Information Sheet on Ramsar Wetlands (RIS) – 2009-2014 version

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

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DD	MM	YY
21	10	2002

Designation date

1	2	2	0		

Site Reference Number

2. Date this sheet was completed/updated:
August 2013

3. Country:
Australia

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

Ashmore Reef Commonwealth Marine Reserve (formerly Ashmore Reef National Nature Reserve).

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

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

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

a) Site boundary and area

The Ramsar site boundary and site area are unchanged: ☑

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

and/or

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

** **Important note**: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

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

In the original RIS (2002) it was stated that the site met criterion 8; however assessment of recent literature does not support this claim. The original argument for meeting this criterion was based on the theory that biological material (and fish larvae) were transported from Ashmore Reef to southern reefs via the Indonesian Throughflow current (Simpson 1991). However, more recent evidence suggests that this is not the case and that Ashmore Reef Commonwealth Marine Reserve Ramsar site is most likely to be disconnected with respect to biological materials from southern reefs and the Kimberley coast (Underwood et al. 2013).

Current assessment of the status of ecological character indicates there is little evidence of significant change since listing in 2002 for the majority of components, processes, benefits and services. Certain critical components, such as dugongs and marine turtles, have a paucity of data, particularly in the decade since designation making detection of change difficult. In other cases, such as for fish, the disparity in survey methods and ways in which data is reported has meant that a quantitative assessment of change is not possible. However, there is no evidence of a decline and fish communities are still considered to be in good condition (Heyward et al. 2012).

Recent data from 2010 for seabirds and shorebirds indicate some increases in abundance and diversity at the site. For example, change analysis of five large bodied seabirds that breed at the site showed positive changes over the past decade (Clarke et al. 2011).

Hard and soft coral cover has expanded at the Ashmore Reef Commonwealth Marine Reserve Ramsar site since listing. Percentage cover of hard and soft corals within the Ramsar site at listing were relatively low, but by 2009 had increased. It has been postulated that coral cover was higher prior to a 1998 bleaching event, and the subsequent increase in cover was indicative of recovery. Maintaining resilience in these communities is considered critical for long term maintenance of ecological character (Ceccarelli et al. 2011b).

At the time of listing, diversity and abundance of seasnakes was on a trajectory of decline. Seasnakes were abundant and highly diverse at the site just four years prior to designation, were of moderate diversity and abundance in 2002 and have since declined further to very low diversity and abundances (Lukoschek et al. 2013). The exact causes of this are not known, with altered habitat, increased sea surface temperature, disease, pollution, loss of prey and seismic surveys all being suggested as possible causes (Guinea and Whiting 2005, Guinea 2008; Lukoschek et al. 2013).

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7. Map of site:

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

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

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

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

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

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b) Describe briefly the type of boundary delineation applied:

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

The boundary of the Ashmore Reef Commonwealth Marine Reserve Ramsar site is the same as Ashmore Reef Commonwealth Marine Reserve as gazetted in *Commonwealth of Australia Gazette,* G32, 16 August

1983, as amended by *Environment Protection and Biodiversity Conservation (Ashmore Reef National Nature Reserve) Amendment Proclamation 2012 (No.1)* entered on the Federal Register of Legislative Instruments as instrument F2012C00819 on 19 November 2012.

8. Geographical coordinates (latitude/longitude, in degrees and minutes):
Provide the coordinates of the approximate centre of the site and/or the limits of the site. If the site is composed of more than one separate area, provide coordinates for each of these areas.

Latitude: 12° 14' S, Longitude: 123° 07' E

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

The Ashmore Reef Commonwealth Marine Reserve Ramsar site is located in the Australian Territory of Ashmore and Cartier Islands on the outer edge of the continental shelf in the Indian Ocean and Timor Sea. The site is 840 kilometres west of Darwin (Northern Territory), Australia and 610 kilometres north of Broome (Western Australia), approximately 320 kilometres off Australia's northwest coast and 170 kilometres south of the Indonesian Island of Roti.

10. Elevation: (in metres: average and/or maximum & minimum)
0 - 3 metres above sea level.

11. Area: (in hectares)
The Ashmore Reef Commonwealth Marine Reserve Ramsar site is approximately 58 300 hectares.

12. General overview of the site:
Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

The Ramsar site comprises the area proclaimed as the Ashmore Reef Commonwealth Marine Reserve and is the largest of only three atolls present within the north-eastern Indian Ocean, and the only one which is vegetated. The territory does not support a permanent population, but Indonesian fishermen visit the Ramsar site each year under a Memorandum of Understanding signed by the Australian and Indonesian Governments, which allows them to land at West Island to obtain freshwater.

A diverse array of marine habitats are found within the bounds of the site and is considered a regional biodiversity hotspot being important for supporting the highest cover of seagrass in the region, a potentially genetically distinct population of dugong, the highest diversity of reef building corals (Vernon 1993, Griffith 1997), non-reef building corals (Marsh 1993), molluscs (Wells 1993, Willan 2005), sea cucumbers (Skewes et al. 1999a), a high number of decapod crustaceans (Morgan and Berry 1993) and fish (Russell et al. 2005, Kospartov et al. 2006) compared to other reefs in the region (see number of taxon listed for each group under justification for criterion 3 below). Furthermore, the Ramsar site includes important seabird and turtle nesting sites and supports large populations of migratory shorebirds and breeding seabirds. Prior to listing the site was considered internationally significant for seasnakes.

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

1	2	3	4	5	6	7	8	9
☑	☑	☑	☑	☑	☑	❑	❑	❑

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

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

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

Ashmore is the largest of the atolls in the Timor Province biogeographic region and has been managed for the purposes of conservation for three decades. Each of the wetland types present at Ashmore Reef Commonwealth Marine Reserve Ramsar site is in near natural condition, with low densities of coral predators and disease (Richards et al. 2009). The Ramsar site also has the highest seagrass cover in the bioregion (Russell et al. 2005). In addition, the three islands at the Ramsar site (West, Middle and East) represent the only vegetated islands within the Timor Province bioregion (DEWHA 2008). Thus, by definition the site contains bioregionally unique examples of wetland type E (sand, shingle or pebble shores).

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

There are 64 nationally and/or internationally threatened species supported by the Ramsar site including (see Appendix A for a full list of threatened species):

- 41 species of hard, reef forming coral
- one species of soft coral (*Heliopora coerulea*)
- two species of giant clam (*Tridacna gigas, Tridacna derasa*)
- five species of sea cucumber (*Actinopyga echinites, Actinopyga mauritiana, Actinopyga miliaris, Holothuria fuscogilva, Holothuria nobilis*)
- eight fish (*Bolbometopon muricatum, Cheilinus undulates, Cromileptes altivelis, Hemipristis elongate, Plectropomus laevis, Plectropomus areolatus, Sphyrna lewini, Sphyrna mokarran*)
- six reptiles (*Aipysurus fuscus, Aipysurus foliosquama, Aipysurus apraefrontalis, Chelonia mydas, Eretmochelys imbricate, Caretta caretta*) and
- a mammal (*Dugong dugon*).

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

There is abundant evidence that Ashmore Reef Commonwealth Marine Reserve Ramsar site represents a true "hotspot" of biological diversity within the Timor Province bioregion and within the 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). A total of 13 species of sea cucumber are known to occur at the site, which is higher than other reefs in the bioregion (Skewes et al. 1999a). 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 also higher than other comparable reefs in the bioregion with over 760 species recorded (Russell et al. 2005, Kospartov et al. 2006). Prior to the time of listing, the site was globally significant in terms of its seasnake abundance and diversity. Thirteen species of seasnake have been recorded from the waters of Ashmore Reef including two that are considered to be endemic to the site; leaf-scaled seasnake (*Aipysurus foliosquama*) and short-nosed seasnake (*Aipysurus apraefrontalis*) (Guinea 2008). However, at the time of listing the seasnake population at the site was on a trajectory of decline with respect to abundance and diversity and this trajectory has continued.

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

Ashmore Reef Commonwealth Marine Reserve Ramsar site supports 47 species of waterbird listed as migratory under international treaties and three species of migratory turtles: green (*Chelonia mydas*),

hawksbill (*Eretmochelys imbricate),* and loggerhead (*Caretta caretta*). The site also supports breeding of green and hawksbill turtles (Whiting and Guinea 2005a) dugongs (*Dugong dugong*) (Whiting and Guinea 2005b) and 20 species of waterbird (Clarke et al. 2011); including the species listed in Table 1 that breed in significant numbers within the Ramsar site.

Table 1: Waterbirds that breed at Ashmore Reef Commonwealth Marine Reserve Ramsar site.

English name	Scientific name	Comments
Brown booby	*Sula leucogaster*	Over 4000 breeding pairs in 2010 (Clarke 2010).
Lesser frigatebirds	*Fregata ariel*	Estimated that over 2000 breeding pairs occur on occasion (Clarke 2010).
Crested tern	*Thalasseus bergii*	1000 to 4000 breeding pairs estimated (Milton 1999) although the number regularly supported is more likely to be 1000 (Clarke 2010).
Bridled tern	*Onychoprion anaethetus*	500 to 1000 breeding pairs breed regularly at the site (Clarke 2010).
Sooty tern	*Onychoprion fuscata*	Up to 50 000 pairs (Milton 1999) and more recently 40,000 individual recorded (Clarke 2010).
Common noddy	*Anous stolidus*	Estimates of 13 500 to 35 000 breeding pairs (Milton 1999), with more recent counts of up to 45 000 individuals (Clarke 2010).

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

Comprehensive bird survey data for the Ashmore Reef Commonwealth Marine Reserve Ramsar site are relatively rare. Data from around the time of listing are reported as maximum counts of individual species over a number of years (Milton 2005) and so do not allow for an application of the principles of "regularly supports". More recent data have been collected from 2002 to 2010 (Clarke et al. 2011) and these have been presented as total counts in Table 2. This data does not consistently cover all parts of the Ramsar site and does not always include counts of shorebirds; as such total counts are likely to be higher. However, it is clear that there is sufficient evidence to state that the Ramsar site meets this criterion, with total waterbirds greater than 20 000 in six out of eight counts over the period 2002 to 2010.

Table 2: Counts of seabirds and shorebirds from Ashmore Reef Commonwealth Marine Reserve 2002 to 2010 (data from Clarke et al. 2011).

Location	Jan 2002	Jan 2003	Jan 2005	Oct 2005	Oct 2006	Oct 2007	Oct 2009	Apr 2010
Seabirds Middle Island	19 338	6971	3291	4540	17 613	21 924	6733	22 124
Seabirds – East Island	32 416	16 157	3845	14 360	19 046	14 396	10 468	41 057
Shorebirds – complete	11 334	14 164	18 255					4213
Total	**63 088**	**37 292**	**25 391**	**18 900**	**36 659**	**36 293**	**17 201**	**67 394**

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

Assessment of the Ashmore Reef Commonwealth marine Reserve Ramsar site against this criterion has been made using the latest Waterbird Population Estimates (Wetlands International 2013). There are no population estimates for frigatebirds or boobies and so this criterion cannot be applied to these species. As mentioned above, records from around the time of listing (and the proceeding decade) are reported only as maximum counts over a number of years (Milton 2005) and so the test for "regularly supports"

cannot be applied to these counts. Species for which maximum counts have exceeded the relevant one per cent population thresholds are provided in (
Table **3**). Given the lack of consistent count data, an application of the principle "regularly supports" is difficult. However, it is considered that one per cent population thresholds were exceeded in at least two thirds of seasons in which data is available for at least six species.

Table 3: Waterbirds species (with sufficient evidence to meet the provision of "regularly supports") for which maximum counts in the Ashmore Reef Commonwealth Marine Reserve Ramsar site exceed one per cent of the relevant population.

English name	Scientific name	Maximum count	Population (one per cent)	Years with counts above threshold
Sooty tern	*Onychoprion fuscata*	45 000 (1979-1998)	13 400	2003, 2005, 2006, 2007
Bar-tailed godwit	*Limosa lapponica*	4560 (2005)	1500	2002, 2003, 2005
Grey-tailed tattler	*Tringa brevipes*	1791 (2005)	500	1998, 2002, 2003, 2005, 2010
Ruddy turnstone	*Arenaria interpres*	1708 (2003)	290	1998, 2002, 2003, 2005, 2010
Sanderling	*Calidris alba*	1132 (2003)	220	2002, 2003, 2005, 2010
Greater sand plover	*Charadrius leschenaultii*	2559 (2005)	790	2002, 2003, 2005

Data from Milton (1999) and Clarke et al. (2011). Population estimates from the latest Waterbird Population Estimates (Wetlands International 2013) for the East Asia-Australasia Flyway.

15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):
Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:

Timor Province.

b) biogeographic regionalisation scheme (include reference citation):

Integrated Marine and Coastal Regionalisation for Australia (IMCRA v4, Commonwealth of Australia 2006).

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

Ashmore Reef Commonwealth Marine Reserve Ramsar site is located at the north-western boundary of the Browse and Bonaparte Basins, south-east of the Timor Trough. The reef rises from a depth of more than 400 metres to the south and slopes gently to a depth of 220 metres in the east-north-east (Glenn and Collins 2005). The region is a significant area of oil and gas reserves and natural hydrocarbon seepage. The formation of Ashmore Reef may have commenced some two to five million years ago, by bacterial communities feeding on hydrocarbons forming carbonate structures. These higher relief features were then colonised by reef building biota as follows (O'Brien et al. 2002, O'Brien and Glenn 2005):

a) Seven to six thousand years ago – reef vertical growth began on the underlying Pleistocene layers and kept pace with sea levels;
b) Six to four thousand years ago – a transitional phase of reef growth in response to slowly rising sea levels; and
c) Four thousand years ago to present – lateral extension of the reef, resulting in pronounced reef flats and the infilling of lagoons as mobile sand flats formed.

There are two large lagoons covering 55 square kilometres (25 per cent of the total reef area) with four northern entrances and are noted for exceptional coral growth. The east lagoon is three times larger than the west and has a depth of five to 15 metres. The west lagoon is deeper, with maximum depths exceeding 25 metres. The islands are vegetated sandy cay islands each with a freshwater lens. West Island is the largest (one kilometre in length) while Middle and East Island are about half this size. All three islands in the Ramsar site have beach rock.

Temperature and salinity of the oceanic water surrounding the site varies seasonally, with longer term variation linked to broad climatic patterns of El Nino and La Nina (Wienberg et al. 2009). Sea surface temperatures from a logger located off the west of Ashmore Reef from 1995 to 1999 indicated an average of 28.6 degrees Celsius and a range from 25 degrees Celsius in June / July to 31 degrees Celsius in November / December (Sprintall et al. 2003). The water column is relatively well mixed over at least 50 metres, with little change in temperature over this distance (Glenn 2005).

Satellite measurements of the lagoon waters of the Ramsar site indicate a seasonal cycle in water temperature ranging from 27 degrees Celsius in June/July to over 33 degrees Celsius in November / December (Glenn 2005). Direct measures from the lagoon indicate temperature variations from 25 to 38 degrees Celsius; salinity ranging from 31 to 39 parts per thousand and pH averaging around 7.6 (Glenn 2005).

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

The hydrodynamic energy at the Ramsar site is high with a mean wave height of one to two metres and tidal currents averaging one metre per second (Glenn and Collins 2005). Tides are semi-diurnal (two tidal cycles per day) with a spring tidal range of 4.75 metres and a neap tide of 1.8 metres (Wienberg et al. 2009). Glenn and Collins (2005) estimated that on a spring tide 7500 gigalitres of water washes over the reef at the Ramsar site.

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17. Physical features of the catchment area:

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

Ashmore Reef Commonwealth Marine Reserve Ramsar site lies on the confluence of the Pacific and Indian Oceans. The high temperature, low salinity waters of the Western Pacific Warm Pool flow into the Indian Ocean through the Indonesian archipelago forming the major ocean current known as the Indonesian Throughflow. The surface flow of warm, low nutrient water varies seasonally. During autumn and winter there is a strong south-westerly flow along the coastal margin, recently named the Holloway Current. This creates a strong thermocline of warm, low nutrient water over cooler, comparatively nutrient rich waters at depth. During the summer monsoonal months, however, the Indonesian Throughflow and Holloway Currents are weakened as the pressure gradient between the Pacific and Indian Oceans is reduced. During this time, wind driven currents result in recirculation of surface waters in an easterly or northerly direction (DEWHA 2008, Underwood et al. 2013).

Surface currents around the site are also influenced by broad climatic patterns, such as the Southern Oscillation / El Nino and La Nina events. The effect of these climatic events is complex and to some extent uncertain. While El Nino events coincide with a weakening of the strength of the Indonesian Throughflow in general (DEWHA 2008); there is evidence that such events may also result in increased transport through the Timor Strait (close to the site) and reduced transport through the Indonesian archipelago (Sprintall et al. 2003)

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

There are large areas of mobile sand flats within Ashmore Reef Commonwealth Marine Reserve Ramsar site. Shifting sand cays and sand fans develop from the reef flat and encroach on the lagoons. Fresh water lenses occur on all three islands during the monsoon season, but only on West Island is this water used for drinking. A water pump has been installed near the beach for use by visiting Indonesian fishermen and there is a covered well near the centre of the island.

19. Wetland Types

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

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

Inland: L • M • N • O • P • Q • R • Sp • Ss • Tp Ts • U • Va •
Vt • W • Xf • Xp • Y • Zg • Zk(b)

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

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

A, G, B, C, E.

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

Marine Habitats
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 per cent of the site), back reef sands (40 per cent of total reef characterised by intertidal and sub-tidal sands) and two lagoons with three islands. As stated in sections 12 and 14 above, the marine environments support substantial populations of fish, crustaceans, echinoderms and both hard and soft corals. In the reef flats and sand flats up to five species of seagrass have been reported (*Thalassia hemprichii*, *Thalassodendron ciliatum*, *Halophila ovalis*, *Halophila decipiens* and *Halodule pinifolia*) (Pike and Leach 1997). However, only the first three of these have been confirmed in subsequent surveys (Skewes et al. 1999b, Brown and Skewes 2005). The dominant species is *Thalassia hemprichii*, which comprises over 85 per cent of the total seagrass cover within the Ramsar site, followed by *Thalassodendron ciliatum*, with 13 per cent and *Halophila ovalis* with just one per cent (Skewes et al. 1999b). Seagrass grows in a patchy distribution across the sand flats, but has a higher coverage on the reef flat area, where it extends to within 100 metres of the reef crest. The area of greatest cover and diversity is in the west and south west of the site in the inner reef flat (Brown and Skewes 2005).

The seagrass beds provide important habitat for a number of species including Dugong and turtles. The sand flat habitats support a range of species including 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 wide range of fish,

and predators such as sharks and seasnakes. It is also a feeding area for Dugong and turtles. The lagoons support corals, sponges and a range of holothurians, echinoderms and polychaetes on and beneath the substrate.

Terrestrial Habitats

Terrestrial habitats in the Reserve consist of three vegetated islands (West, Middle and East Islands) and numerous un-vegetated sand cays. A total of 39 terrestrial plant species have been recorded from the West Island within the Ramsar site (Russell et al. 2004). The number of plant species is small, but probably dynamic as new species are introduced through seed drift and others lost due to cyclones, high tides, beach erosion on the actions of animals (Bellio et al. 2007). The interior of all three of the islands consists of grasslands and herb fields dominated by annual species that are mostly wind dispersed. The woody octopus bush (*Heliotropium foertherianum*) grows in a band within 15 metres of the shore fringing West Island, forming the dominant structural layer at this site and reaching heights of up to six metres. In contrast, Middle and East Islands have lower vegetation, with isolated shrubs up to three metres in height. East Island is predominantly grassland, with a species mix that includes *Digitaria marianensis*, *Lepturus repens* and *Sporobolis virginicus*. Middle Island has the vestigial remnants of a fringing shrubland, comprising *Scaevola sericea*, *Argusia argentea* and *Suriana maritima* and an interior herbfield with areas of *Amaranthus interruptus* and *Cleome gynandra* along with a range of grasses similar to that found on East Island (Pike and Leach 1997) (See Appendix B for list of vascular flora from Pike and Leach 1997).

The vegetated islands provide important nesting habitat for many species, including marine turtles and a number of seabirds and migratory birds. The Middle Island shrubs provide the nesting habitat for great frigate birds (*Fregata minor*), wedge-tailed shearwater (*Ardenna pacifica*) nests in shallow burrows dug in the soft sand under low vegetation on West Island, bridled tern (*Onychoprion anaethetus*) typically nest in loose aggregations on Middle and East Island concealed under herbaceous vegetation, and red-footed booby (*Sula sula*) have been observed nesting in octopus bush on Middle and East Islands.

21. Noteworthy flora:

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

The marine flora of Ashmore Reef Commonwealth Marine Reserve Ramsar site is not well studied but there are significant seagrass beds (see Marine habitats in previous section) that provide important habitat for a number of marine animal species. Comparatively little is known about the algal communities at the Ramsar site, with no comprehensive species list. Mapping in 1999 indicated a total cover of 3292 hectares of algae at the site, comprising about 30 per cent of the reef habitat (Skewes et al. 1999b, Kospartov et al. 2006).

Terrestrial flora are limited, dynamic and briefly described in section 20 above. The site has a number of invasive terrestrial species. This includes: beach caltrop (*Tribulus cistoides*), burr grass (*Cenchrus brownii*), buffel grass (*Cenchrus ciliaris*), Mossman River grass (*Cenchrus echinatus*), feather grass (*Pennisetum pedicellatum*), water grass (*Bolbostylis barbata*), Asthma weed (*Euphorbia hita*) and cat's whisker (*Cleome gynandra*).

22. Noteworthy fauna:

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

Seventeen species of seasnake have been recorded within the Ashmore Reef Commonwealth Marine Reserve Ramsar site, including three species listed as critically endangered or endangered (see Appendix A). Density of seasnakes was estimated at 2.2 individuals per hectare on the reef flat and the total population at the site estimated at almost 40 000 (Guinea and Whiting 2005). Whilst the site still supports

seasnakes catch per unit effort has dropped since 1998, the exact causes of this are not known. It may be related to sea surface temperatures and the high temperatures in 1998, perhaps to harvesting, or increased vessel traffic, or due to oil and gas activities in the area (Guinea 2008). The reason for the decline and the potential for recovery remains a significant knowledge gap.

Three species of marine turtle have been recorded within the Ashmore Reef Commonwealth Marine Reserve Ramsar site, green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*) and loggerhead (*Caretta caretta*) (see section 14 and Appendix A).

Green turtles are the most abundant of the three species and comprise of 90 per cent of the total turtle population at the Ramsar site. Loggerhead turtles comprise some seven per cent of total turtle numbers and hawksbill just over one per cent (Whiting and Guinea 2005a). Total population estimates for green turtles are around 10 000 (six individuals per hectare) for the Ramsar site (Whiting and Guinea 2005a). Green turtles are known to nest at West Island, with occasional records of hawksbill turtle nests (Whiting and Guinea 2005a). Numbers of turtles nesting each year is highly variable, for example there was an average of 0.7 green turtle nests per night in 1998 and 34 nests per night in 1999 (Whiting and Guinea 2005a), making it difficult to estimate average nesting numbers. Hatching success varied between 75 and 93 per cent, which is within the range found on other beaches in Australia

Ashmore Reef Commonwealth Marine Reserve Ramsar site supports a small, but significant population of the internationally listed vulnerable mammal species, dugong (*Dugong dugon*). 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.

Diversity of reef building (hermatypic) coral at the Ramsar site is high, with 255 species from 56 genera recorded in 1986 (Vernon 1993). Taxonomic revisions and additional surveys have resulted in a net increase in species numbers to 275 (Griffith 1997, Ceccarelli et al. 2011b). Species are typical of the indo-pacific region and none are unique or considered endemic. However, 41 species (15 per cent of the total hard coral species at the site) are listed as vulnerable on the IUCN Red List (see Appendix A). Dominant families (in terms of numbers of species and cover) are Acroporidae, Faviidae and Poritidae (Vernon 1993). Temporal changes in coral cover at the Ramsar site have been dramatic, with an eight fold increase in coral cover from 1998 to 2009. The increase in live hard coral cover may be indicative of recovery of the community after a bleaching event in 1998, and represent part of a cycle of variation (Ceccarelli et al. 2011b).

In 1986, 39 soft coral taxa were recorded within the site, including the vulnerable blue coral (*Heliopora coerulea*) which was moderately common on the reef flats (Marsh 1993). In 1998, the total cover of soft coral at Ashmore Reef Commonwealth Marine Reserve Ramsar site was 323 hectares and Sarcophyton spp. were the dominant taxa covering around 19 hectares in total (Skewes et al. 1999b). Temporal changes in soft coral cover have followed a similar pattern to that described for hard corals above.

Ashmore Reef Commonwealth Marine Reserve Ramsar site also supports six of the eight known species of giant clam (*Tridacna maxima*, *T. gigas*, *Hippopus hippopus*, *T. squamosa*, *T. derasa* and *T. crocea*), and is considered a refuge for these commercially valuable species. Horse's hoof clam (*Hippopus hippopus*) is the dominant giant clam species at the site with a mean density of almost 50 per hectare in reef flat habitats in 1998 (Skewes et al. 1999a). Over 180 species of echinoderms have been recorded within the Ramsar site (Marsh et al. 1993). Dominant groups (in terms of numbers of species) include: sea lilies and feather stars (Crinoidea), starfish (Asteroidea), brittle stars (Ophiuroidea), sea urchins (Echinoidea) and sea cucumbers or bêche-de-mer (Holothurioidea). The Ramsar site is considered a refuge for commercially valuable sea cucumber species, and supports significant populations of many species including five listed threatened species (see Appendix A). In 1998, the total estimated population of sea-cucumbers at Ashmore Reef Commonwealth Marine Reserve Ramsar site was approximately 33.5 million, dominated by the low

commercial value species white thread fish (*Holothuria leucospilota*) which comprised over 96 per cent of the total population.

The site supports an abundance and diversity of water birds. A total of 72 species have been recorded within the Ramsar site including includes 47 species that are listed under international migratory agreements CAMBA (40), JAMBA (43) and ROKAMBA (35) as well as an additional 22 Australian species that are listed as marine under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The majority of species recorded at the site are seabirds and shorebirds from the families Charadriformes, Pelecaniformes and Procellariformes. The site is also significant for the role it plays in supporting individual bird species. Maximum counts for eight bird species exceed the one per cent population thresholds (see section 14). Twenty species have been recorded breeding within the site. This includes fifteen species that regularly nest at the site and a further five that use the site occasionally. Middle and East Islands are the major sites for seabird breeding in terms of both numbers of species and abundance of nest sites. Recent analysis has indicated that the Ashmore Reef Commonwealth Marine Reserve Ramsar site supports over 100 000 breeding seabirds in a 12 month cycle (Clarke et al. 2011).

The invasive species Ginger ants (*Solenopsis geminate*; also known as tropical fire ants) were first formally recorded on the islands within the Ramsar site in 1992, but are likely to have been at the site for some years prior to this, arriving from Indonesia with fishers (Bellio et al. 2007). Other introduced fauna species known from the site are: black field cricket (*Teleogryllus oceanicus*), Asian house gecko (*Hemidactylus frenatus*), house mouse (*Mus Musculus*) and black rat (*Rattus rattus*).

23. Social and cultural values:

a) Describe if the site has any general social and/or cultural values e.g., fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values:

Indonesians have traditionally fished the reefs of the Ashmore region for several centuries and it is thought that the Bajo and Makassan people from Sulawesi explored the system in the mid 1700s. Traditional fishers replenished water from the fresh water wells on the islands of the Ramsar site and harvested fish, birds, bird eggs, sea cucumbers, clam flesh, shells, turtles and turtle eggs for food and trade. The islands within the Ramsar site contain a number of Indonesian artefacts including ceramics and a relic cooking site; and there are graves located on both West and Middle Islands (Russell et al. 2004).

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning?

If Yes, tick the box ❑ and describe this importance under one or more of the following categories:

i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:

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

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

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

24. Land tenure/ownership:
a) within the Ramsar site:

The Territory of Ashmore Reef and Cartier Island is administered by the Commonwealth of Australia.

b) in the surrounding area:

Ashmore Reef Commonwealth Marine Reserve Ramsar site lies within the Australian Commonwealth's Exclusive Economic Zone (EEZ), and the area of the Indian ocean and reefs known as the MOU Box that is subject to a Memorandum of Understanding between Indonesia and Australia (MOU 1974, and revised 1989), which provides for continued Indonesian traditional fishing activities in the area while protecting the marine habitats of the area.

25. Current land (including water) use:
a) within the Ramsar site:
The islands, reef and surrounding waters to a boundary approximately following the 50 m bathymetric contour have been declared the Ashmore Reef Commonwealth Marine Reserve. The Reserve is managed under the EPBC Act by the Director of National Parks. Priority is given to the protection of the natural features of the Ramsar site. Commercial exploitation such as commercial fishing, mining or oil exploration is prohibited within the Ramsar site. Other commercial activities such as commercial tourism may only be carried out upon a permit being issued by the Director of National Parks.
Access to most of Ashmore Reef Commonwealth Marine Reserve Ramsar site is closed to all members of the public by a determination in force under the EPBC Act. Non-commercial fishing for immediate consumption is permitted in West Island Lagoon of the Ramsar site.

b) in the surroundings/catchment:
The major activities in the surrounding waters are oil and gas production and exploration and traditional harvesting of trochus, giant clams, sea cucumbers, fish and sharks.

26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:
a) within the Ramsar site:
Natural events such as cyclones have previously inflicted damage to reefs nearby, and have likely affected both the terrestrial and marine environments of Ashmore Reef Commonwealth Marine Reserve Ramsar site, although specific investigations on this have not yet occurred. Human uses, including non-traditional (recreational, management, research, illegal immigrants) and traditional uses represent historic, present and future threats that primarily relate to harvesting and extraction, introductions of non-indigenous species (marine and terrestrial) and pollution (Russell et al. 2004). There is strong evidence to suggest that past hunting and fishing activities have resulted in a decline in the diversity and abundance of target species and communities within the Ramsar site (Skewes et al. 1999a).

Ginger ants (*Solenopsis geminate*; also known as tropical fire ants) were first formally recorded on the islands within the Ramsar site in 1992, but are likely to have been at the site for some years prior to this, arriving from Indonesia with fishers (Bellio et al. 2007). They are an opportunistic feeder and actively prey on invertebrates, vertebrates and plants. With respect to the Ashmore Reef Commonwealth Marine Reserve Ramsar site, they are considered a threat to nesting seabirds and turtles, attacking nestlings and eggs that have just started to hatch and have a broken shell, providing the ants with access (Bellio et al. 2007).

b) in the surrounding area:
The northwest shelf region of Australia is significant for its reserves of oil and gas. The Ashmore Reef Commonwealth Marine Reserve Ramsar site is located in the Bonaparte Basin of this region and oil exploration commenced within the Ramsar site in 1968 with the drilling of the Ashmore Reef – 1 exploration well (Department of Resources, Energy and Tourism 2011). There is potential for impacts from oil spills and underwater noise created during seismic surveys. On the 21st August 2009, Montara

reservoir fluids and gases were accidently released, with an estimated 64 000 litres of crude oil released per day and the spill continuing for 72 days (Gilbert et al. 2010). Trajectory modelling indicated that surface oil, in low concentrations, might have extended into the Ramsar site boundary (Gilbert et al. 2010).

Climate changes has the potential to impact on the ecological character of the Ashmore Reef Commonwealth Marine Reserve Ramsar site via sea level rise, increases in sea surface temperature and ocean acidification. The Ramsar site 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. In 1998, high sea surface temperature led to widespread bleaching of corals at the Ramsar site and nearby atoll systems (Ceccarelli et al. 2011b). This led to a change in community composition, with more resilient species increasing and a decrease in cover of susceptible species and possible flow on effects to invertebrate and fish communities from the change in habitat (Kospartov et al. 2006). There is evidence from elsewhere that increased sea surface temperatures can also negatively impact on larvae of invertebrates and fish decreasing recruitment (Commonwealth of Australia 2012). There have also been suggestions that increases in sea surface temperature have affected seasnake abundance and diversity (Guinea 2008).

Increased carbon dioxide in the Earth's atmosphere results in increased dissolved carbon dioxide in the oceans. While sea water has a large buffering capacity, the net result is a decrease in pH (Howard et al. 2012). 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 (Commonwealth of Australia 2012). This ultimately could lead not only to a change in the composition, diversity and abundance of reef organisms through direct impacts; but have flow on effects to fish and other organisms due to a loss of habitat.

Marine debris from shipping and from activities as far away as Indonesia washes up on the shores of the vegetated islands and is commonly seen within the aquatic ecosystems. Seabirds have been observed incorporating plastics and other debris material into nests and there is the potential for toxic and physical impacts on biota.

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27. Conservation measures taken:

a) List national and/or international category and legal status of protected areas, including boundary relationships with the Ramsar site:

In particular, if the site is partly or wholly a World Heritage Site and/or a UNESCO Biosphere Reserve, please give the names of the site under these designations.

The Ramsar site comprises the area proclaimed as the Ashmore Reef Commonwealth Marine Reserve (previously Ashmore Reef National Nature Reserve) in August 1983 under the *National Parks and Wildlife Conservation Act 1975*. The Reserve is now managed under the provisions of the EPBC Act.

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

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

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

Interim management arrangements under the EPBC Act for Ashmore Reef Commonwealth Marine Reserve commenced on 26 June 2009 following the expiry of the most recent management plan for the reserve. The interim management arrangements will continue unchanged until the North-west Commonwealth Marine Reserves Network management plan comes into effect on 1 July 2014.

Marine Bioregional Plan for the North-west Marne Region 2012, Department of Sustainability, Environment, Water, Population and Communities, Canberra.

d) Describe any other current management practices:

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

North-west Commonwealth Marine Reserves Network Management Plan 2014-24.

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

The remote nature of Ashmore Reef Commonwealth Marine Reserve 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. The Ramsar site was surveyed by the Western Australian Museum in the late 1980s including fish, birds, vegetation, and marine invertebrates (Berry 1993). Research continues today with a number of long term monitoring and research projects conducted at the site. The Department of the Environment continues its commitments to a research program that identifies gaps in scientific knowledge relating to the management of the Ramsar site, outlines research priorities for the Ramsar site and encourages appropriate research with permits or approvals.

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

Ashmore Reef Commonwealth Marine Reserve Ramsar site is in a special category with respect to CEPA, in that it is mostly closed to the public and the main target group for informing about the site is Indonesian fishers that arrive to use the freshwater resources under the MOU agreement. There is currently a program in place whereby they are provided with information about the site, via that Customs Officers play to any arrivals and through an information booklet distributed to fishing villages. Key messages include:

1. The Australian and Indonesian Governments are working together to manage the environment within the MOU Box.

2. Landing of vessels is not permitted on Ashmore/Cartier with the exception of obtaining fresh water from specified locations and to visit graves of ancestors.

3. What is and isn't allowed to occur in MOU Box and Commonwealth Marine Reserve with regard to certain fishing methods and taking of marine animals.

4. Fishing is permitted within the MOU Box using traditional vessels (non-motorised) only.

5. Safety recommendations.

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

Ashmore Reef Commonwealth Marine Reserve Ramsar site is closed to the general public and visitation is by permit only. Despite this there are one or two visits per year by a commercial tourist boat with up to 20 passengers, primarily for wildlife viewing. Recreational yachts also visit the Ramsar site, usually only for several days each visit, and only 15 to 20 vessels per annum.

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

The Territory of Ashmore and Cartier Islands is administered by the Commonwealth Department of Transport and Regional Services. The Ramsar site is a Commonwealth Marine Reserve, and is subject to the provisions of the EPBC Act.

33. Management authority:

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

Management of the reserve is the responsibility of the Director of National Parks under the provisions of the EPBC Act. Day to day management of the Reserve is undertaken by the Commonwealth Marine Reserves Branch, Parks Australia Division, Department of the Environment.

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Canberra ACT 2601
Australia
Phone: +61 2 6274 1111
Email:
marinereserves@environment.gov.au

34. Bibliographical references:

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

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Appendix A: Threatened species

Threatened species recorded from Ashmore Reef Commonwealth Marine Reserve

Common name	Species name	EPBC Act	IUCN	CMS	CITES	Reference
Starry cup coral	*Acanthastrea bowerbanki*		Vulnerable		Appendix II	Vernon 1993
A staghorn coral	*Acropora abrolhosensis*		Vulnerable		Appendix II	Vernon 1993, Griffith 1997
A staghorn coral	*Acropora acuminata*		Vulnerable		Appendix II	Vernon 1993, Griffith 1997
A staghorn coral	*Acropora aculeus*		Vulnerable		Appendix II	Kospartov et al. 2006
A staghorn coral	*Acropora anthocercis*		Vulnerable		Appendix II	Vernon 1993, Griffith 1997
A staghorn coral	*Acropora aspera*		Vulnerable		Appendix II	Vernon 1993, Griffith 1997
A staghorn coral	*Acropora caroliniana*		Vulnerable		Appendix II	Vernon 1993
A staghorn coral	*Acropora horrida*		Vulnerable		Appendix II	Vernon 1993, Griffith 1997
A staghorn coral	*Acropora listeri*		Vulnerable		Appendix II	Kospartov et al. 2006
A staghorn coral	*Acropora microclados*		Vulnerable		Appendix II	Richards et al. 2009
A staghorn coral	*Acropora spicifera*		Vulnerable		Appendix II	Richards et al. 2009
A staghorn coral	*Acropora willisae*		Vulnerable		Appendix II	Richards et al. 2009
A staghorn coral	*Acropora paniculata*		Vulnerable		Appendix II	Vernon 1993, Griffith 1997
A staghorn coral	*Acropora solitaryensis*		Vulnerable		Appendix II	Vernon 1993, Griffith 1997
A staghorn coral	*Acropora verweyi*		Vulnerable		Appendix II	Vernon 1993
A net coral	*Alveopora fenestrata*		Vulnerable		Appendix II	Vernon 1993
A net coral	*Alveopora verrilliana*		Vulnerable		Appendix II	Vernon 1993
A hedgehog coral	*Echinopora ashmorensis*		Vulnerable		Appendix II	Vernon 1993
Hammer coral	*Euphyllia ancora*		Vulnerable		Appendix II	Vernon 1993
Starburst coral	*Galaxea astreata*		Vulnerable		Appendix II	Vernon 1993, Griffith 1997
Mushroom coral	*Heliofungia actiniformis*		Vulnerable		Appendix II	Vernon 1993
Yabe's coral	*Leptoseris yabei*		Vulnerable		Appendix II	Richards et al. 2009
A lobed cactus coral	*Lobophyllia diminuta*		Vulnerable		Appendix II	Kospartov et al. 2006
A lobed cactus coral	*Lobophyllia flabelliformis*		Vulnerable		Appendix II	Kospartov et al. 2006
A pore coral	*Montipora calcarea*		Vulnerable		Appendix II	Richards et al. 2009
A pore coral	*Montipora caliculata*		Vulnerable		Appendix II	Vernon 1993, Griffith 1997, Kospartov et al. 2006

Common name	Species name	EPBC Act	IUCN	CMS	CITES	Reference
A pore coral	*Montipora crassituberculata*		Vulnerable		Appendix II	Kospartov et al. 2006
Elephant skin coral	*Pachyseris rugosa*		Vulnerable		Appendix II	Vernon 1993, Griffith 1997
A lettuce coral	*Pavona cactus*		Vulnerable		Appendix II	Vernon 1993, Griffith 1997, Kospartov et al. 2006
A lettuce coral	*Pavona decussata*		Vulnerable		Appendix II	Vernon 1993, Kospartov et al. 2006
A lettuce coral	*Pavona venosa*		Vulnerable		Appendix II	Vernon 1993, Griffith 1997, Kospartov et al. 2006
An antler coral	*Pectinia alcicornis*		Vulnerable		Appendix II	Vernon 1993, Griffith 1997
An antler coral	*Pectinia lactuca*		Vulnerable		Appendix II	Vernon 1993, Griffith 1997, Kospartov et al. 2006
Pearl bubble coral	*Physogyra lichtensteini*		Vulnerable		Appendix II	Vernon 1993, Griffith 1997, Kospartov et al. 2006
Lesser valley coral	*Platygyra yaeyamaensis*		Vulnerable		Appendix II	Kospartov et al. 2006
Hump coral	*Porites nigrescens*		Vulnerable		Appendix II	Vernon 1993, Griffith 1997, Kospartov et al. 2006
A stony coral	*Seriatopora aculeata*		Vulnerable		Appendix II	Kospartov et al. 2006
A turban coral	*Turbinaria mesenterina*		Vulnerable		Appendix II	Vernon 1993, Kospartov et al. 2006
A turban coral	*Turbinaria peltata*		Vulnerable		Appendix II	Vernon 1993, Griffith 1997, Kospartov et al. 2006
A turban coral	*Turbinaria reniformis*		Vulnerable		Appendix II	Vernon 1993, Griffith 1997, Kospartov et al. 2006
A turban coral	*Turbinaria stellulata*		Vulnerable		Appendix II	Vernon 1993, Griffith 1997, Kospartov et al. 2006
Blue coral	*Heliopora coerulea*		Vulnerable		Appendix I & II	Marsh 1993
A giant clam	*Tridacna gigas*		Vulnerable			Skewes et al. 1999a
Southern giant clam	*Tridacna derasa*		Vulnerable			Skewes et al. 1999a
Deep water redfish (sea cucumber)	*Actinopyga echinites*		Vulnerable			Marsh et al. 1993, Skewes et al. 1999a, Smith et al. 2000
Surf redfish (sea cucumber)	*Actinopyga mauritiana*		Vulnerable			Marsh et al. 1993, Skewes et al. 1999a, Smith et al. 2000
Hairy Blackfish (sea cucumber)	*Actinopyga miliaris*		Vulnerable			Ceccarelli et al. 2011a
White teatfish (sea cucumber)	*Holothuria fuscogilva*		Vulnerable			Marsh et al. 1993, Skewes et al. 1999a, Smith et al. 2000
Black teatfish (sea cucumber)	*Holothuria nobilis*		Endangered			Marsh et al. 1993, Skewes et al. 1999a,

Common name	Species name	EPBC Act	IUCN	CMS	CITES	Reference
						Smith et al. 2000
Blacksaddled coral grouper	*Plectropomus laevis*		Vulnerable			Skewes et al. 1999a, Dennis et al. 2005, Kospartov et al. 2006
Green humphead parrotfish	*Bolbometopon muricatum*		Vulnerable			Kospartov et al. 2006
Humpback grouper	*Cromileptes altivelis*		Vulnerable			Kospartov et al. 2006
Humphead wrasse	*Cheilinus undulatus*		Endangered		Appendix II	Allen 1993, Skewes et al. 1999a, Dennis et al. 2005, Kospartov et al. 2006
Squaretail leopard grouper	*Plectropomus areolatus*		Vulnerable			Russell et al. 2005
Snaggletooth shark	*Hemipristis elongata*		Vulnerable			Meekan et al. 2006
Scalloped hammerhead	*Sphyrna lewini*		Endangered			Meekan et al. 2006
Squat-headed hammerhead	*Sphyrna mokarran*		Endangered			Meekan et al. 2006
Dusky seasnake	*Aipysurus fuscus*		Endangered			Guinea 2008
Leaf-scaled seasnake	*Aipysurus foliosquama*	Critically endangered	Critically endangered			Guinea 2008
Short-nosed seasnake	*Aipysurus apraefrontalis*	Critically endangered	Critically endangered			Guinea 2008
Green turtle	*Chelonia mydas*	Vulnerable	Endangered	Appendix I & II	Appendix I	Whiting and Guinea 2005a
Hawksbill turtle	*Eretmochelys imbricata*	Vulnerable	Critically endangered	Appendix I & II	Appendix I	Whiting and Guinea 2005a
Loggerhead turtle	*Caretta caretta*	Endangered	Endangered		Appendix I	Whiting and Guinea 2005a
Dugong	*Dugong dugon*		Vulnerable		Appendix I	Whiting and Guinea 2005b