	☐	☐	☐	13	2014		NT	☐	☐	nationally listed (EPBC Act) - endangered, migratory	Nationally listed threatened and migratory species (C, J, RK, CMS).
CHORDATA / AVES	<i>Numenius madagascariensis</i>	☒	☒	☐	☐	☐	☐	☐	☐				EN	☐	☒	nationally listed (EPBC Act) – critically endangered, migratory	Internationally and nationally listed threatened and migratory species (C, J, RK, CMS).

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	<i>Numenius minutus</i>	☐	☒	☐	☐	☐	☒	☐	☐	50	2014		LC	☐	☐	nationally listed (EPBC Act) – migratory	Nationally listed migratory species (C, J, RK, CMS). This species breeds in central and north-east Russia and generally spend the non-breeding season in northern Australia. The site provides important non-breeding habitat for the species during its annual migration through the East Asian – Australasian Flyway. This species contributes to the abundance and diversity of wetland birds supported by the site.
CHORDATA/ AVES	<i>Numenius phaeopus</i>	☐	☒	☐	☐	☐	☒	☐	☐	536	2014	0.82	LC	☐	☐	nationally listed (EPBC Act) - migratory	Nationally listed migratory species (C, J, RK, CMS). The Variegatus, E & SE Asia (non-breeding) population estimate for this species is 65,000 individuals (EAAFP CSR 1), with a 1% threshold of 650. The site supports 0.82% of the Australian population.
CHORDATA/ AVES	<i>Nycticorax caledonicus</i>	☐	☒	☐	☐	☐	☒	☐	☐				LC	☐	☐	nationally listed (EPBC Act) - marine	Occasionally breeds on West Island. This species contributes to the abundance and diversity of wetland birds supported by the site.
CHORDATA/ AVES	<i>Onychoprion anaethetus</i>	☐	☒	☐	☐	☐	☒	☐	☐	400	2019		LC	☐	☐	nationally listed (EPBC Act) - migratory, marine	Nationally listed migratory species (C, J). Regularly breeds on Middle and East Islands. This species contributes to the abundance and diversity of wetland birds supported by the site.
CHORDATA/ AVES	<i>Onychoprion fuscatus</i>	☐	☒	☐	☐	☐	☒	☐	☐				LC	☐	☐		The site provides important nesting habitat and food sources for this species. This species contributes to the abundance and diversity of wetland birds supported by the site.
CHORDATA/ AVES	<i>Phaethon lepturus</i>	☐	☒	☐	☐	☐	☒	☐	☐	2	2019		LC	☐	☐	nationally listed (EPBC Act) - marine	Regularly breeds on West Island. Occasionally breeds on Middle and East Islands.
CHORDATA/ AVES	<i>Phaethon rubricauda</i>	☐	☒	☐	☐	☐	☒	☐	☐	84	2019		LC	☐	☐	nationally listed (EPBC Act) - marine	Regularly breeds on West Island. Occasionally breeds on Middle and East Islands.
CHORDATA/ AVES	<i>Phalaropus lobatus</i>	☐	☒	☐	☐	☐	☒	☐	☐				LC	☐	☐	nationally listed (EPBC Act) – migratory, marine	Nationally listed migratory species (C, J, RK, CMS). This species breeds in the Arctic and subarctic North America, Europe and Russia. The site provides important non-breeding habitat for the species during its annual migration through the East Asian – Australasian Flyway. This species contributes to the abundance and diversity of wetland birds supported by the site.
CHORDATA/ AVES	<i>Pluvialis fulva</i>	☐	☒	☐	☐	☐	☒	☐	☐	746	2014		LC	☐	☐	nationally listed (EPBC Act) – migratory, marine	Nationally listed migratory species (C, J, RK, CMS). The Pacific Golden Plover is a migratory species, breeding in the Northern Hemisphere and flying south for the boreal winter. The site provides important non-breeding habitat for the species during its annual migration through the East Asian – Australasian Flyway. This species contributes to the abundance and diversity of wetland birds supported by the site.
CHORDATA/ AVES	<i>Pluvialis squatarola</i>	☐	☒	☒	☐	☐	☒	☐	☐	1511	2014	1.89	VU	☐	☐	nationally listed (EPBC Act) – migratory, marine	Internationally listed threatened species. Nationally listed migratory species (C, J, RK, CMS). The quatarola, E, SE Asia & Australia (non-breeding) population estimate for this species is 80,000 individuals (#EAAFP CSR 1), with a 1% threshold of 800. The site supports 1.89% of the population of this species.
CHORDATA/ AVES	<i>Puffinus pacificus</i>	☐	☒	☐	☐	☐	☒	☐	☐					☐	☐	nationally listed (EPBC Act) - EPBC listed migratory, marine	(<i>Ardenna pacifica</i>) Nationally listed migratory species (J). Regularly breeds on West Island. The site provides important nesting habitat and food sources for this species. This species contributes to the abundance and diversity of wetland birds supported by the site.

Phylum	Scientific name	Species qualifies under criterion				Species contributes under criterion				Pop. Size	Period of pop. Est.	% occurrence 1)	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
		2	4	6	9	3	5	7	8								
CHORDATA/ AVES	<i>Sterna dougallii</i>	☐	☒	☐	☐	☐	☒	☐	☐	78	2019	0.08	LC	☐	☐	nationally listed (EPBC Act) - migratory, marine	Nationally listed migratory species (C, J). Occasionally breeds on Middle and East Islands. The gracilis, Australia & Moluccas Is estimate for this species is 90,000 individuals, and the gracilis, SE Asia population is 44,000 (EAAFP CSR1). Based on the higher gracilis, Australia & Moluccas Is population, the site supports 0.08% of the population.
CHORDATA/ AVES	<i>Sula dactylatra</i>	☐	☒	☐	☐	☐	☒	☐	☐	246	2019		LC	☐	☐	nationally listed (EPBC Act) – migratory, marine	Nationally listed migratory species (J, RK) Regularly breeds on Middle and East Islands.
CHORDATA/ AVES	<i>Sula leucogaster</i>	☐	☒	☐	☐	☐	☒	☐	☐	30168	2019	15	LC	☐	☐	nationally listed (EPBC Act) - migratory, marine	Nationally listed migratory species (C, J, RK). Regularly breeds on Middle and East Islands.
CHORDATA/ AVES	<i>Sula sula</i>	☐	☒	☐	☐	☐	☒	☐	☐	496	2019		LC	☐	☐	nationally listed (EPBC Act) - migratory, marine	Nationally listed migratory species (C, J). Regularly breeds on Middle and East Islands.
CHORDATA/ AVES	<i>Thalasseus bergii</i>	☐	☒	☐	☐	☐	☒	☐	☐	4458	2019	0.5	LC	☐	☐	nationally listed (EPBC Act) - migratory, marine	Nationally listed migratory species (J). Regularly breeds on Middle and East Islands.
CHORDATA/ AVES	<i>Tringa brevipes</i>	☐	☒	☒	☐	☐	☒	☐	☐	1791	2014	2.6	LC	☐	☐	nationally listed (EPBC Act) - migratory, marine	Nationally listed migratory species (C, J, RK, CMS). The population estimate for this species is 70,000 individuals (EAAFP CSR 1), with a 1% threshold of 700. The site supports 2.6% of the population of this species.
CHORDATA/ AVES	<i>Tringa incana</i>	☐	☒	☐	☐	☐	☒	☐	☐				LC	☐	☐	nationally listed (EPBC Act) – migratory, marine	Nationally listed migratory species (J, CMS). This species is a vagrant in the East Asian-Australasian Flyway and is uncommon in Australia. The distribution and status of this species in Asia and Australia is poorly known, partly because of confusion with the Grey-tailed Tattler. This species contributes to the abundance and diversity of wetland birds supported by the site.
CHORDATA/ AVES	<i>Tringa nebularia</i>	☐	☒	☐	☐	☐	☒	☐	☐	590	2014	0.54	LC	☐	☐	nationally listed (EPBC Act) - migratory	Nationally listed migratory species (C, J, RK, CMS). The E, SE Asia, Australia (non-breeding) population estimate for this species is 110,000 individuals (EAAFP CSR 1), with a 1% threshold of 1,100. The site supports 0.54% of the Australian population.
CHORDATA/ AVES	<i>Tringa stagnatilis</i>	☐	☒	☐	☐	☐	☒	☐	☐				LC	☐	☐	nationally listed (EPBC Act) – migratory, marine	Nationally listed migratory species (C, J, RK, CMS). This species breeds from eastern Europe to eastern Siberia, and migrates south for the boreal winter to non-breeding areas from Africa, across southern Asia to Australia. The site provides important non-breeding habitat for the species during its annual migration through the East Asian – Australasian Flyway. This species contributes to the abundance and diversity of wetland birds supported by the site.
CHORDATA/ AVES	<i>Tringa totanus</i>	☐	☒	☐	☐	☐	☒	☐	☐				LC	☐	☐	nationally listed (EPBC Act) – migratory, marine	Nationally listed migratory species (C, J, RK, CMS). This species breeds in the northern hemisphere and and migrates south for the boreal winter to non-breeding areas. The site provides non-breeding habitat for the species during its annual migration through the East Asian – Australasian Flyway. This species contributes to the abundance and diversity of wetland birds supported by the site.

Phylum	Scientific name	Species qualifies under criterion				Species contributes under criterion				Pop. Size	Period of pop. Est.	% occurrence 1)	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
		2	4	6	9	3	5	7	8								
CHORDATA/ AVES	<i>Xenus cinereus</i>	☐	☒	☐	☐	☐	☒	☐	☐	216	2014		LC	☐	☐	nationally listed (EPBC Act) – migratory, marine	Nationally listed migratory species (C, J, RK, CMS). This species breeds in the Northern Hemisphere and flying south for the boreal winter. The site provides important non-breeding habitat for the species during its annual migration through the East Asian – Australasian Flyway. This species contributes to the abundance and diversity of wetland birds supported by the site.

1) Percentage of the total biogeographic population at the site

Ashmore Reef supports more than 30 species listed under international migratory bird treaties (CAMBA, JAMBA, ROKAMBA and CMS). It includes three important bird areas under the Global Important Bird Area (IBA) criteria for: lesser frigatebirds (*Fregata ariel*), brown boobies (*Sula leucogaster*) and grey tailed tattlers (*Tringa brevipes*) (Keesing et al. 2020). It is a hotspot of biological diversity within the Timor Province bioregion and broader north-west marine region (Wells and Allen 2005).

The Ramsar Site has the highest diversity of hermatypic (reef building corals) on the West Australian coast with 275 species from 56 genera recorded (Vernon 1993, Griffith 1997) and the highest diversity of non-reef building corals in the region (Marsh 1993). The site also has a higher diversity of molluscs than other reefs in the bioregion, with over 600 species recorded (Wells 1993, Willan 2005).

Forty-seven species of sea cucumber are known to occur at the Site, which is higher than other reefs in the bioregion (Marsh et al. 1993). Ninety-nine species of decapod crustacean have been recorded at Ashmore Reef and Cartier Island, nearly twice that recorded at Scott and Seringapatam Reefs (Morgan and Berry 1993).

The diversity of fish is higher than other comparable reefs in the bioregion, with over 760 species recorded (Russell et al. 2005, Kospartov et al. 2006, Edgar et al. 2017, Edgar et al. 2020). Prior to the time of listing, the site was globally significant in terms of its sea snake abundance and diversity. The first records of the threatened grey nurse shark (*Carcharias taurus*) were recorded in the area covered by the MoU with Indonesia, south of the Ramsar site (Momigliano and Jaiteh 2015).

In the 2019 survey, only one olive sea snake (*Aipysurus laevis*) was observed (Keesing et al 2020). In the 1990s, there were estimated to be 40,000 sea snakes at Ashmore Reef from at least 13 species (Guinea and Pike 1994, cited in Commonwealth of Australia 2002). Research since 2003 showed a steep decline in abundance and diversity of sea snakes at Ashmore Reef. The reason for this decline remains unknown but may relate to changes in reef structure and habitats (Commonwealth of Australia 2009).

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

Name of ecological community	Community qualifies under Criterion 2?	Description	Justification
Reef and seagrass communities	☐	Description provided below.	

Optional text box to provide further information

The Site does not include any nationally/internationally listed threatened ecological communities identified under Criterion 2. However, Ashmore's reef and seagrass ecological communities are considered significant for their remoteness and representativeness.

Ashmore Reef is a platform reef (150 km²) on the edge of the continental slope. Glenn and Collins (2005) identified and described the following marine environments present within the Site:

- reef fronts (active growth areas punctuated with spur and groove formations and a high diversity of corals),
- reef crest (emergent up to 1.7 metres in a spring tide, characterised by the presence of coralline algae and a coral boulder zone),
- reef flat (covers approximately 32% of the Site),
- back reef sands (40% of total reef characterised by intertidal and sub-tidal sands),
- extensive seagrass beds and
- two lagoons with four islands or cays, including the recently vegetated Splittgerber Cay or Little East Island (Clarke et al. 2011).

These habitats support substantial populations of fish, crustaceans, echinoderms and both hard and soft corals. In nearly every species group, diversity is higher than nearby reefs in the region, although some holothurian, trochus and clam species are considered to have reproductively ineffective populations due to historical fishing pressures. In the reef and sand flats, up to five species of seagrass have been reported (*Thalassia hemprichii*, *Thalassodendron ciliatum*, *Halophila ovalis*, *H. decipiens* and *Halodule pinifolia*) (Pike and Leach 1997). However, only the first three have been confirmed in subsequent surveys (Skewes et al. 1999b, Brown and Skewes 2005). The dominant species is *T. hemprichii*, comprising over 85% of the total seagrass cover, followed by 13% *T. ciliatum* and just over 1% *H. ovalis* (Skewes et al. 1999b). Of these, *T. hemprichii* and *H. ovalis* were observed in 2019.

The seagrass beds provide important foraging habitat for dugong and turtles. The sand flats support a range feeding turtles, stingrays, echinoderms, molluscs (including clams), crustaceans and migratory shorebirds. Areas of sand flats that do not dry at low tide also have a sparse cover of soft corals and various algae. The lagoon habitats support a lower biological diversity, in terms of both coral and fish communities (Keesing et al. 2020). In contrast, the channel habitats and reef slopes are characterized by complex habitat characteristics, which in turn support a wide range of microhabitats and promote high abundance of marine life (Keesing et al. 2020).

The Site provides critical habitat for internationally significant numbers of seabirds and migratory shorebirds, with seabird breeding habitat showing a recent expansion and an overall increase in the numbers of seabirds observed (Keesing et al. 2020).

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

4.1 - Ecological character

The critical components and processes of the Site are:

- **Marine invertebrates:** the Site has a diversity of marine invertebrates including hard and soft corals, molluscs, echinoderms and crustaceans. Diversity of reef building (hermatypic) coral is high, with up to 275 species recorded. Soft, non-reef building corals are less well studied at Ashmore Reef.
Over 600 species of mollusc have been recorded from within the Site (Wells 1993, Willan 2005). Most species are from the gastropod family (greater than 80%) with approximately 15% of species being bivalves, and 7 species of cephalopod (octopus, squid) recorded. Two species of mollusc are endemic to Ashmore Reef, both are volute shells from the family Volutidae: *Amoria spenceriana* and *Cymbiola baili* (Willan 2005). Over 180 species of echinoderms have been recorded within the Site (Marsh et al. 1993). Dominant groups include sea lilies and feather stars (Crinoidea), starfish (Asteroidea), brittle stars (Ophiuroidea), sea urchins (Echinoidea) and sea cucumbers or bêche-de-mer (Holothuroidea). Information on crustacean communities and populations at Ashmore Reef is limited to decapod crustaceans (crabs, crayfish and prawns), of which 99 species were recorded in 1986.
- **Fish:** In 2019, comprehensive surveys recorded finfish from 43 families. 349 species were recorded with the composition of fish and sharks strongly influenced by reef zone (Keesing et al. 2020). Mean density of fish observed was 2,394 individuals per ha, with the highest densities recorded on the reef slope and west lagoon, where numbers neared 5,000 per ha. Sharks were rare, but this may have been due to survey techniques used. Over 750 species of fish have previously been recorded from within the Site (Allen 1993, Russell et al. 2005). Most fish species at Ashmore Reef are shallow water, benthic taxa that typically inhabit depths down to 100 m and are widely distributed throughout the Indo-West Pacific (Russell et al. 2005).
- **Seabirds and shorebirds:** Ashmore Reef supports an abundance and diversity of wetland birds, including seabirds and migratory shorebirds. Most of the species recorded at the Site are seabirds and shorebirds from the families Charadriiformes, Pelecaniformes and Procellariiformes. The islands provide nesting habitat for seabirds, and an overwintering site for migratory shorebirds. Middle and East Islands are the major sites for seabird breeding in terms of both numbers of species and abundance of nest sites.
- **Seasnakes:** historically, over 13 species of sea snake have been recorded within the Ramsar Site. Sea snake diversity and abundance has declined since the early 1990s. In 2019, a single specimen of the Olive sea snake was observed. The reason for this decline is unknown.
- **Turtles:** 3 species of marine turtle have been recorded within the Site, green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*) and loggerhead (*Caretta caretta*). All 3 species are listed as threatened under the EPBC Act and IUCN Red List. Green turtles are the most abundant and comprise of 90% of the total turtle population at Ashmore Reef. Green turtles are known to nest at West Island in the Site, with occasional records of hawksbill turtle nests. There are unconfirmed records of two loggerheads and one flatback turtle nest from the Site, but these have not been observed in recent monitoring (Whiting and Guinea 2005a).
- **Dugongs:** Ashmore Reef supports a small, but significant population of dugong (*Dugong dugon*) which is internationally listed as threatened. The population is estimated at around 100 individuals and comprises of all age classes from calves to mature adults (Whiting and Guinea 2005b). Dugongs have been observed during most months of the year, suggesting that they are resident or regular visitors to the Site, which is used for foraging and perhaps breeding.

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
A: Permanent shallow marine waters		1		Representative
B: Marine subtidal aquatic beds (Underwater vegetation)		3		Representative
C: Coral reefs		0		Representative
E: Sand, shingle or pebble shores		4		Unique
G: Intertidal mud, sand or salt flats		2		Representative

4.3 - Biological components

4.3.1 - Plant species

Other noteworthy plant species

Phylum	Scientific name	Position in range / endemism / other
TRACHEOPHYTA/MAGNOLIOPSIDA	<i>Amaranthus interruptus</i>	This species is native to Ashmore. It may provide nesting habitat for breeding seabirds.
TRACHEOPHYTA/MAGNOLIOPSIDA	<i>Cordia subcordata</i>	Provides nesting habitat for seabirds. Only a single individual is left at Ashmore Reef.
TRACHEOPHYTA/MAGNOLIOPSIDA	<i>Guettarda speciosa</i>	Provides nesting habitat for seabirds.
TRACHEOPHYTA/MAGNOLIOPSIDA	<i>Heliotropium foertherianum</i>	Provides nesting habitat for seabirds.
TRACHEOPHYTA/LILIOPSIDA	<i>Lepturus repens</i>	This is the dominant tufted grass species at the site. It is located near nesting sites.
TRACHEOPHYTA/MAGNOLIOPSIDA	<i>Sesbania cannabina</i>	Provides nesting habitat for seabirds.

Invasive alien plant species

Phylum	Scientific name	Impacts	Changes at RIS update
TRACHEOPHYTA/LILIOPSIDA	<i>Bulbostylis barbata</i>	Potential	unknown
TRACHEOPHYTA/LILIOPSIDA	<i>Cenchrus brownii</i>	Potential	unknown
TRACHEOPHYTA/LILIOPSIDA	<i>Cenchrus ciliaris</i>	Potential	increase
TRACHEOPHYTA/LILIOPSIDA	<i>Cenchrus echinatus</i>	Potential	No change
TRACHEOPHYTA/LILIOPSIDA	<i>Cenchrus pedicellatus</i>	Potential	unknown
TRACHEOPHYTA/MAGNOLIOPSIDA	<i>Euphorbia hirta</i>	Potential	unknown
TRACHEOPHYTA/MAGNOLIOPSIDA	<i>Tribulus cistoides</i>	Potential	No change
TRACHEOPHYTA/MAGNOLIOPSIDA	<i>Xenostegia tridentata</i>	Potential	unknown

Optional text box to provide further information

The marine flora of Ashmore Reef is not well studied but there are significant seagrass beds (the extent of these are described in previous sections) that provide important habitat for a number of marine species and a food source for dugongs and green turtles. Comparatively little is known about the algal communities at the Site. Mapping in 1999 indicated a total cover of 3,292 ha of algae at the site, comprising about 30% of the reef habitat (Skewes et al. 1999b, Kospartov et al. 2006).

The comprehensive ecological assessment of the islands completed in 2019 identified distinct vegetation communities across West Island (13 communities), Middle Island (9), East Island (10) and Splittgerber Cay (1) (Keesing et al. 2020). Forty-three terrestrial plant species have previously been identified at Ashmore Reef, although this number should be considered approximate due to misidentifications. During the 2019 survey, 29 terrestrial plant species were recorded (Keesing et al. 2020). In these surveys, researchers identified one new plant record tentatively identified as a Pandanus species. The abundance of large shrubs and trees is declining, with all palm trees (*Cocos nucifera*) now dead (Keesing et al. 2020). Shrubs are now completely absent from East Island and only one individual in poor health remains on Middle Island.

Alien plant species:

- Asthma weed (*Euphorbia hirta*) was not detected in the 2019 survey, despite targeted searching.
- Cat’s whisker (*Cleome gynandra*) - this species was not found in the plant database used for Table 4.3.1.
- Given that some of the introduced grasses at Ashmore Reef are a significant threat elsewhere in their introduced range (e.g. *Cenchrus ciliaris*), it is likely that there will be negative impacts on native vegetation, as well as possible indirect impacts on the faunal community.

Future management decisions as to control non-native plants will need to understand and consider possible cascading impacts to other community values, such as bird nesting habitat.

4.3.2 - Animal species

Other noteworthy animal species

Phylum	Scientific name	Pop. size	Period of pop. est.	%occurrence	Position in range /endemism/other
ECHINODERMATA/HOLOTHUROIDEA	<i>Actinopyga palauensis</i>				Contributes to the biodiversity of the site.
ECHINODERMATA/HOLOTHUROIDEA	<i>Holothuria rigida</i>				Contributes to the biodiversity of the site.

Invasive alien animal species

Phylum	Scientific name	Impacts	Changes at RIS update
CHORDATA/REPTILIA	<i>Hemidactylus frenatus</i>	Potential	No change
CHORDATA/MAMMALIA	<i>Mus musculus</i>	Potential	No change
CHORDATA/MAMMALIA	<i>Rattus rattus</i>	Potential	No change
ARTHROPODA/INSECTA	<i>Solenopsis geminata</i>	Potential	No change
ARTHROPODA/INSECTA	<i>Teleogryllus oceanicus</i>	Potential	No change

Optional text box to provide further information

The Site was once considered a refuge for 6 species of giant clam: *Tridacna maxima*, *T. gigas*, *T. squamosa*, *T. derasa*, *T. crocea* and *Hippopus hippopus*. Recent data indicates populations of these species remain depressed from historical fishing and/or other mortality. While *H. hippopus* (Horse’s hoof clam) is the most abundant species on the reef flat, its density has been greatly reduced from 130 per ha to 37 per ha. Recent data suggests *T. maxima* has increased in abundance on the reef slope (48 per ha). During this survey, 5 *T. gigas*, were observed, the most recorded at Ashmore Reef since the 1980s (Keesing et al. 2020).

In the 2019 survey, Holothurian diversity at Ashmore Reef was high (47 species, Marsh et al. 1993). Other dominant groups (numbers of species) recorded included sea lilies and feather stars (Crinoidea), starfish (Asteroidea), brittle stars (Ophiuroidea) and sea urchins (Echinoidea). The blue starfish (*Linckia laevigata*) was the most abundant macroinvertebrate (Edgar et al. 2017) observed. Other starfish observed in 2019 were *Acanthaster planci*, *Echinaster luzonicus*, *Fromia indica*, *Linckia guildingi*, *L. laevigata*, *L. multifora* and *Luidia maculata*.

The Site is a refuge for commercially valuable sea cucumbers, supporting significant populations of many species, including 5 threatened species. In 1998, the sea cucumber population was approximately 33.5 million, dominated by white thread fish (*Holothuria leucospilota*), a low commercial value species. In 2019, 18 species were observed. Many holothurian species are cryptic or burrowing and were not expected to be recorded using the visual surveying techniques applied (Keesing et al. 2020). There is evidence that fishing pressure has caused the local extinction of some species, such as *H. lessona*, a high value commercial species (Keesing et al. 2020). The most consistently recorded species since 1988 are *H. atra*, *H. edulis*, *H. argus*, *H. fuscogilva*, *H. leucospilota*, *H. whitmaei*, *Pearsonothuria graeffei*, *Stichopus chloronotus*, *S. hermanni* and *Thelenota ananas*.

The 2019 survey targeted key introduced species: tropical fire ant (*Solenopsis geminata*), and Asian house gecko (*Hemidactylus frenatus*) as well as introduced plant species. Surveys of *Mus musculus* on Middle Island were not undertaken in 2019. No evidence of impact of tropical fire ant on native species was observed. The potential impacts of the Asian house gecko on terrestrial invertebrate fauna remains unknown.

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 general climatic pattern is warm to hot temperatures and low rainfall. Annual rainfall is around 950mm and annual evaporation (approx. 1800mm) exceeds rainfall by a factor of 2 (Commonwealth of Australia 2002). There is a prevailing westerly and north-westerly rain bearing monsoon from November - March and dry south-easterly trade winds from May - September (Berry 1993). Ashmore Reef lies to the north of the main belt of tropical cyclones which form in the Timor Sea (January - March) and few cyclones pass close to the site (Berry 1993).

The site has been subject to a changing climate. Australia has warmed by 1.4°C since 1910. Further increases in temperatures are projected, with more extremely hot days and fewer extremely cool days over the coming decades under all emissions scenarios. Australian oceans have warmed by >1°C since 1910, contributing to longer and more frequent marine heatwaves. Sea levels are rising, increasing inundation risk, and the oceans are acidifying.

4.4.2 - Geomorphic setting

a) Minimum elevation above sea level (in metres)

a) Maximum elevation above sea level (in metres)

- Entire river basin

☐
- Upper part of river basin

☐
- Middle part of river basin

☐
- Lower part of river basin

☐
- More than one river basin

☐
- Not in river basin

☒
- Coastal

☒

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

Ashmore Reef lies on the confluence of the Pacific and Indian Oceans. It is located at the north-western boundary of the Browse and Bonaparte Basins, south-east of the Timor Trough, in the west of the Timor Sea. The reef rises from a depth of more than 400 m to the south and slopes gently to a depth of 220 m in the east-north-east (Glenn and Collins 2005).

4.4.3 - Soil

Mineral ☒

(Update) Changes at RIS update

No change ☒ Increase ☐ Decrease ☐ Unknown ☐

No available information ☐

Are soil types subject to change as a result of changing hydrological conditions (e.g., increased salinity or acidification)?

Yes ☐ No ☒

Please provide further information on the soil (optional)

The formation of Ashmore Reef may have commenced some 2-5,000,000 ago, by bacterial communities feeding on these hydrocarbon sources and forming carbonate structures. These higher relief features were then colonised by reef building biota as follows:

- 7,000-6,000 years ago: reef vertical growth began on the underlying Pleistocene layers and kept pace with sea levels.
- 6,000-4,000 years ago: a transitional phase of reef growth in response to slowly rising sea levels.
- 4,000 ago to present: a lateral extension of the reef, resulting in pronounced reef flats and the infilling of lagoons as mobile sand flats formed. (O'Brien et al 2002, O'Brien and Glenn 2005, cited in Hale and Butcher 2013).

4.4.4 - Water regime

Water permanence

Presence?	Changes at RIS update
Usually permanent water present	

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:

In addition to the marine environment, all three islands at Ashmore Reef have freshwater lenses. Data is only available for the groundwater at West Island. Measurements taken in October 2000 and March 2001 suggest a seasonal variation in salinity and dissolved oxygen. Glenn (2005) also noted that the depth to groundwater varied from 2.6 m in the height of the wet season to 2.9 m in the dry season.

(ECD) Stratification and mixing regime

The water column is relatively well mixed over at least 50 m, with little change in temperature.

4.4.5 - Sediment regime

Significant erosion of sediments occurs on the site ☐

(Update) Changes at RIS update

No change ☐ Increase ☐ Decrease ☐ Unknown ☒

Significant accretion or deposition of sediments occurs on the site ☐

(Update) Changes at RIS update

No change ☐ Increase ☐ Decrease ☐ Unknown ☒

Significant transportation of sediments occurs on or through the site ☐

(Update) Changes at RIS update

No change ☐ Increase ☐ Decrease ☐ Unknown ☒

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

(Update) Changes at RIS update

No change ☐ Increase ☐ Decrease ☐ Unknown ☒

Sediment regime unknown ☒

(ECD) Water temperature

Water temperature varies seasonally, ranging from 27°C in June/July to > 33°C in November / December (Glenn 2005).

4.4.6 - Water pH

Alkaline (pH>7.4) ☒

(Update) Changes at RIS update

No change ☒ Increase ☐ Decrease ☐ Unknown ☐

Unknown ☐

Please provide further information on pH (optional):

pH averages around 7.6 in Ashmore Reef lagoon (Glenn 2005).

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):

There are seasonal variations in the salinity of the ocean and lagoon water due to monsoonal rainfall (Wienberg et al. 2009). From 1995 to 1999 surface water salinity averaged 34 ppt near Ashmore Reef, with seasonal variations of around 0.5 ppt (Sprintall et al. 2003). In the lagoon, salinity ranged from 31 to 39 ppt (Glenn 2005).

4.4.8 - Dissolved or suspended nutrients in water

Eutrophic ☐

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

Mesotrophic ☐

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

Oligotrophic ☐

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

Dystrophic ☐

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

Unknown ☒

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

The waters of the Indonesian Throughflow are low in nutrients, but it is thought that the action of atolls such as Ashmore on internal waves can result in mixing of comparatively nutrient rich water from below the thermocline. No data on nutrient concentrations, however, could be sourced to confirm this theory or provide a quantitative description (Hale and Butcher 2013). Water quality parameters (including turbidity and clarity) remain a knowledge gap.

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 Site is located in the north east Indian Ocean, approximately 110 km south of the Indonesian island of Roti. The remote oceanic location of the Site is likely to have a significant effect on the ecological attributes of the Site.

4.5 - Ecosystem services

4.5.1 - Ecosystem services/benefits

Provisioning Services

Ecosystem service	Examples	Importance/Extent/Significance
Food for humans	Sustenance for humans (e.g., fish, molluscs, grains)	Low
Fresh water	Drinking water for humans and/or livestock	Low

Cultural Services

Ecosystem service	Examples	Importance/Extent/Significance
Recreation and tourism	Nature observation and nature-based tourism	Low
Spiritual and inspirational	Cultural heritage (historical and archaeological)	Medium
Scientific and educational	Important knowledge systems, importance for research (scientific reference area or site)	Medium
Scientific and educational	Major scientific study site	High

Supporting Services

Ecosystem service	Examples	Importance/Extent/Significance
Biodiversity	Supports a variety of all life forms including plants, animals and microorganisms, the genes they contain, and the ecosystems of which they form a part	High

Other ecosystem service(s) not included above:

The Ecological Character Description for Ashmore Reef (Hale and Butcher 2013) identifies the following ecosystem services for the site:

- near-natural wetland types: Ashmore Reef supports a number of largely unmodified wetland types.
- biodiversity: The Site is a hotspot of biodiversity within the Timor Province bioregion. It has the highest diversity of reef building corals; highest diversity of soft corals; more than 600 species of mollusc; over 180 species of echinoderm; nearly 100 species of decapod crustacean; over 750 species of finfish; and populations of turtles and dugong.
- physical habitat: Ashmore Reef supports large breeding colonies of seabirds.
- priority wetland species: The Site supports over 30 species of migratory shorebirds listed under international migratory bird treaties.
- threatened species: Ashmore Reef supports over 60 species listed as threatened at the national and/ or international level.

Within the site: 1000s

Outside the site: 1000s

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

4.5.2 - Social and cultural values

- i) the site provides a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland ☐
- ii) the site has exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland ☐
- iii) the ecological character of the wetland depends on its interaction with local communities or indigenous peoples ☐
- iv) relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland ☐

<no data available>

4.6 - Ecological processes

(ECD) Primary production	Seagrass species <i>Thalassia hemprichii</i> and <i>Halophila ovalis</i> are the predominant food source of green turtles. The Site includes over 3,000 ha of macroalgae, mostly on the reef slope and crest.
(ECD) Nutrient cycling	Near bottom turbulence, mixes cooler, nutrient rich waters below the thermocline with surface waters, increasing nutrients at shallow depths.
(ECD) Carbon cycling	Located in an area in an area of high oil and gas reserves, with active hydrocarbon seeps, which may have fed the bacterial communities that formed the reef (O'Brien et al. 2002).
(ECD) Animal reproductive productivity	The Site provides breeding and nesting sites for seabirds and turtles.
(ECD) Vegetational productivity, pollination, regeneration processes, succession, role of fire, etc.	Terrestrial vegetation productivity is seasonal. Annual grasses and herbs/ shrubs dominate vegetative productivity. Pollination systems are dominated by generalists.
(ECD) Notable species interactions, including grazing, predation, competition, diseases and pathogens	Changes in trophic structure of marine species has been detected from surveys in 2004 to 2016, with an increase in apex species and decline in lower trophic species (Speed et al. 2018, Edgar 2020).
(ECD) Notable aspects concerning migration	Marine mammals, reptiles and birds migrate through and to the Ashmore Reef Site.
(ECD) Pressures and trends concerning any of the above, and/or concerning ecosystem integrity	Illegal fishing, oil and gas extraction, human visitation, and climate change have the potential to put pressure on the Site.

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

5.1 - Land tenure and responsibilities (Managers)

5.1.1 - Land tenure/ownership

Public ownership

Category	Within the Ramsar Site	In the surrounding area
National/Federal government	☒	☒

Other

Category	Within the Ramsar Site	In the surrounding area
Commoners/customary rights	☒	☒

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

The entire Ramsar Site is a declared Australian Marine Park. Traditional Indonesian fishers are allowed to fish in the Recreational Use Zone of the marine park in accordance with the MoU arrangements between Indonesia and Australia

5.1.2 - Management authority

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

Marine Parks Branch, Parks Australia Division,
Department of Climate Change, Energy, the Environment and Water

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

Director, Marine Parks Management - West

Postal address:

GPO Box 3090
CANBERRA, ACT 2601
AUSTRALIA

E-mail address:

marineparks@dcceew.gov.au

5.2 - Ecological character threats and responses (Management)

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

Energy production and mining

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Oil and gas drilling	Low impact	High impact	☒	unknown	☒	unknown

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	High impact	☒	decrease	☒	unknown

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	Low 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	Low impact	Medium impact	☒	No change	☐	unknown

Pollution

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Industrial and military effluents	Low impact	unknown impact	☐	unknown	☒	unknown
Garbage and solid waste	Low impact	unknown impact	☒	unknown	☒	unknown
Excess heat, sound, light	Low impact	Medium impact	☒	unknown	☐	unknown

Climate change and severe weather

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Temperature extremes	Medium impact	Medium impact	☒	increase	☐	increase
Storms and flooding	unknown impact	unknown impact	☒	unknown	☐	unknown

Please describe any other threats (optional):

Threats to the ecological character of the Site include:

- biological resource use: fishing and hunting of marine fauna have historically been major activities within the site. Species targeted include: topshell (*Trochus niloticus*); sea cucumbers; giant clams; finfish and sharks; turtles and turtle eggs; seabirds and seabird eggs; and dugong.
- oil and gas exploration and mining: the northwest shelf region of Australia is significant for its reserves of oil and gas. Exploration has been undertaken in the area immediately adjacent to the Ramsar Site and may continue in future.
- invasive species: species that are known to be a significant threat elsewhere and are established on the islands include buffel grass (*Cenchrus ciliaris*) and tropical fire ants (*Solenopsis geminata*).
- marine debris: from shipping and from activities as far away as Indonesia wash up on the shores of the vegetated islands and are commonly seen within the aquatic ecosystems. Seabirds have been observed incorporating plastics and other material into nests. There is the potential for toxic and physical impacts on biota, for example through ingesting plastics.
- climate change: sea level rise, increases in sea surface temperature and ocean acidification have the potential to impact the Site. Ashmore Reef has a relatively low profile, with the islands just a few metres above mean sea level. An increase in sea level could result in an increase in submerged areas and intertidal sands at the expense of terrestrial vegetation and a corresponding loss of nesting sites for seabirds and green turtles. Increases in sea surface temperature will lead to coral bleaching and changes in community composition, with more resilient species increasing in the place of susceptible species. Increased carbon dioxide in the Earth's atmosphere will result in increased dissolved carbon dioxide in the oceans. While sea water has a large buffering capacity, the net result is a decrease in pH. This impacts the ability of organisms such as hard coral to grow and impairs the ability of species with calcareous shells (molluscs, echinoderms, crustaceans) to maintain shell integrity. This will lead to a change in the composition, diversity and abundance of reef organisms through direct impacts, and have flow on effects to fish and other organisms due to a loss of habitat and/or prey species.

5.2.2 - Legal conservation status

National legal designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
Commonwealth Marine Park	Ashmore Reef Marine Park	https://parksaustralia.gov.au/marine/parks/north-west/ashmore-reef/	whole

5.2.3 - IUCN protected areas categories (2008)

Ia Strict Nature Reserve ☒

Ib Wilderness Area: protected area managed mainly for wilderness protection ☐

II National Park: protected area managed mainly for ecosystem protection and recreation ☐

III Natural Monument: protected area managed mainly for conservation of specific natural features ☐

IV Habitat/Species Management Area: protected area managed mainly for conservation through management intervention ☐

V Protected Landscape/Seascape: protected area managed mainly for landscape/seascape conservation and recreation ☐

VI Managed Resource Protected Area: protected area managed mainly for the sustainable use of natural ecosystems ☐

5.2.4 - Key conservation measures

Legal protection

Measures	Status
Legal protection	Implemented

Species

Measures	Status
Threatened/rare species management programmes	Implemented

Human Activities

Measures	Status
Management of water abstraction/takes	Implemented
Fisheries management/regulation	Implemented
Regulation/management of recreational activities	Implemented
Harvest controls/poaching enforcement	Implemented
Research	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).

Legal protection is also applied through the regulation of resource use in the Reserve.

The Ramsar Site has been integrated into the North-west Marine Parks Network Management Plan 2018. This Reserve is now known as the 'Ashmore Reef Marine Park'.

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, but restoration is needed

5.2.7 - Monitoring implemented or proposed

Monitoring	Status
Plant species	Implemented
Animal species (please specify)	Implemented

The Management Plan for the Site commits to the development of a monitoring program, using environmental indicators to document and evaluate biodiversity condition and trends over time.

Site monitoring includes:

- Island topography
- Plant species
- Plant community composition
- Marine invertebrates - coral
- Marine invertebrates - molluscs
- Marine invertebrates - echinoderms
- Marine invertebrates - other (sea cucumbers; particularly listed species)
- Fish
- Sea snakes
- Marine turtles
- Seabirds
- Shorebirds
- Dugong

6 - Additional material

6.1 - Additional reports and documents

6.1.1 - Bibliographical references

See Bibliography in Section 6.1.2., under the filename, " AU1220_lit201116__bibliography.docx".

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

<1 file(s) uploaded>

6.1.3 - Photograph(s) of the Site

Please provide at least one photograph of the site:



Low tide at Ashmore Reef (*DAWE, 14-12-2021*)



Birds at Ashmore Reef (*DAWE, 14-12-2021*)

6.1.4 - Designation letter and related data

Designation letter

<1 file(s) uploaded>

Date of Designation 2002-10-21