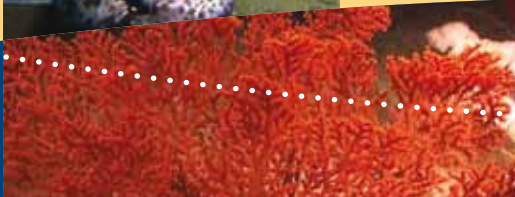




**Australian Government**

**Department of Sustainability, Environment,  
Water, Population and Communities**



# Species group report card — seabirds

Supporting the marine bioregional plan  
for the North Marine Region

prepared under the *Environment Protection and Biodiversity Conservation Act 1999*

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## Images:

Bridled Tern – B.Furby, Crested Tern fishing – R.Freeman, Cat shark – A.Heyward and M.Rees,  
A gorgonian with polyps extended – Geoscience Australia, Morning Light – I.Kiessling,  
Soft corals – A.Heyward and M.Rees, Shrimp, scampi and brittlestars – A.Heyward and M.Rees,  
Yellowstripe Snapper – R.Thorn, Hard corals – A.Heyward and M.Rees



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# SPECIES GROUP REPORT CARD – SEABIRDS

Supporting the marine bioregional plan for the North Marine Region prepared under the *Environment Protection and Biodiversity Conservation Act 1999*

## Report cards

The primary objective of the report cards is to provide accessible information on the conservation values found in Commonwealth marine regions. This information is maintained by the Department of Sustainability, Environment, Water, Population and Communities and is available online through the department's website ([www.environment.gov.au](http://www.environment.gov.au)). A glossary of terms relevant to marine bioregional planning is located at [www.environment.gov.au/marineplans](http://www.environment.gov.au/marineplans).

Reflecting the categories of conservation values, there are three types of report cards:

- species group report cards
- marine environment report cards
- protected places report cards.

While the focus of these report cards is the Commonwealth marine environment, in some instances pressures and ecological processes occurring in state waters are referred to where there is connectivity between pressures and ecological processes in state and Commonwealth waters.



## Species group report cards

Species group report cards are prepared for large taxonomic groups that include species identified as conservation values in a region; that is, species that are listed under Part 13 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and live in the Commonwealth marine area for all or part of their lifecycle. All listed threatened, migratory and marine species and all cetaceans occurring in Commonwealth waters are protected under the EPBC Act and are identified in the relevant marine bioregional plans as conservation values.

Species group report cards focus on species for which the region is important from a conservation perspective; for example, species of which a significant proportion of the population or an important life stage occurs in the region's waters.

For these species, the report cards:

- outline the conservation status of the species and the current state of knowledge about its ecology in the region
- define biologically important areas; that is, areas where aggregations of individuals of a species display biologically important behaviours
- assess the level of concern in relation to different pressures.



## 1. Seabirds of the North Marine Region

Northern Australia is extremely important for many species of seabird. The waters of the North Marine Region support large populations of seabirds, predominantly tern species. Offshore islands adjacent to the region host internationally and nationally significant breeding sites for significant numbers of colonially nesting terns; in particular the crested tern, bridled tern, roseate tern and black-naped tern (Chatto 2001). Individual breeding colonies may contain more than 60 000 adult seabirds from one to five species (Chatto 2001).

Fifty-one bird species listed under the EPBC Act are known to occur in the North Marine Region; another 49 listed bird species occur infrequently in the region (see Attachment 1). Of these listed bird species, this report card focuses on the 11 seabird species listed in Table 1. These species were selected following consideration of their conservation status, distribution and population structure within the North Marine Region, life history characteristics and the potential for the population(s) in the region to be genetically distinct from populations elsewhere. For the purposes of this report card, 'seabirds' refers to birds that feed primarily in marine waters by flying or swimming.

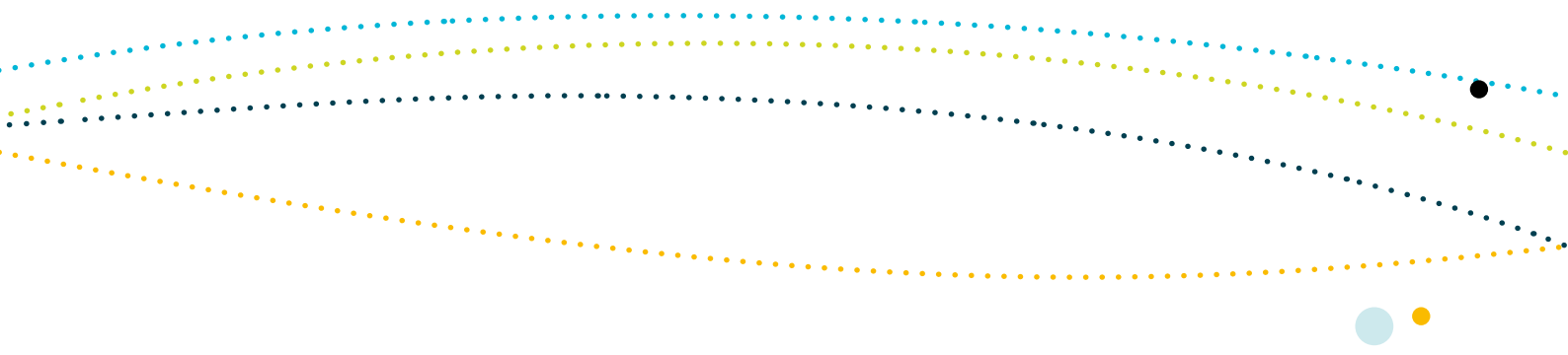
Taxonomic names used follow Christidis and Boles (2008).

### Brown booby

The brown booby (*Sula leucogaster*) is listed as migratory and marine under the EPBC Act. It is the most common booby, occurring throughout all tropical oceans approximately bounded by latitudes 30° N and 30° S. The species forages in the North Marine Region and breeds in areas adjacent to the region.

The brown booby is a specialised plunge diver, and is thought to forage closer to land than other booby species, which are considered more pelagic (Marchant & Higgins 1990a). However, a study of the marine distribution of Christmas Island seabirds found that the brown booby foraged within 250 kilometres of the island (Dunlop et al. 2001). The brown booby feeds on a large range of fish species and some cephalopods.

The total breeding population in the Australian region in 1996–97 was 59 940–73 900 pairs (WBM Oceanics & Claridge 1997). The brown booby has been recorded in all months of the year around most of the Northern Territory coastline, except for the shallower, more turbid waters such as in the south-west, Van Diemen Gulf and the many mangrove-lined bays around the coast (Chatto 2001). There are no confirmed breeding sites for brown boobies in the Northern Territory (Chatto 2001). One almost inaccessible site on a large, high rock off the



northern coast of Groote Eylandt may be a breeding site as it was reported to have 200–300 birds on it each year for about six weeks around August (C Davis pers. comm. in Chatto 2001). However, this site was ground-checked in October 1994 and there was no evidence of current or recent breeding (Chatto 2001). There are two large breeding colonies on the Wellesley Islands, Queensland (1400 nests on Manowar Island and 4500–6000 nests (20 000–30 000 birds) on Rocky Island in 1991; Walker 1992). The breeding season for brown boobies varies, with egg laying recorded throughout the year at many locations (Marchant & Higgins 1990a); however, young birds may disperse and/or migrate when not breeding.

### Lesser frigatebird

The lesser frigatebird (*Fregata ariel*) is listed as migratory and marine under the EPBC Act. It is usually seen in tropical or warmer waters off northern Western Australia, Northern Territory, Queensland and northern New South Wales. The species forages in the North Marine Region and breeds in areas adjacent to the region.

The species is usually pelagic and often found far from land, but is also found over shelf waters, in inshore areas, and inland over continental coastlines (Marchant & Higgins 1990a). It resides further out to sea during the day and in inshore waters during rough weather or in the late evening (Chatto 2001). The lesser frigatebird feeds mostly on fish and sometimes on cephalopods. It forages by scooping up marine organisms from the surface of the water, taking flying fish from just above the surface, or by harassing other seabirds to force them to disgorge some of their meal (Marchant & Higgins 1990a). The lesser frigatebird appears to range relatively close to breeding colonies (Jaquemet et al. 2005) but some large movements have been recorded through band recoveries.

The lesser frigatebird breeds on the Wellesley Islands, Gulf of Carpentaria, Queensland (Chatto 2001). Manowar Island of the Wellesley Islands group supports up to 3800 breeding pairs (O'Neill & White 2003). The species has a protracted breeding season that varies slightly between different localities. In Australia egg laying occurs mostly about mid-year. At Manowar Island eggs, downy young and juveniles have all been seen in July (Garnett & Crowley 1987). The presence of fully feathered chicks together with eggs in mid-May at North Bountiful Island, Wellesley Islands, indicates a breeding occupation of at least April to June (Walker 1992). A frigatebird roost (non-breeding location) is recorded near Weipa, with up to 500 lesser frigatebirds observed (Mustoe 2008).



## Streaked shearwater

The streaked shearwater (*Calonectris leucomelas*) is listed as migratory and marine under the EPBC Act. It occurs frequently in northern Australia, with records from central Western Australia, around the north coast, and south to central New South Wales (Brooke 2004; Marchant & Higgins 1990b). The species forages in the North Marine Region.

The species occurs over pelagic and inshore waters. In northern Australia, the streaked shearwater is usually found in offshore waters more than 18 kilometres from the mainland coast (Marchant & Higgins 1990b). In the Gulf of Carpentaria the species mostly occurs further than 100 kilometres from land (Blaber & Milton 1994; Marchant & Higgins 1990b). The streaked shearwater eats mainly fish and squid caught by surface-seizing or by shallow plunges (del Hoyo et al. 1992; Marchant & Higgins 1990b). It has been recorded diving to a depth of 5 metres (Oka 1994a). The species also follows fishing boats and eats fish scraps thrown from boats (Oka 1994b). Off the Northern Territory coast, the species is common in the Arafura Sea during summer. Although the streaked shearwater does not breed in Australia, the species is recorded regularly in northern Australia from October to March, with some records as early as August and as late as May (Marchant & Higgins 1990b).

## Black-naped tern

The black-naped tern (*Sterna sumatrana*) is listed as migratory and marine under the EPBC Act. It is found in the central and eastern Northern Territory, the Gulf of Carpentaria and the Torres Strait. The species forages in the North Marine Region and breeds in areas adjacent to the region.

The species is generally recorded in the vicinity of its breeding colonies (Chatto 2001). The black-naped tern feeds solely on fish, with a mean length of prey of 35 millimetres, but it can also take fish up to 100 millimetres long (Higgins & Davies 1996). The estimated annual breeding population in the Northern Territory is 9000 birds, with colonies ranging in size from a few pairs to more than 1300 birds (Chatto 2001). In the Northern Territory, most black-naped tern breeding occurs off north-eastern Arnhem Land, on and around Groote Eylandt and in the Sir Edward Pellew Group of islands, with sparse at-sea records elsewhere off the northern Australian coast. Black-naped terns also breed on Bare Sand Island, west of Darwin, and off the Cobourg Peninsula and Croker Island. In Queensland, the species is common and widespread throughout the Gulf of Carpentaria. In the Northern Territory, the main breeding period is September–December, with some breeding also recorded in January and April–July.





## Bridled tern

The bridled tern (*Onychoprion anaethetus*) is listed as migratory and marine under the EPBC Act. It is widespread in the tropical and subtropical seas around Australia, breeding on islands, including vegetated coral cays, rocky continental islands and rock stacks (Chatto 2001; Higgins & Davies 1996). The species forages in the North Marine Region and breeds in areas adjacent to the region. The bridled tern feeds on a range of fish, crustaceans, cephalopods and insects (Higgins & Davies 1996).

Bridled terns are difficult to census accurately because of their cryptic breeding habits, with nests often under rocks or bushes in steep terrain with dense vegetation. The breeding population in the Northern Territory is estimated to be approximately 60 000 birds (Chatto 1998, 1999, 2001). Most colonies consist of 100–500 birds, and some contain 1000–5000 birds. The largest colony, on Three Hummocks Island, is estimated to have up to 30 000, but possibly more than 50 000, birds (Chatto 1998, 1999, 2001). On Low Rock, south-western Gulf of Carpentaria, more than 1000 birds were recorded in late September 1994 (Chatto 1998, 1999, 2001). If most of the birds recorded at the larger Northern Territory colonies actually breed at these sites, then it appears that this coast has nationally significant bridled tern breeding areas (Chatto 2001). On Higginson Islet the breeding season is protracted, with breeding recorded nearly all year, although mainly from April to June. On some islands, or in some years, breeding is concentrated in a short season, but on other islands breeding has been recorded in most months (Chatto 1998, 2001).

## Caspian tern

The caspian tern (*Hydroprogne caspia*) is listed as migratory and marine under the EPBC Act. It is mostly seen off the eastern and western coasts of the Northern Territory, except for the area between Maningrida and Elcho Island. The species is less often seen across much of the northern coast or in the far south-west (Chatto 2001). The species forages in the North Marine Region and breeds in areas adjacent to the region. The diet of the caspian tern includes fish, the eggs and young of other birds, carrion, aquatic invertebrates (e.g. crayfish) and flying insects (IUCN 2010).

It is thought that most caspian terns breed outside the Northern Territory (Chatto 2001). For example, in May 1986, 500 breeding pairs were recorded on Lake Gregory (Jaensch & Vervest 1990), Western Australia, near the Northern Territory border (Chatto 2001). Chatto (2001) suggested that the Lake Gregory breeding site may be the reason why there are reasonable numbers of caspian terns foraging in the Northern Territory even though there are low numbers breeding adjacent to the North Marine Region. In the Northern Territory, the caspian tern has been recorded breeding at four sites, each with a single nest, and all on small islands along the eastern coast (Chatto 2001). Two of the four sites had eggs in May while the other two had eggs in October. In surveys reported by Chatto (2001), non-breeding caspian tern numbers appeared fairly consistent throughout the year, except for slightly lower numbers in January and February, and higher numbers in July.



## Crested tern

The crested tern (*Thalasseus bergii*) is listed as marine under the EPBC Act. It inhabits tropical and subtropical coastlines, and forages in the shallow waters of lagoons, coral reefs, bays, harbours, inlets and estuaries; along sandy, rocky, coral or muddy shores; on rocky outcrops in open sea; in mangrove swamps; and in offshore and pelagic waters (Higgins & Davies 1996). The species forages in the North Marine Region and breeds in areas adjacent to the region.

The crested tern usually feeds from the surface of the sea to less than 1 metre water depth but can forage well out to sea (Higgins & Davies 1996). Its diet consists predominantly of pelagic fish 10–50 millimetres long, although the species will also take cephalopods, crustaceans, insects and hatchling turtles opportunistically (IUCN 2010). Crested terns may also eat discards from trawl fisheries (Blaber et al. 1995).

The species shows a preference for nesting on offshore islands, low-lying coral reefs, sandy or rocky coastal islets, coastal spits and lagoon mudflats (IUCN 2010). The crested tern is widespread and numerous along the coastline of the Northern Territory, although it is less common around the southern part of Van Diemen Gulf and in the south-west (Chatto 2001). Chatto (2001) reported 20 crested tern breeding colonies off the Northern Territory, with many in excess of 5000 birds and two in excess of 50 000 birds. Breeding colonies are distributed from Melville Island in the north-west to the Sir Edward Pellew Islands in the south-east of the Northern Territory. Most breeding colonies are on small inshore islands except for the larger North-West Crocodile Island, which is well out to sea (Chatto 2001). Surveys in 1994 suggested that more than 60 000 crested terns were breeding off the Northern Territory coast. The combined total of the two largest colonies alone in 1999 was more than 100 000 birds, which could indicate that 1999 was a particularly successful breeding season, or that numbers of crested terns off the Northern Territory are increasing (Chatto 2001). Walker (1992) recorded 13 000–15 000 crested tern pairs on the Wellesley Islands off Queensland.

Around the Northern Territory coast, crested tern breeding occurs consistently between March and July regardless of the timing of other species nesting at their breeding sites. Birds in breeding plumage begin arriving in numbers in March and April, and most eggs are laid from late April to early June (Chatto 2001).



## Lesser crested tern

The lesser crested tern (*Thalasseus bengalensis* formerly known as *Sterna bengalensis*) is listed as migratory and marine under the EPBC Act. The species inhabits tropical and subtropical sandy and coral coasts and estuaries. It breeds on low-lying offshore islands, coral flats, sandbanks and flat sandy beaches, and forages for small pelagic fish and shrimp in the surf and over offshore waters (IUCN 2010) in both areas of reef and deeper shelf waters (Surman & Nicholson 2008). The species forages in the North Marine Region and breeds in adjacent areas.

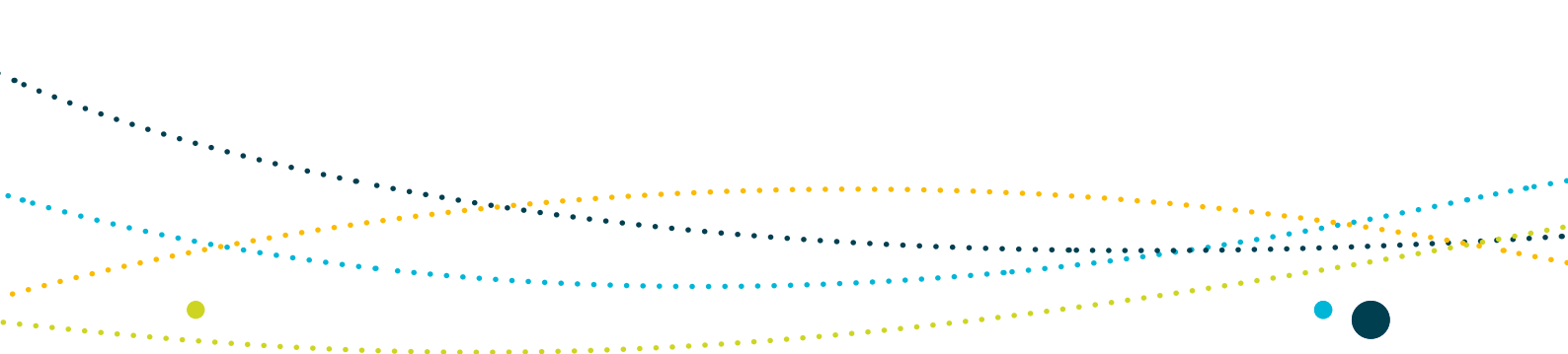
The lesser crested tern occurs around most of the Northern Territory coast but is absent or rare in the far south-west; around Van Diemen Gulf and the Tiwi Islands; and in parts of north-east Arnhem Land. The highest density of confirmed sightings is along the coast to the south-west of Darwin. Larger flocks of lesser crested terns are distributed in four locations: in the area between Darwin and North Perron Island; and in the north-west, the north-east and the south-east corners of the Top End (Chatto 2001).

The lesser crested tern may move nesting sites from one year to the next (Surman & Nicholson 2008). A single breeding colony of lesser crested terns, comprising approximately 440 birds with at least 150 nests, has been recorded in the Northern Territory on an island in the south-east (Chatto 2001). At the colony, the terns began breeding in late August – early September (Chatto 2001). However, this breeding site does not account for the numbers of lesser crested terns present in the Northern Territory.

## Little tern

The little tern (*Sternula albifrons* formerly known as *Sterna albifrons*) is listed as migratory and marine under the EPBC Act. It is widespread in Australia, with breeding sites distributed from north-west Western Australia, around the northern and eastern Australian coasts, to south-eastern Australia and Tasmania (Higgins & Davies 1996). The species forages in the North Marine Region and breeds in areas adjacent to the region.

The little tern is commonly seen in sandy coastal habitats and in mangrove-mudflat habitats along the coast, or in bays and estuaries, generally within 1 kilometre of the coast (Chatto 2001). However, in the Northern Territory, little terns are known to nest on the beaches of small offshore islands, within approximately 25 kilometres of the mainland or another large island or island chain (Chatto 2001). The extent of occurrence and area of occupancy for this species is increasing with the ongoing management of breeding sites (Garnett & Crowley 2000). The little tern usually forages close to breeding colonies (Higgins & Davies 1996). It feeds mainly on small fish (less than 10 centimetres in length), but also on crustaceans, insects, annelids and molluscs (Higgins & Davies 1996).



In the Northern Territory, breeding colonies of this species have been recorded on sandy beaches, often mixed with shells or coral rubble, just above the high-tide mark among the dunes, or on open blow-out areas among or behind the dunes. Breeding has been recorded in 44 colonies in the Northern Territory and is likely to occur at many more sites (Chatto 2001). Of the 44 recorded colonies, 20 comprised 11–100 birds and one colony had at least 150 pairs (Chatto 2001). The northern Australian breeding population has an extended breeding season covering most of the year. Breeding occurs from April to early January, with the main periods being late April–July and September – early January (Chatto 2001).

### Roseate tern

The roseate tern (*Sterna dougallii*) is listed as migratory and marine under the EPBC Act. It is found in the northern waters of Australia around offshore coral or continental islands, and near the mainland if breeding islands are nearby (Higgins & Davies 1996). The species forages in the North Marine Region and breeds in areas adjacent to the region.

The species often rests and forages in sheltered estuaries, creeks, inshore areas and waters up to several kilometres offshore (del Hoyo et al. 1996 in IUCN 2010). The roseate tern diet consists mostly of small pelagic fish (del Hoyo et al. 1996 in IUCN 2010; Urban et al. 1986), although it will also take insects and marine invertebrates such as crustaceans (del Hoyo et al. 1996 in IUCN 2010; Urban et al. 1986). Roseate terns in Australia are found to feed primarily in the open sea and at greater distances from the colony (on average) than other similar species of inshore tern (Hulsman 1989).

Northern populations of the roseate tern breed in summer and winter on offshore islands, cays and banks, mainly of sand, coral or rock (Higgins & Davies 1996). Around the Northern Territory coast, roseate tern breeding colonies vary in size from a few pairs in association with larger black-naped tern colonies to sites consisting of many thousands of nesting roseate terns (Chatto 2001). At some of the active breeding sites, high hundreds to low thousands of roseate terns in non-breeding plumage have also been recorded roosting (Chatto 2001). The number of breeding roseate terns off the Northern Territory coast has been roughly estimated at more than 26 000 (Chatto 2001). All confirmed roseate tern breeding sites are on islands, most of which are along the east coast from north-east Arnhem Land to the Sir Edward Pellew Islands (Chatto 2001). A small number of breeding colonies are also found around Cobourg Peninsula and the islands to the east of Croker Island; with another on Haul Round Island, near Maningrida on the central north coast. Roseate tern breeding occurs in two distinct periods of the year—a small number of colonies nest between April and June–July, while most nest between September and December–January (Chatto 2001). Large numbers of non-breeding Asian migrants may also be present in some areas during the summer months, as occurs on the Great Barrier Reef (O'Neill & Elder 2005; O'Neill et al. 2008).



## Common noddy

The common noddy (*Anous stolidus*) is listed as migratory and marine under the EPBC Act. It is mainly found off Queensland and the Western Australian coast where island breeding colonies are of considerable size. All sightings of the common noddy off the Northern Territory have been at latitudes north of 14° (Chatto 2001). The species forages in the North Marine Region and breeds in adjacent areas.

Small numbers of non-breeding common noddies have been recorded in the North Marine Region between September and March (Chatto 2001). There is only one known breeding location off the Northern Territory coastline, on an island in north-east Arnhem Land, which hosts about 100–300 birds (Chatto 2001). This colony has been checked only twice, in different years. In one of these years birds were on eggs in early May and breeding had finished by mid-September (Chatto 2001).

The common noddy forages in inshore waters surrounding breeding islands, often along the line of breakers or in lagoons, and disperses up to 50 kilometres into the pelagic zone to forage (especially when not breeding). Out at sea it often rests on buoys, flotsam, ships and on the open water (IUCN 2010). Its diet consists mostly of small fish as well as squid, pelagic molluscs, medusae and insects (IUCN 2010).

## Biologically important areas

Biologically important areas are areas that are particularly important for the conservation of the protected species and where aggregations of individuals display biologically important behaviour such as breeding, foraging, resting or migration. The presence of the observed behaviour is assumed to indicate that the habitat required for the behaviour is also present. Biologically important areas have been identified for some EPBC Act listed species found in the North Marine Region, using expert scientific knowledge about species' distribution, abundance and behaviour in the region. The selection of species was informed by the availability of scientific information, the conservation status of listed species and the importance of the region for the species. The range of species for which biologically important areas are identified will continue to expand as reliable spatial and scientific information becomes available.

Biologically important areas have been identified for the brown booby, lesser frigatebird, birdled tern, crested tern, lesser crested tern, roseate tern and common noddy. Behaviours used to identify biologically important areas for seabirds include breeding, roosting and foraging.

Biologically important areas are included in the North Marine Region Conservation Values Atlas ([www.environment.gov.au/cva](http://www.environment.gov.au/cva)).

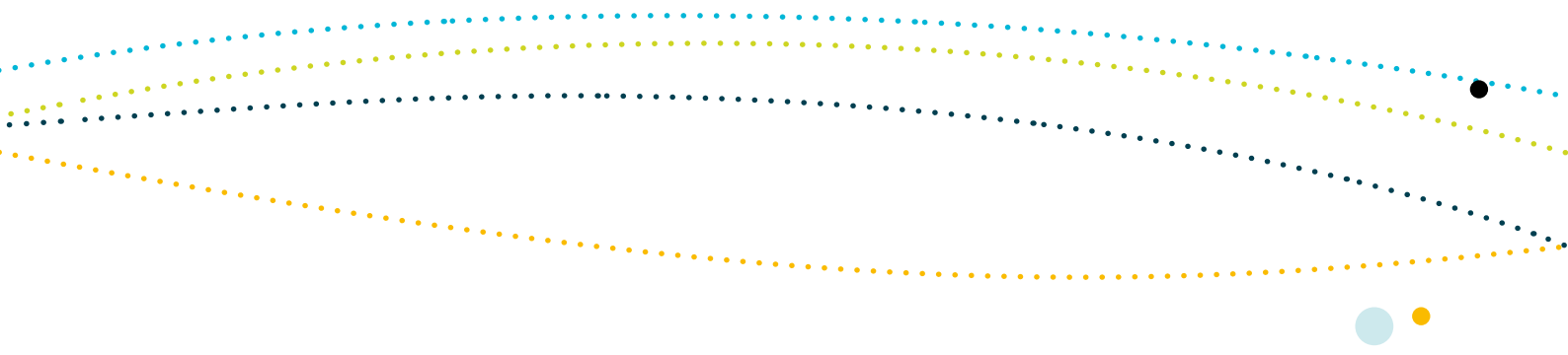


## 2. Vulnerabilities and pressures

### Vulnerabilities

Seabirds are especially vulnerable to alien mammalian predation due to their lack of effective anti-predator behaviour; the habit of most species of nesting at ground level and leaving chicks unattended during long-range foraging; and their low annual productivity (DEH 2005). The seven tern species (little tern, bridled tern, lesser crested tern, crested tern, caspian tern, roseate tern and black-naped tern) and the brown booby are all ground nesting and, as such, are vulnerable to pressures such as human disturbance of nest sites, predation from introduced predators, and increased sea level due to climate change. The lesser frigatebird and common noddy are predominantly tree-nesting species; however, these species are also highly susceptible to predation and human disturbance of nest sites.

Terns usually breed in colonies and lay 1–3 eggs (although the crested tern, lesser crested tern and bridled tern usually lay only one egg). Both sexes incubate and feed the young (Higgins & Davies 1996). The common noddy has a clutch size of 1–2 eggs and will re-lay if eggs are lost (Higgins & Davies 1996). The brown booby is usually colonial and has an annual clutch of 1–2 (rarely 3) eggs, with both sexes incubating and feeding the young (Marchant & Higgins 1990a). However, as cannibalism between chicks is frequently practised in this species often only one chick is reared to fledging. Due to the relatively low productivity of tern and booby species, they are particularly vulnerable to pressures that affect adult survival. The streaked shearwater is relatively long lived with low fecundity (one egg per year) and, as such, is particularly susceptible to impacts that affect survival of breeding adults (e.g. bycatch from fisheries operations). The lesser frigatebird generally lays only one egg and successful pairs breed only once every two years (Marchant & Higgins 1990a), which makes this species less resilient to mortality caused by human-induced pressures.



## Analysis of pressures

On the basis of current information, pressures have been analysed for the 11 seabird species discussed in this report card. A summary of the pressure analysis for seabirds is provided in Table 1. Only those pressures identified as of concern or of potential concern are discussed in further detail below. An explanation of the pressure analysis process, including the definition of substantial impact used in this analysis, is provided in Part 3 and Section 1.1 of Schedule 1 of the plan.

**Table 1: Outputs of the seabird species pressure analysis for the North Marine Region**

Pressure	Source	Species				
		Boobies and frigatebirds		Shearwaters	Terns and noddies	
		Brown booby	Lesser frigatebird	Streaked shearwater	Black-naped tern	Bridled tern
Sea level rise	Climate change					
Changes in sea temperature	Climate change					
Changes in oceanography	Climate change					
Ocean acidification	Climate change					
Marine debris	Land-based activities Fishing boats Shipping Vessels (other)					
Light pollution	Onshore and offshore activities					
Human presence at sensitive sites	Tourism					
	Recreational and charter fishing (burleying)					
	Research					
Extraction of living resources	Indigenous harvest					
	Commercial fishing (prey depletion)					
	Commercial, recreational and charter fishing (fisheries discards)					
Bycatch	Commercial fishing					
	Recreational and charter fishing					
Oil pollution	Shipping Vessels (other)					
	Oil rigs					
Collision with vessels	Shipping					
	Fishing					
	Tourism					
Invasive species	Land-based activities					

**Legend** ■ of concern ■ of potential concern ■ of less concern ■ not of concern  data deficient or not assessed



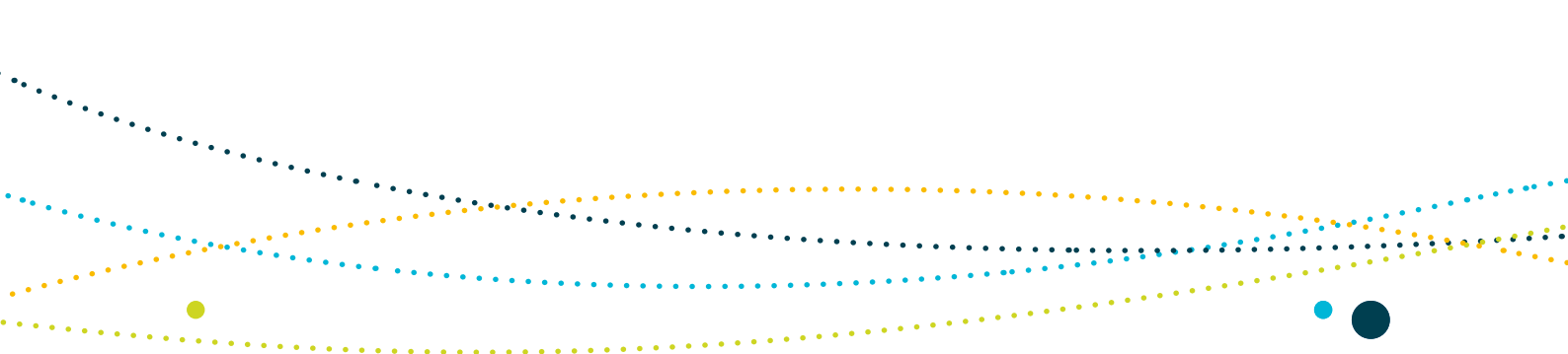


**Table 1 continued: Outputs of the seabird species pressure analysis for the North Marine Region**

Pressure	Source	Species					
		Terns and noddies					
		Caspian tern	Crested tern	Lesser crested tern	Little tern	Roseate tern	Common noddy
Sea level rise	Climate change	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Changes in sea temperature	Climate change	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Changes in oceanography	Climate change	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Ocean acidification	Climate change	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Marine debris	Land-based activities Fishing boats Shipping Vessels (other)	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Light pollution	Onshore and offshore activities	Grey	Grey	Grey	Grey	Grey	Grey
Human presence at sensitive sites	Tourism	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
	Recreational and charter fishing (burleying)	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
	Research	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Extraction of living resources	Indigenous harvest	Grey	Green	Grey	Green	Green	Grey
	Commercial fishing (prey depletion)	Green	Green	Green	Green	Green	Green
	Commercial, recreational and charter fishing (fisheries discards)	Grey	Grey	Grey	Grey	Grey	Grey
Bycatch	Commercial fishing	Grey	Grey	Grey	Grey	Grey	Grey
	Recreational and charter fishing	Grey	Grey	Grey	Grey	Grey	Grey
Oil pollution	Shipping Vessels (other)	Green	Green	Green	Green	Green	Green
	Oil rigs	Green	Green	Green	Green	Green	Green
	Shipping	Green	Green	Green	Green	Green	Green
Collision with vessels	Fishing	Green	Green	Green	Green	Green	Green
	Tourism	Green	Green	Green	Green	Green	Green
	Shipping	Green	Green	Green	Green	Green	Green
Invasive species	Land-based activities	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow

**Legend**

- of concern
- of potential concern
- of less concern
- not of concern
- data deficient or not assessed



The long-term effects of climate change on marine species are still speculative. However, the most likely impacts on seabirds are reduction or loss of nesting habitat; reduction or loss of roosting areas; redistribution or reduction in availability of marine prey; and redistribution of nesting, roosting and foraging areas brought about by redistribution of marine prey and consequent population decline.

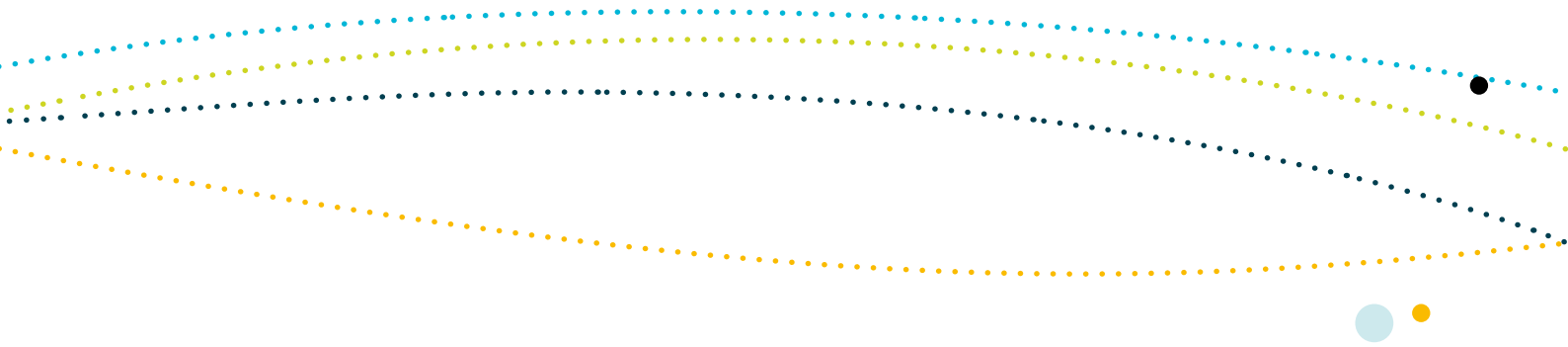
An increase in temperatures is likely to lead to earlier or later nesting, an expansion or shift in ranges southward, the loss of nesting sites and foraging habitat through increases in sea level, and changes in availability and abundance of food resources (Hobday et al. 2006). Changes in prey availability will also affect the distribution, abundance, migration patterns and structure of seabird communities. There is evidence that the ranges of a number of tropical seabird species in Western Australia are expanding south (Dunlop & Goldberg 1999; Dunlop & Mitchell 2001), although the mechanisms driving this range expansion are unclear. There is also evidence that arrival and departure dates for migratory species are changing and that this may be linked to changes in climate (Beaumont et al. 2006).

### **Sea level rise—climate change**

Sea level rise is assessed as *of potential concern* for the brown booby, lesser frigatebird, black-naped tern, bridled tern, caspian tern, crested tern, lesser crested tern, little tern, roseate tern and common noddy. Global sea levels have risen by 20 cm between 1870 and 2004 and predictions estimate a further rise of 5–15 cm by 2030, relative to 1990 levels (Church et al. 2009). Longer term predictions estimate increases of 0.5–1.0 m by 2100, relative to 2000 levels (Climate Commission 2011). Some foraging areas and low-lying nesting habitats of seabirds may be altered or lost if the sea level rises (Hobday et al. 2006). Even a relatively small rise in sea level could have major impacts on low-lying islands and, in particular, on surface-nesting species (Chambers et al. 2009).

### **Changes in sea temperature—climate change**

Changes in sea temperature is assessed as *of potential concern* for all 11 seabird species. Sea temperatures have warmed by 0.7 °C between 1910–1929 and 1989–2008, and current projections estimate ocean temperatures will be 1 °C warmer by the 2030s (Lough 2009). Warming of land and oceans is expected to expand or shift seabird and seabird prey distribution southwards; to alter reproductive timing, chick growth rates and breeding success; to alter foraging areas and possibly prey species (Chambers et al. 2005; Cullen et al. 2009; Poloczanska et al. 2007); and potentially to negatively affect adult survival. The capacity of seabirds to adapt to the changes brought about by increasing sea temperatures will depend on the species' ability to alter foraging behaviour, nesting location and timing of breeding (Chambers et al. 2009).



A southward range expansion of some seabird species due to climate changes is projected, and there are records of nesting occurring earlier at some sites for some seabirds due to changes in prey availability (Hobday et al. 2006). Projected range expansion may be due to shifts in productivity and prey distribution linked to changes in sea temperature. Abnormally high sea temperatures on the Great Barrier Reef were accompanied by reduced provisioning, decreased growth rates of chicks and reproductive failure of wedge-tailed shearwaters (*Ardenna pacifica*, formerly known as *Puffinus pacificus*) (Peck et al. 2004; Smithers et al. 2003). There is also recent evidence that sea temperature variation at smaller within-season and day-to-day time scales significantly affects seabird foraging success, growth patterns and reproductive output (Johnson & Marshall 2007).

Understanding how El Niño-related phenomena impact biological processes in tropical marine systems can help predict climate change impacts (Devney et al. 2009). In addition, the frequency and severity of El Niño Southern Oscillation events is predicted to increase with climate change (Dunlop et al. 2002). Intense El Niño events severely affect seabird populations, often months in advance of peak temperature anomalies, with changes in sea temperature and thermocline depth recorded as precursors to El Niño events (Devney et al. 2009). Pelagic seabird breeding participation is directly and independently related to changes in both surface chlorophyll concentration and thermocline depth that occur well in advance of El Niño-generated sea temperature anomalies (Devney et al. 2009).

### **Changes in oceanography–climate change**

Changes in oceanography is assessed as *of potential concern* for all 11 seabird species assessed. Oceanographic changes have been related to changes in seabird breeding participation and success, mortality, and shifts in distribution (Chambers et al. 2009). Alteration of currents is predicted to impact on the distribution, migration and foraging of seabirds (Hobday et al. 2006).

Major changes in the distribution of seabird colonies off the Western Australia coast have already occurred over the past few decades, with several seabird species establishing colonies well to the south of known historical distributions (Dunlop & Wooller 1986 and Dunlop 2001 in Hobday et al. 2006). It is thought that changes in the behaviour of the Leeuwin Current, affecting marine food chains, are the ultimate cause of the changes in seabird foraging and population dynamics. El Niño Southern Oscillation (ENSO) events can also influence changes in ocean currents. Reduced breeding participation and extensive reproductive failure have been observed in a range of tropical pelagic seabirds (including the wedge-tailed shearwater) at the Lowendal Islands, in the North West Shelf region of Western Australia, and in the Houtman Abrolhos Islands during strong ENSO events (Surman & Nicholson 2009). In Western Australia, stronger ENSO events tend to correspond to reduced breeding participation and success in wedge-tailed shearwaters and tropical terns (Dunlop et al. 2002). The frequency and severity of ENSO events is predicted to increase with climate change (Dunlop et al. 2002).



## ***Ocean acidification–climate change***

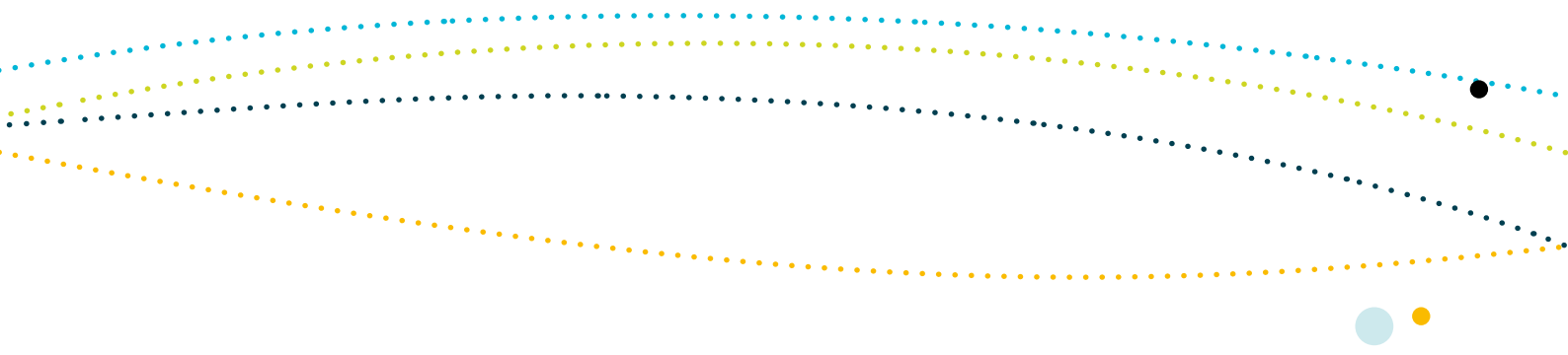
Ocean acidification is assessed as *of potential concern* for all 11 seabird species. Driven by increasing levels of atmospheric CO<sub>2</sub> and subsequent chemical changes in the ocean, acidification is already underway and detectable. Since pre-industrial times, acidification has lowered ocean pH by 0.1 pH units (Howard et al. 2009). Furthermore, climate models predict this trend will continue, with a further 0.2–0.3 unit decline by 2100 (Howard et al. 2009).

Acidification has the potential to adversely affect many organisms that use calcium carbonate for their skeletons and shells, including corals, molluscs and some phytoplankton species (Hobday et al. 2006; Scientific Committee on Ocean Research 2009). This impact may have flow-on effects for seabirds that rely on food sources (such as fish) that are dependent on coral reef habitats. Seabirds are efficient indicators of ecosystem health, as many feed on small pelagic fish and zooplankton and thus are sensitive to changes at lower trophic levels (Hobday et al. 2006). For coral reef systems, acidification of the oceans has the potential to reduce the stability of the reef, amplify the damage of storms and cyclones, and impair the reefs' capacity to recover from high-wave forces. The consequent change in the ecology of reef systems has the potential to affect seabird foraging (Chambers et al. 2009).

## ***Marine debris–land-based activities; fishing boats; shipping; vessels (other)***

Marine debris is assessed as *of potential concern* for all 11 seabird species assessed. Marine debris accumulates in high concentrations along the coasts of north-western Cape York Peninsula, Groote Eylandt and north-east Arnhem Land (DEWHA 2009; Limpus 2009; Roelofs et al. 2005). It can affect seabird species through either entanglement or ingestion (Baker et al. 2002).

A number of different plastic types are recorded as affecting seabirds and derelict fishing nets dominate entanglement records (Ceccarelli 2009). Smaller plastic items tend to be found wrapped around seabirds' bills or legs (Ceccarelli 2009). Entanglement in marine debris can constrict growth and circulation, leading to asphyxiation, and can affect an animal's ability to forage or to avoid predators (Baker et al. 2002). Seabird rescue organisations report that active recreational fishing gear appears to pose a much greater threat to seabirds around the Australian mainland coast than derelict commercial fishing gear or other types of plastic debris (Ceccarelli 2009). In a study of 205 known interactions between seabirds and plastic debris since 1974, involving 29 species of seabird, just over 17 per cent were freed and released alive, while around 70 per cent died (the fate of the remaining seabirds is unknown) (Ceccarelli 2009). The crested tern and caspian tern have been recorded entangled in marine debris, with the crested tern having the second greatest number of instances of entanglement, after the Australian pelican (*Pelecanus conspicillatus*) (Ceccarelli 2009).



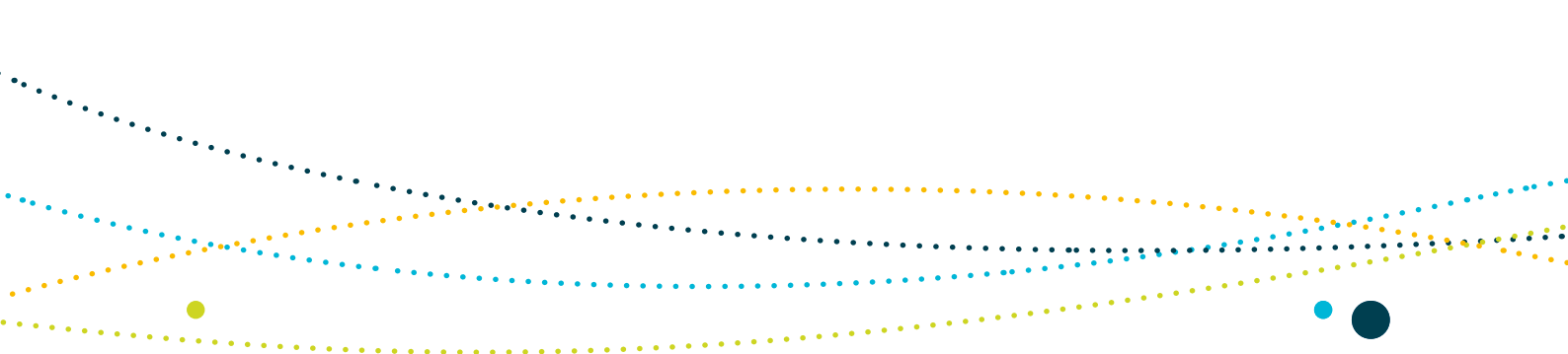
Some seabirds ingest plastic that they mistake for food. Ingestion of marine debris can cause physical damage, perforation, mechanical blockage or impairment of the digestive system, resulting in starvation as well as potentially being a source of ingested toxic chemicals (Baker et al. 2002). These chemicals are known to compromise immunity and cause infertility in animals (Kiessling 2003). Adult seabirds can regurgitate ingested marine debris to their chicks, which can have a large impact on chick survival due to their high rates of ingestion and low frequency of regurgitation of indigestible material (Baker et al. 2002).

### ***Human presence at sensitive sites—recreational and charter fishing; research; tourism***

Human presence at sensitive sites is assessed as *of potential concern* for all 11 seabird species assessed. Human disturbance of seabird breeding sites can cause breeding failure through modification or destruction of breeding habitat, displacement of breeders, nest desertion by all or part of a breeding population, destruction or predation of eggs, and exposure or crushing of chicks, particularly in ground-nesting species (i.e. terns, brown booby) (National Oceans Office 2004; WBM Oceanics & Claridge 1997). Other potential impacts from human presence at sensitive sites include transfer of invasive pests (e.g. mice, weeds), habitat loss through wildfire, and habitat degradation through inappropriate disposal of refuse.

The little tern is very sensitive to disturbance during breeding (Mustoe & Edmunds 2008). Some colonies of little terns have been disturbed or destroyed by residential, recreational and industrial developments in Australia, including sand mining and establishment of waste-disposal dumps (Chatto 2001; Garnett & Crowley 2000; Higgins & Davies 1996; NSW NPWS 2003). Crested terns are also susceptible to human disturbance at breeding colonies, as they take flight when people are within 20 metres, which exposes eggs and chicks to predation by gulls (Langham & Hulsman 1986). Human disturbance can be a pressure on some colonies of bridled terns, especially in places where terns nest in the open or in sparse vegetation (Garavanta & Wooller 2000). Black-naped terns are highly sensitive to human disturbance when roosting or nesting; however, although few black-naped tern colonies in the Northern Territory are within reserves, most are remote from human disturbance (Chatto 2001; Higgins & Davies 1996; WBM Oceanics & Claridge 1997).

The driving of four-wheel drive vehicles on beaches is a common occurrence on some parts of the mainland and on larger islands adjacent to the North Marine Region. This practice is a potential threat for beach-nesting species (e.g. the little tern) (National Oceans Office 2004). An increasing number of boat and yacht travellers and cruise ships visit northern Australian waters, and some travellers and researchers come ashore on islands, even in the most remote areas adjacent to the North Marine Region (National Oceans Office 2004). Several large cruise



vessels work between Broome and Cairns, all of which have smaller boats to carry people ashore at various points. However, at present, there are few registered tourist ventures taking people out to islands and other important seabird sites (National Oceans Office 2004). Most islands in the North Marine Region are owned by Aboriginal people and a permit is required to land on them (National Oceans Office 2004). Traditional burning practices could have positive effects for seabirds nesting on some islands (e.g. keeping nest sites clear of vegetation) as well as negative effects (e.g. disrupting breeding) (National Oceans Office 2004).

### ***Invasive species—land-based activities***

Invasive species is assessed as *of potential concern* for all 11 seabird species assessed. Invasive species are the most significant pressure on seabirds at their breeding sites. Introduced pest species may affect seabird populations by preying on adults and/or eggs and chicks, destroying nests and modifying habitat (DEH 2005). The adults, young and eggs of seabird species are at risk of predation from introduced mammalian predators (e.g. cats and rats). Smaller seabird species (e.g. little terns) are particularly at risk from predation since breeding-age adults as well as chicks can be killed (Baker et al. 2002).

Some or all of the known invasive species (e.g. cats, dogs, pigs and rats) are present on many of the larger islands adjacent to the North Marine Region, but they have not yet been found on the smaller seabird nesting islands, except Rocky Island, which has black rats (National Oceans Office 2004). Tern species are often attacked or killed by cats and dogs (Higgins & Davies 1996). The black rat (*Rattus rattus*) is the most widely distributed introduced rodent on Australian islands (Morris 2002) and, as a voracious nest predator, poses a great threat to nesting seabirds (DERM 2010). The common noddy is threatened by predation from introduced rats and cats on islands with breeding colonies (IUCN 2010).

Exotic plant species can also affect seabird breeding by reducing nesting habitat, eroding burrowing substrate, giving cover to predators, and reducing cover and shade for chicks (WBM Oceanics & Claridge 1997). For example, the environmental stability of the Wellesley Islands in the southern Gulf of Carpentaria is at risk from nationally significant weeds including rubber vine and calotrope (DSEWPac 2009). In addition, breeding colonies of seabirds could be threatened by the introduction of invasive ant species like the yellow crazy ant (*Anoplolepis gracilipes*), which has colonised parts of Arnhem Land (DNREAS 2009).



### 3. Relevant protection measures

The brown booby, lesser frigatebird, black-naped tern, bridled tern, caspian tern, lesser crested tern, little tern, roseate tern and common nobby discussed in this report card are listed as migratory species under the EPBC Act. In addition, all seabird species are protected as listed marine species under section 248 of the EPBC Act. Under the Act, it is generally an offence to kill, injure, take, trade, keep or move listed marine, migratory or threatened species on Australian Government land or in Commonwealth waters without a permit.

Alongside the EPBC Act, a broad range of sector-specific management measures to address environmental issues and mitigate impacts apply to activities that take place in Commonwealth marine areas. These measures give effect to regulatory and administrative requirements under Commonwealth and state legislation for activities such as commercial and recreational fishing, oil and gas exploration and production, ports activities and maritime transport. In some instances, as in the case of shipping, these measures also fulfil Australia's obligations under a number of international conventions for the protection of the marine environment from pollution and environmental harm.

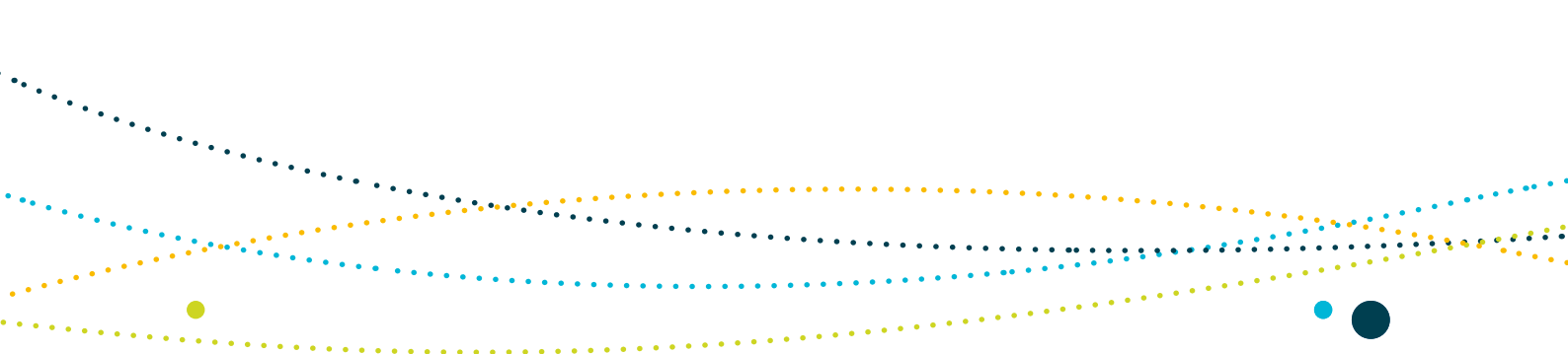
#### EPBC Act conservation plans and action plans

- Threat abatement plan for the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations (DEWR 2006)
- Threat abatement plan for the impacts of marine debris on vertebrate marine life (DEWHA 2009)

#### International measures

Australia is a signatory to the following international agreements for the conservation of seabirds:

- Convention on International Trade in Endangered Species (CITES)—[www.cites.org](http://www.cites.org)
- The Bonn Convention: Conservation of Migratory Species (CMS)—[www.cms.int](http://www.cms.int)
- Japan–Australia Migratory Bird Agreement—Agreement between the Government of Australia and the Government of Japan for the Protection of Migratory Birds in Danger of Extinction and their Environment—[www.austlii.edu.au/au/other/dfat/treaties/1981/6.html](http://www.austlii.edu.au/au/other/dfat/treaties/1981/6.html)
- China–Australia Migratory Bird Agreement—Agreement between the Government of Australia and the Government of the People's Republic of China for the Protection of Migratory Birds and their Environment—[www.austlii.edu.au/au/other/dfat/treaties/1988/22.html](http://www.austlii.edu.au/au/other/dfat/treaties/1988/22.html)
- Republic of Korea – Australia Migratory Bird Agreement—Agreement between the Government of Australia and the Government of the Republic of Korea on the Protection of Migratory Birds—[www.austlii.edu.au/au/other/dfat/treaties/2007/24.html](http://www.austlii.edu.au/au/other/dfat/treaties/2007/24.html)
- The Convention on Wetlands of International Importance (Ramsar Convention) —[www.ramsar.org](http://www.ramsar.org)



For more information on conservation listings under the EPBC Act, and related management objectives and protection measures, visit:

- [www.environment.gov.au/epbc/protect/species-communities.html](http://www.environment.gov.au/epbc/protect/species-communities.html)  
(listed threatened species)
- [www.environment.gov.au/epbc/protect/migratory.html](http://www.environment.gov.au/epbc/protect/migratory.html)  
(listed migratory species)
- [www.environment.gov.au/cgi-bin/sprat/public/sprat.pl](http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl)  
(species profile and threats database)







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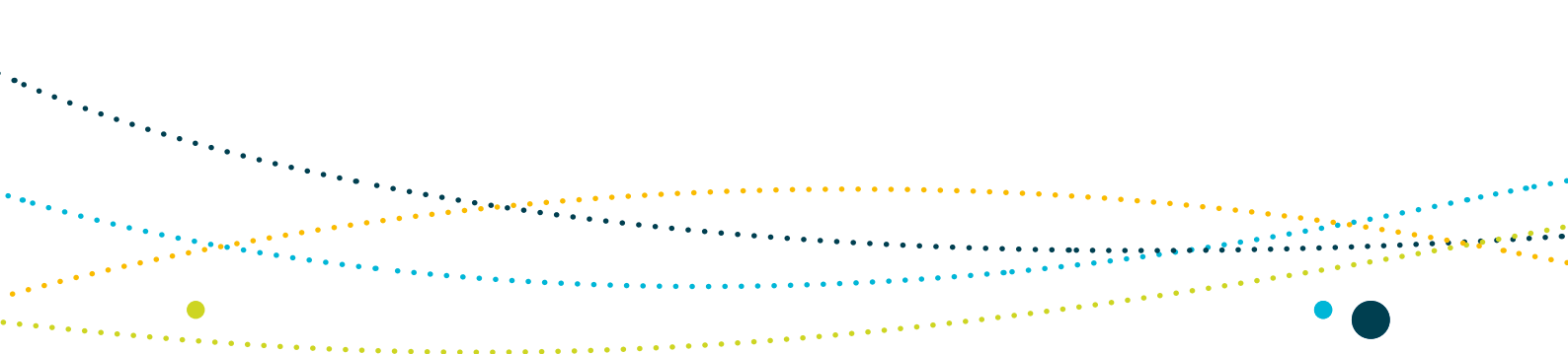
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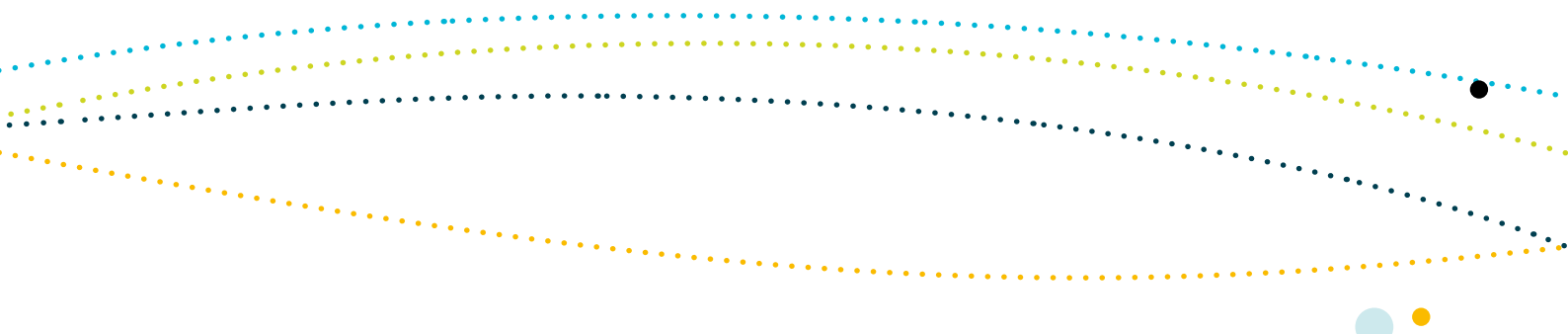
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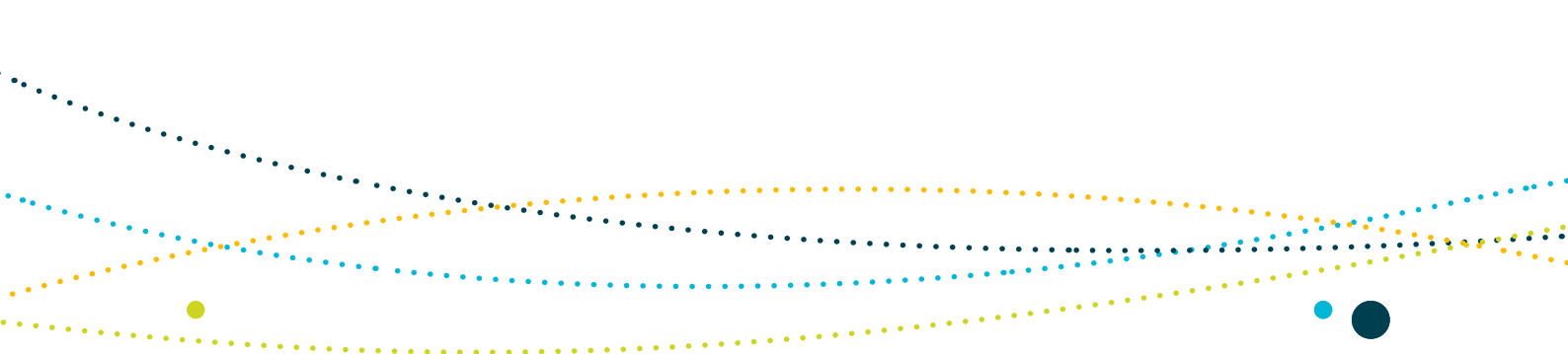
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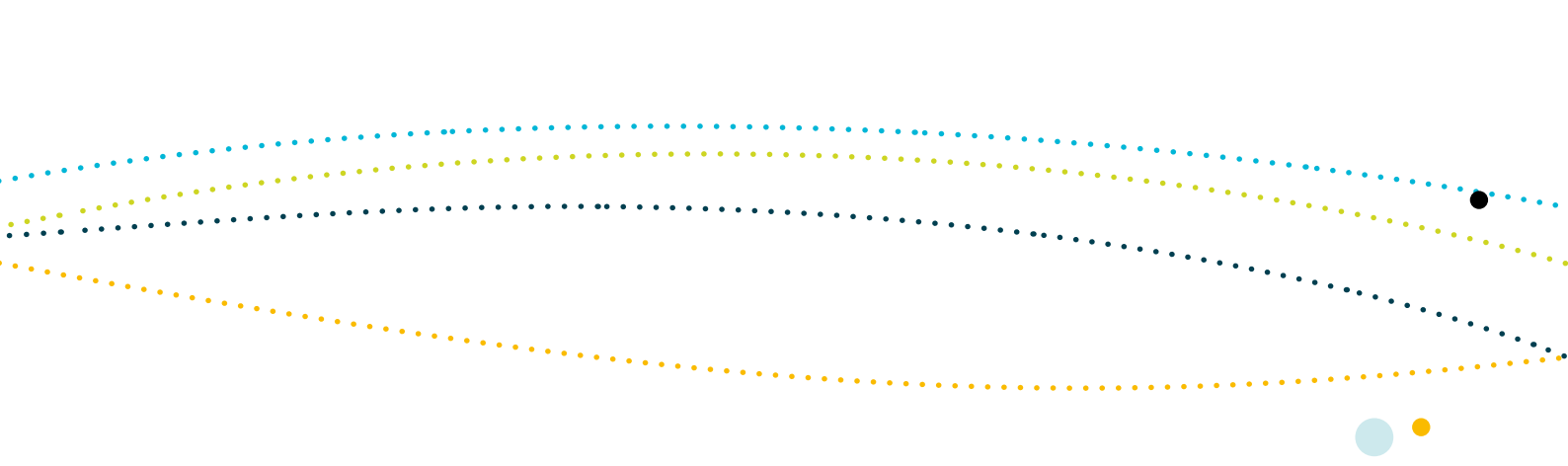
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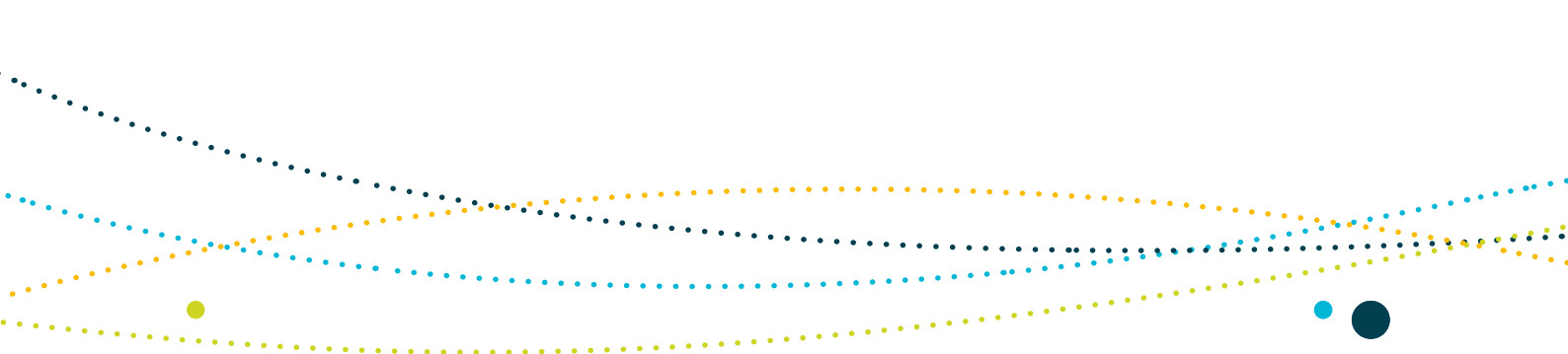
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# ATTACHMENT 1: SEABIRD SPECIES OCCURRING IN THE NORTH MARINE REGION

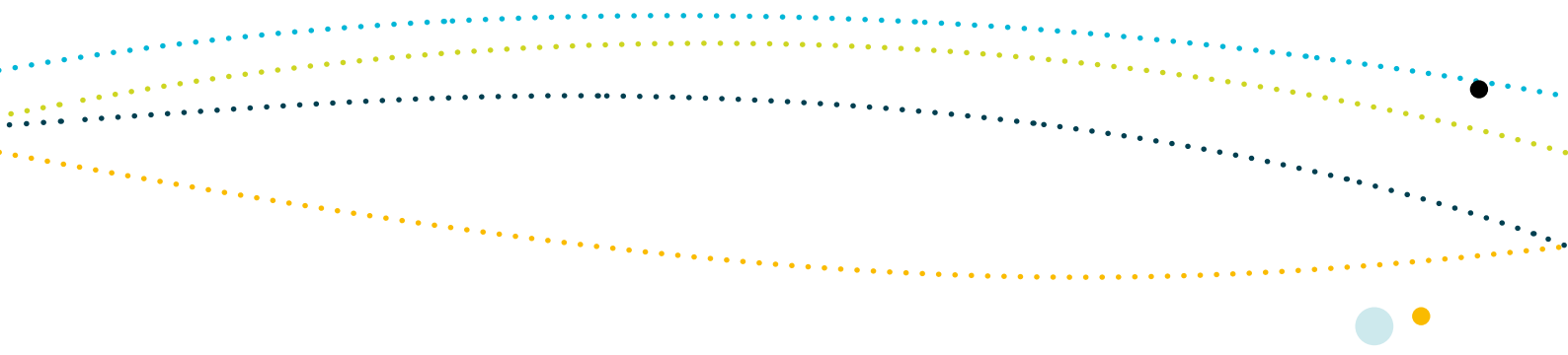
**Table A1: Seabird species known to occur in the North Marine Region**

Species (common name/ scientific name) <sup>1</sup>	Conservation status
<b>Boobies, frigatebirds and tropicbirds</b>	
Brown booby <i>Sula leucogaster</i>	Migratory, marine
Lesser frigatebird <i>Fregata ariel</i>	Migratory, marine
<b>Egrets, herons and ibis</b>	
Eastern reef egret <i>Egretta sacra</i>	Migratory, marine
Little egret <i>Egretta garzetta</i>	Marine
<b>Gulls and jaegers</b>	
Silver gull <i>Chroicocephalus novaehollandiae</i>	Marine
<b>Plovers</b>	
Greater sand plover <i>Charadrius leschenaultii</i>	Migratory, marine
Grey plover <i>Pluvialis squatarola</i>	Migratory, marine
Lesser sand plover <i>Charadrius mongolus</i>	Migratory, marine
Pacific golden plover <i>Pluvialis fulva</i>	Migratory, marine

Species (common name/ scientific name) <sup>1</sup>	Conservation status
Red-capped plover <i>Charadrius ruficapillus</i>	Marine
<b>Raptors</b>	
Brahminy kite <i>Haliastur indus</i>	Marine
Eastern osprey <i>Pandion cristatus</i>	Migratory, marine
White-bellied sea-eagle <i>Haliaeetus leucogaster</i>	Migratory, marine
<b>Sandpipers</b>	
Broad-billed sandpiper <i>Limicola falcinellus</i>	Migratory, marine
Common sandpiper <i>Actitis hypoleucos</i>	Migratory, marine
Curlew sandpiper <i>Calidris ferruginea</i>	Migratory, marine
Marsh sandpiper <i>Tringa stagnatilis</i>	Migratory, marine
Pectoral sandpiper <i>Calidris melanotos</i>	Migratory, marine
Sharp-tailed sandpiper <i>Calidris acuminata</i>	Migratory, marine
Terek sandpiper <i>Xenus cinereus</i>	Migratory, marine
Wood sandpiper <i>Tringa glareola</i>	Migratory, marine
<b>Shearwaters</b>	
Streaked shearwater <i>Calonectris leucomelas</i>	Migratory, marine



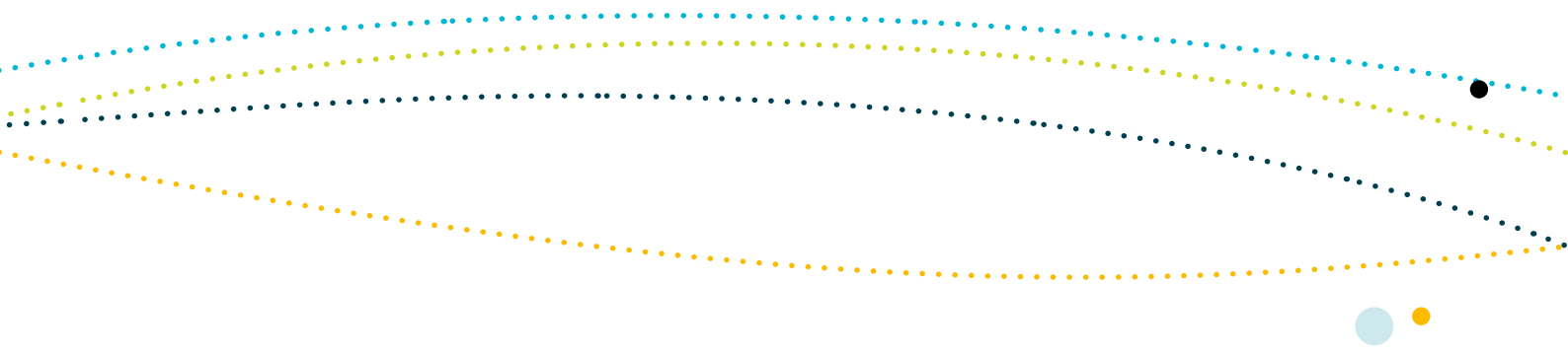




Species (common name/ scientific name) <sup>1</sup>	Conservation status
<b>Terns and noddies</b>	
Black-naped tern <i>Sterna sumatrana</i>	Migratory, marine
Bridled tern <i>Onychoprion anaethetus</i>	Migratory, marine
Caspian tern <i>Hydroprogne caspia</i>	Migratory, marine
Common tern <i>Sterna hirundo</i>	Migratory, marine
Crested tern <i>Thalasseus bergii</i>	Marine
Gull-billed tern <i>Gelochelidon nilotica</i>	Marine
Lesser crested tern <i>Thalasseus bengalensis</i>	Migratory, marine
Little tern <i>Sternula albifrons</i>	Migratory, marine
Roseate tern <i>Sterna dougallii</i>	Migratory, marine
Sooty tern <i>Onychoprion fuscata</i>	Marine
Whiskered tern <i>Chlidonias hybrida</i>	Marine
White-winged black tern <i>Chlidonias leucopterus</i>	Migratory, marine
Common noddy <i>Anous stolidus</i>	Migratory, marine
<b>Other</b>	
Australian pratincole <i>Stiltia isabella</i>	Marine

Species (common name/ scientific name) <sup>1</sup>	Conservation status
Bar-tailed godwit <i>Limosa lapponica</i>	Migratory, marine
Beach stone-curlew <i>Esacus magnirostris</i>	Marine
Black-tailed godwit <i>Limosa limosa</i>	Migratory, marine
Common greenshank <i>Tringa nebularia</i>	Migratory, marine
Eastern curlew <i>Numenius madagascariensis</i>	Migratory, marine
Great knot <i>Calidris tenuirostris</i>	Migratory, marine
Grey-tailed tattler <i>Tringa brevipes</i>	Migratory, marine
Little curlew <i>Numenius minutus</i>	Migratory, marine
Oriental pratincole <i>Glareola maldivarum</i>	Migratory, marine
Radjah shelduck <i>Tadorna radjah</i>	Marine
Red knot <i>Calidris canutus</i>	Migratory, marine
Red-necked stint <i>Calidris ruficollis</i>	Migratory, marine
Ruddy turnstone <i>Arenaria interpres</i>	Migratory, marine
Sanderling <i>Calidris alba</i>	Migratory, marine
Whimbrel <i>Numenius phaeopus</i>	Migratory, marine

<sup>1</sup> Scientific and common names follow Christidis and Boles (2008)



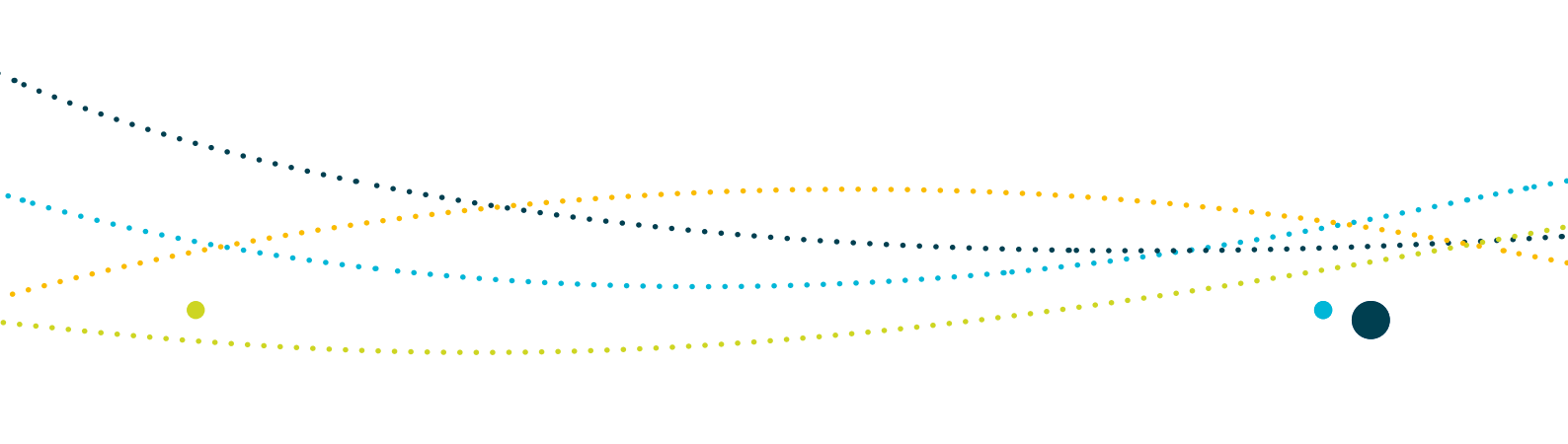
**Table A2: Seabird species known to occur in the North Marine Region on an infrequent basis**

Species (common name/ scientific name) <sup>1</sup>	Conservation status
<b>Boobies, frigatebirds and tropicbirds</b>	
Masked booby <i>Sula dactylatra</i>	Migratory, marine
Red-footed booby <i>Sula sula</i>	Migratory, marine
Great frigatebird <i>Fregata minor</i>	Migratory, marine
Red-tailed tropicbird <i>Phaethon rubricauda</i>	Marine
White-tailed tropicbird <i>Phaethon lepturus</i>	Migratory, marine
<b>Egrets, herons and ibis</b>	
Cattle egret <i>Ardea ibis</i>	Migratory, marine
Intermediate egret <i>Ardea intermedia</i>	Marine
Nankeen night-heron <i>Nycticorax caledonicus</i>	Marine
Australian white ibis <i>Threskiornis molucca</i>	Marine
Glossy ibis <i>Plegadis falcinellus</i>	Migratory, marine
Straw-necked ibis <i>Threskiornis spinicollis</i>	Marine
<b>Gulls and jaegers</b>	
Arctic jaeger <i>Stercorarius parasiticus</i>	Migratory, marine
Pomarine jaeger <i>Stercorarius pomarinus</i>	Migratory, marine

Species (common name/ scientific name) <sup>1</sup>	Conservation status
<b>Petrels</b>	
Matsudaira's storm-petrel <i>Hydrobates matsudairae</i>	Marine
Wilson's storm-petrel <i>Oceanites oceanicus</i>	Migratory, marine
<b>Plovers</b>	
Caspian plover <i>Charadrius asiaticus</i>	Migratory, marine
Little ringed plover <i>Charadrius dubius</i>	Migratory, marine
Ringed plover <i>Charadrius hiaticula</i>	Migratory, marine
Oriental plover <i>Charadrius veredus</i>	Migratory, marine
<b>Shearwaters</b>	
Wedge-tailed shearwater <i>Ardenna pacifica</i> , formerly known as <i>Puffinus pacificus</i>	Migratory, marine
<b>Terns and noddies</b>	
White tern <i>Gygis alba</i>	Marine
Black noddy <i>Anous minutus</i>	Marine
<b>Other</b>	
Australian painted snipe <i>Rostratula australis</i>	Vulnerable, migratory, marine
Arafura fantail <i>Rhipidura dryas</i>	Migratory, marine
Asian dowitcher <i>Limnodromus semipalmatus</i>	Migratory, marine



Species (common name/ scientific name) <sup>1</sup>	Conservation status
Australian pelican <i>Pelecanus conspicillatus</i>	Marine
Barn swallow <i>Hirundo rustica</i>	Migratory, marine
Black-faced monarch <i>Monarcha melanopsis</i>	Migratory, marine
Black-winged monarch <i>Monarcha frater</i>	Migratory, marine
Black-winged stilt <i>Himantopus himantopus</i>	Marine
Common redshank <i>Tringa totanus</i>	Migratory, marine
Dollarbird <i>Eurystomus orientalis</i>	Marine
Eurasian curlew <i>Numenius arquata</i>	Migratory, marine
Fork-tailed swift <i>Apus pacificus</i>	Migratory, marine
Latham's snipe <i>Gallinago hardwickii</i>	Migratory, marine
Little stint <i>Calidris minuta</i>	Marine
Long-toed stint <i>Calidris subminuta</i>	Migratory, marine
Magpie goose <i>Anseranas semipalmata</i>	Marine
Rainbow bee-eater <i>Merops ornatus</i>	Migratory, marine
Red-necked avocet <i>Recurvirostra novaehollandiae</i>	Marine



Species (common name/ scientific name) <sup>1</sup>	Conservation status
Red-necked phalarope <i>Phalaropus lobatus</i>	Migratory, marine
Red-rumped swallow <i>Cecropis daurica</i>	Marine
Ruff <i>Philomachus pugnax</i>	Migratory, marine
Sarus crane <i>Grus antigone</i>	Migratory
Satin flycatcher <i>Myiagra cyanoleuca</i>	Migratory, marine
Spangled drongo <i>Dicrurus bracteatus</i>	Marine
Spectacled monarch <i>Symposiachrus trivirgatus</i>	Migratory, marine
Wandering tattler <i>Tringa incana</i>	Migratory, marine
White-throated needletail <i>Hirundapus caudacutus</i>	Migratory, marine

<sup>1</sup> Scientific and common names follow Christidis and Boles (2008)

