



THE NORTH MARINE BIOREGIONAL PLAN

BIOREGIONAL PROFILE

APPENDIX D6

NORTH MARINE REGION PROTECTED SPECIES GROUP REPORT CARDS: BIRDS



A DESCRIPTION OF THE ECOSYSTEMS, CONSERVATION VALUES AND USES
OF THE NORTH MARINE REGION



Australian Government

Department of the Environment, Water, Heritage and the Arts

D6 North Marine Region Protected Species Group Report Card – Birds

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General information

The northern coastline of Australia is extremely important for many groups of aquatic birds. Seabirds feed primarily in marine waters, which they reach by flying or swimming. Pelagic species such as boobies, frigatebirds and shearwaters range widely over the shelf and open ocean, while other seabirds, including most terns, gulls and noddies, prefer coastal and inshore waters. 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 colonial 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 of one to five species (Chatto 2001).

Shorebirds (or wading birds) are mostly migratory birds, many of which breed in the Northern Hemisphere. They fly over the waters of the North Marine Region during migration but spend the majority of their time close to the shore, wading or feeding in shallow coastal waters, along sandy or rocky shorelines or on mudflats. Species that are migratory to northern Australia include knots, godwits, curlews, tattlers, sandpipers, stints, plovers and sand plovers. A small number of shorebirds, including dotterels, some plovers, thick-knees and oystercatchers, are not international migrants, and breed on coastal lands adjacent to the Region.

There are several species of migratory shorebird for which northern Australia represents the most significant proportion of the Australian population, including the little curlew, bar-tailed godwit, black-tailed godwit, greater sand plover, lesser sand plover and red-necked stint (Chatto 2003a). The great knot is the most abundant shorebird species recorded around the coast of northern Australia. At its peak, the population of great knots along the Northern Territory coastline alone exceeded 120 000 birds (Chatto 2003a). There are numerous coastal sites in the Northern Territory and southern Gulf of Carpentaria that support feeding

and roosting groups of more than 10 000 migratory shorebirds at each site. The route taken by these birds, the East Asian-Australasian Flyway, is considered to be one of the most threatened of the world's flyways. The East Asian-Australasian Flyway stretches over 20 countries from within the Arctic Circle in Siberia and western Alaska, through North and South-East Asia to Australia and New Zealand. The route contains many thousands of wetlands, which together provide a critical chain of feeding and resting spots for shorebirds as they migrate.

'Waterbirds', for the purposes of this report, include ducks, geese, cormorants, egrets, herons, ibis, pelicans and a number of terns that generally do not migrate but are resident in northern Australia. Waterbirds forage in wetlands and coastal waters, and may occasionally feed in offshore waters. The islands, beaches and wetlands of the northern Australian coastline adjacent to the North Marine Region provide important roosting and breeding areas for large numbers of many different species of waterbirds. Chatto (2006) documented 31 regionally or nationally significant wetland feeding and roosting areas, and over 50 regionally or nationally significant colonial breeding sites for waterbirds in the Northern Territory. At least 22 of the significant wetland areas would qualify as internationally significant sites (e.g. those listed under the *Convention on Wetlands of International Importance* (Ramsar Convention) 1971), based on the numbers of waterbirds that aggregate in the area. Some of the largest waterbird breeding colonies in Australia, with 10 000–20 000 birds regularly breeding, occur in the Van Diemen Gulf and between Anson and Fog Bays on the west coast of the Northern Territory (Chatto 2006).

While there are at least 50 shorebird species, more than 50 waterbird species and around 25 seabird species that reside in or are migratory visitors to northern Australia, this report card focuses on the protected species that are known to occur in the Commonwealth waters of the Region. Several other protected coastal birds that are not considered to be aquatic birds but which regularly migrate across, fly over or occasionally feed in offshore waters, for example, white-bellied sea-eagle and rainbow bee-eater, have also been included in appendices C and D.

An overview of the bird species of the Region can be found in chapters 5 and 6 of the National Oceans Office (2004) report, *Description of Key Species Groups in the Northern Planning Area* (Chatto et al. 2004a; 2004b). These chapters and the Chatto (2000; 2001; 2003a;

2003b; 2006) reports have been used as the basis for this Protected Species Group Report Card. Appendix C provides more specific information on those species protected under the EPBC Act that *are known to occur* in the Region, and lists the species that *may infrequently occur* in the Region.

Nationally protected species

None of the 53 protected marine birds known to occur in the North Marine Region are threatened. However, 41 of these species are protected as migratory species under the EPBC Act (table D III). There is one threatened bird species that may infrequently occur in the Region; the Australian painted snipe, which is listed as vulnerable as well as migratory under the EPBC Act. Australia is a signatory to four international agreements for the conservation of migratory birds. These agreements are:

- the *Agreement on the Conservation of Albatrosses and Petrels (ACAP)*, a multilateral agreement that seeks to conserve albatrosses and petrels by coordinating international activity to mitigate known threats to albatross and petrel populations. ACAP has been developed under the auspices of the *Convention on the Conservation of Migratory Species of Wild Animals (CMS)*;
- the *Agreement for the Protection of Migratory Birds and their Environment between the Government of Australia and the Government of Japan 1974 (JAMBA)*;
- the *Agreement for the Protection of Migratory Birds and their Environment between the Government of Australia and the People's Republic of China 1986 (CAMBA)*; and
- the *Agreement between the Government of Australia and the Government of the Republic of Korea on the Protection of Migratory Birds, 2007 (ROKAMBA)*.

Table D III Bird species listed as threatened or migratory under the EPBC Act that are known to occur in the North Marine Region

Species	Conservation status	Australian Government conservation plans or strategies for the species
Common sandpiper (<i>Actitis hypoleucos</i>)	Migratory, Marine [also listed under CAMBA, JAMBA, ROKAMBA and CMS (Appendix II)]	<ul style="list-style-type: none"> • <i>The Action Plan for Australian Birds (2000)</i> • <i>Threat Abatement Plan for the Incidental Catch (or By-catch) of Seabirds During Oceanic Longline Fishing Operations (1998)</i> • <i>Threat Abatement Plan for the Incidental Catch (or By-catch) of Seabirds During Oceanic Longline Fishing Operations (2006)</i> • <i>The Wildlife Conservation Plan for Migratory Shorebirds 2006</i>
Common noddy, brown noddy (<i>Anous stolidus</i>)	Migratory, Marine [also listed under CAMBA and JAMBA]	
Great egret, white egret (<i>Ardea alba</i>)	Migratory, Marine [also listed under CAMBA and JAMBA]	
Ruddy turnstone (<i>Arenaria interpres</i>)	Migratory, Marine [also listed under CAMBA, JAMBA, ROKAMBA and CMS (Appendix II)]	
Sharp-tailed sandpiper (<i>Calidris acuminata</i>)	Migratory, Marine [also listed under CAMBA, JAMBA, ROKAMBA and CMS (Appendix II)]	
Sanderling (<i>Calidris alba</i>)	Migratory, Marine [also listed under CAMBA, JAMBA, ROKAMBA and CMS (Appendix II)]	
Red knot (<i>Calidris canutus</i>)	Migratory, Marine [also listed under CAMBA, JAMBA, ROKAMBA and CMS (Appendix II)]	
Curlew sandpiper (<i>Calidris ferruginea</i>)	Migratory, Marine [also listed under CAMBA, JAMBA, ROKAMBA and CMS (Appendix II)]	
Pectoral sandpiper (<i>Calidris melanotos</i>)	Migratory, Marine [also listed under JAMBA, ROKAMBA and CMS (Appendix II)]	



Species	Conservation status	Australian Government conservation plans or strategies for the species
Red-necked stint (<i>Calidris ruficollis</i>)	Migratory, Marine [also listed under CAMBA, JAMBA, ROKAMBA and CMS (Appendix II)]	
Great knot (<i>Calidris tenuirostris</i>)	Migratory, Marine [also listed under CAMBA, JAMBA, ROKAMBA and CMS (Appendix II)]	
Streaked shearwater (<i>Calonectris leucomelas</i>)	Migratory, Marine [also listed under CAMBA, JAMBA and ROKAMBA]	
Greater sand plover, large sand plover (<i>Charadrius leschenaultii</i>)	Migratory, Marine [also listed under CAMBA, JAMBA, ROKAMBA and CMS (Appendix II)]	
Lesser sand plover, Mongolian plover (<i>Charadrius mongolus</i>)	Migratory, Marine [also listed under CAMBA, JAMBA, ROKAMBA and CMS (Appendix II)]	
White-winged tern, white-winged black tern (<i>Chlidonias leucopterus</i>)	Migratory, Marine [also listed under CAMBA, JAMBA, ROKAMBA and CMS (Appendix II)]	
Eastern reef egret (<i>Egretta sacra</i>)	Migratory, Marine [also listed under CAMBA]	
Lesser frigatebird (<i>Fregata ariel</i>)	Migratory, Marine [also listed under CAMBA, JAMBA and ROKAMBA]	
Oriental pratincole (<i>Glareola maldivarum</i>)	Migratory, Marine [also listed under CAMBA, JAMBA and ROKAMBA]	
White-bellied sea-eagle (<i>Haliaeetus leucogaster</i>)	Migratory, Marine [also listed under CAMBA, CMS (Appendix II) and CITES (Appendix II)]	
Grey-tailed tattler (<i>Heteroscelus brevipes</i>)	Migratory, Marine [also listed under CAMBA, JAMBA, ROKAMBA and CMS (Appendix II)]	
Broad-billed sandpiper (<i>Limicola falcinellus</i>)	Migratory, Marine [also listed under CAMBA, JAMBA, ROKAMBA and CMS (Appendix II)]	
Bar-tailed godwit (<i>Limosa lapponica</i>)	Migratory, Marine [also listed under CAMBA, JAMBA, ROKAMBA and CMS (Appendix II)]	
Black-tailed godwit (<i>Limosa limosa</i>)	Migratory, Marine [also listed under CAMBA, JAMBA, ROKAMBA and CMS (Appendix II)]	
Eastern curlew (<i>Numenius madagascariensis</i>)	Migratory, Marine [also listed under CAMBA, JAMBA, ROKAMBA and CMS (Appendix II)]	
Little curlew, little whimbrel (<i>Numenius minutus</i>)	Migratory, Marine [also listed under CAMBA, JAMBA, ROKAMBA and CMS (Appendix II)]	
Whimbrel (<i>Numenius phaeopus</i>)	Migratory, Marine [also listed under CAMBA, JAMBA, ROKAMBA and CMS (Appendix II)]	

Species	Conservation status	Australian Government conservation plans or strategies for the species
Osprey (<i>Pandion haliaetus</i>)	Migratory, Marine [also listed under CMS (Appendix II) and CITES (Appendix II)]	
Pacific golden plover (<i>Pluvialis fulva</i>)	Migratory, Marine [also listed under CAMBA, JAMBA, ROKAMBA and CMS (Appendix II)]	
Grey plover (<i>Pluvialis squatarola</i>)	Migratory, Marine [also listed under CAMBA, JAMBA, ROKAMBA and CMS (Appendix II)]	
Arctic jaeger, Arctic skua (<i>Stercorarius parasiticus</i>)	Migratory, Marine [also listed under JAMBA and ROKAMBA]	
Little tern (<i>Sterna albifrons</i>)	Migratory, Marine [also listed under CAMBA, JAMBA, ROKAMBA and CMS (Appendix II)]	
Bridled tern (<i>Sterna anaethetus</i>)	Migratory, Marine [also listed under CAMBA and JAMBA]	
Lesser crested tern (<i>Sterna bengalensis</i>)	Migratory, Marine [also listed under CAMBA]	
Caspian tern (<i>Sterna caspia</i>)	Migratory, Marine [also listed under CAMBA and JAMBA]	
Common tern (<i>Sterna hirundo</i>)	Migratory, Marine [also listed under CAMBA, JAMBA, ROKAMBA and CMS (Appendix II)]	
Black-naped tern (<i>Sterna sumatrana</i>)	Migratory, Marine [also listed under CAMBA and JAMBA]	
Brown booby (<i>Sula leucogaster</i>)	Migratory, Marine [also listed under CAMBA, JAMBA and ROKAMBA]	
Wood sandpiper (<i>Tringa glareola</i>)	Migratory, Marine [also listed under CAMBA, JAMBA, ROKAMBA and CMS (Appendix II)]	
Common greenshank (<i>Tringa nebularia</i>)	Migratory, Marine [also listed under CAMBA, JAMBA, ROKAMBA and CMS (Appendix II)]	
Marsh sandpiper, little greenshank (<i>Tringa stagnatilis</i>)	Migratory, Marine [also listed under CAMBA, JAMBA and ROKAMBA]	
Terek sandpiper (<i>Xenus cinereus</i>)	Migratory, Marine [also listed under CAMBA, JAMBA, ROKAMBA and CMS (Appendix II)]	



Ecology of protected bird species in the North Marine Region

The North Marine Region and adjacent coastal waters and lands of northern Australia provide vast and remote expanses of relatively undisturbed breeding, feeding and roosting habitat for a diverse and abundant array of birds, as well as staging points for migratory birds passing through the Region. Habitats include grassy or open saline and freshwater wetlands, intertidal mudflats,

mangroves, paperbark forests, rocky islands, headlands and cliffs, coral reefs and atolls, sandy beaches, dunes and extensive floodplains (Chatto 2003a). Seabirds feed on pelagic fish, squid and zooplankton in the shallow, turbid and nutrient-rich waters of the coastal boundary layer, and in the relatively productive waters of the Gulf of Carpentaria and Joseph Bonaparte Gulf basins.

Some of the more prominent groups of protected bird species that are known to occur in the Region include the following:

Terns and noddies

Thirteen species of tern and two species of noddy have been recorded in the Region (Chatto *et al.* 2004a). Of these, all are listed as marine species and approximately half are protected as migratory species under the EPBC Act. Most species are numerous, at least at certain times of the year, and particularly during the breeding season between March and December (Chatto *et al.* 2004a). Terns and noddies predominantly feed in offshore or inshore waters by diving for small fish, returning to the shore to roost. A few species, notably the sooty tern, soar for prolonged periods over the ocean.

Different species utilise the offshore or inshore waters and coast in different ways. Some species are resident in coastal lands and waters adjacent to the Region and are present all year, while others migrate into, or out of, northern Australia to breed. For example, common terns breed in the Northern Hemisphere but groups of many thousands can be seen in and around the Region, particularly during the late dry to early wet season (Chatto 2006). Some individual Caspian terns breed on the coast adjacent to the Region, while other individuals migrate elsewhere to breed (Chatto *et al.* 2004a). Lesser crested terns are common throughout the Region but have only been observed to breed on one offshore island (Low Rock) in the Gulf of Carpentaria. Similarly, the common noddy breeds only on Higginson Islet, off Gove Peninsula in north-east Arnhem Land, but is an infrequent visitor to the Region (Chatto 2001). Black-naped terns breed in many small colonies around the Northern Territory coast but are rarely seen outside the breeding season or away from known breeding sites (Chatto 2001).



Nesting crested tern. Photo: Biodiversity Conservation Unit, Northern Territory Government

Overall, more than 100 tern breeding colonies are located on offshore islands around the Northern Territory coast and significant colonies are also found on the Wellesley Islands off Queensland in the Gulf of Carpentaria. Colonies are usually formed of between one and five species, containing populations numbering from a few pairs to over 25 000 pairs of each species. Some of these colonies are the largest, or among the largest, in the world. For example, more than 50 000 crested terns have been recorded at Seagull Island off Melville Island, Urquhart Islet in the Sir Edward Pellew Group (Chatto 2001) and North Bountiful Island in the Wellesley Islands (Walker 1992). The little tern is the only species that has been found to breed on mainland beaches. It nests in more than 30 breeding sites of up to 200 birds located around the coast of the Northern Territory, as well sites on Cape York Peninsula (Chatto 2001).

Gulls and jaegers

Silver gulls are abundant in the Gulf of Carpentaria and north-western Northern Territory throughout the year, particularly concentrating around larger coastal towns, but they are rarely seen in the Van Diemen Gulf (Chatto 2001). They feed in coastal and offshore waters and breed colonially on offshore islands. Pomarine jaegers and Arctic jaegers are migratory pelagic seabirds that are occasionally sighted in the offshore waters of the Region (Chatto 2003b). These species may be more common than has been recorded as there have only been a limited number of offshore bird surveys carried out (Chatto *et al.* 2004a).

Sandpipers

More than 30 species of sandpiper, curlew, whimbrel, knot, stint, tattler, godwit, turnstone and greenshank, almost all of which are protected under the EPBC Act, migrate regularly across the waters of the Region to feed and roost in adjacent coastal lands. All are Northern Hemisphere-breeding migrants that are present in northern Australia during the non-breeding season between September and March, although high overwintering numbers suggest that many birds do not migrate north to breed each year (Chatto *et al.* 2004b). Most species are extremely numerous all around the northern Australian coast throughout the wet season, feeding along the shoreline or in saline wetlands, although some birds stop only for a short period in the Region to rest and feed and then continue their migration further south (Chatto *et al.* 2004a). The most abundant populations of the species recorded in the Northern Territory include the great knot, little curlew,

bar-tailed godwit, black-tailed godwit and red-necked stint (Chatto 2003a).

Plovers

There are eight common and widespread species and another five less common species of plover, sand plover, dotterel and lapwing that occur on the coast adjacent to the Region (Chatto 2003b). Nine species are protected as marine or migratory under the EPBC Act. These populations are a mix of migratory birds and breeding residents that feed in coastal and inshore waters and roost or breed on offshore islands, beaches, and saline and freshwater wetlands. Most abundant are the greater sand plover and lesser sand plover, which migrate regularly across the ocean waters of the North Marine Region to breed in the Northern Hemisphere (Chatto 2003a). Large flocks of grey plovers also arrive along the northern Australian coastline between August and September and subsequently disperse to mudflats and sandy beaches around the coast (Chatto 2003a).

Boobies, frigatebirds and tropicbirds

Brown boobies are observed throughout the North Marine Region and near the adjacent coastline all year round (Blaber and Milton 1994), but they are most abundant in the north-western Gulf of Carpentaria. They feed in offshore and inshore waters by diving into the ocean at high speed for fish or squid. The only breeding locations recorded adjacent to the Region for this species are on Rocky and Manowar islands in the Wellesley Islands, which have been reported to support around 5400 breeding pairs (O'Neill and White 2003). Red-footed boobies and masked boobies are uncommon in the Region and have not been observed to breed in the Northern Territory (Chatto 2001). The lesser frigatebird is regularly recorded in both offshore and coastal waters throughout the Region (Blaber and Milton 1994). This seabird only breeds at one site on the adjacent coast, Manowar Island, which supports a large colony of around 3800 breeding pairs (O'Neill and White 2003). There is a large permanent roost of lesser frigatebirds in tall forest near Weipa. Great frigatebirds are less commonly recorded in the Region (Chatto 2001). Tropicbirds are only occasionally sighted in the Region.

Raptors

A number of eagles, kites and hawks are common residents of the coast of northern Australia, but there are three protected species that will occasionally hunt in or fly across the open ocean of the North Marine Region.

Osprey, white-bellied sea-eagle and Brahminy kite nest and roost along the Northern Territory coast, breeding in particularly high densities in some areas such as the smaller offshore islands adjacent to Groote Eylandt (Chatto *et al.* 2004a). Sea-eagles (Family Accipitridae including white-bellied sea-eagle and Brahminy kite) and fish hawks such as the osprey feed mainly by hunting fish over open water, however the white-bellied sea-eagle may also take turtles, sea snakes, birds and mammals while the Brahminy kite will scavenge dead fish and crabs.

Shearwaters

Tube-nosed seabirds (Procelliformes) are almost exclusively pelagic birds that feed and soar over the open ocean. The group is poorly represented in the North Marine Region, although they may be more numerous than the limited number of offshore surveys carried out to date have indicated (Chatto *et al.* 2004a). The streaked shearwater is the only species to have been recorded in larger numbers in the Region. It is a regular, widespread and moderately common non-breeding wet season visitor (Chatto 2003b). Wilson's storm-petrels and Matsudaira's storm-petrels have also been sighted in the Region and are likely to be more common visitors than has yet been recorded (Chatto *et al.* 2004a).

Egrets, herons and ibis

Twelve species of heron, egret and ibis are considered as resident waterbirds that feed, roost and/or breed around the coast of northern Australia. Cormorants and darters are also abundant and well-represented in this area. There are five species of egret, three species of ibis and one species of heron that may occasionally feed in or migrate across the offshore waters of the North Marine Region and are protected as marine or migratory species under the EPBC Act.

Most of the protected egrets, herons and ibis are widespread and abundant, breeding colonially in mangroves, paperbark trees or on riverbanks between February and August (Chatto 2003b; Chatto *et al.* 2004b). There are at least 20 large waterbird breeding colonies on the coast of the Northern Territory. The largest colony, found near the mouth of the Adelaide River, regularly contains around 30 000 breeding birds (Chatto 2000). In Queensland there are substantial colonies on the Coleman, Mitchell, Nassau, Norman, Bynoe and Flinders rivers. Straw-necked ibis do not breed along the coast of the Northern Territory and glossy ibis have only been recorded breeding at one



location (Chatto 2006), but both species are common migrants that pass through the Region.

The eastern reef egret is common along the coastline throughout the year. It does not breed colonially but breeds in single pairs or in small groups around the Northern Territory coast (Chatto 2001).

Important areas for birds in the North Marine Region

Important areas are identified for those bird species listed as threatened or migratory under the EPBC Act. Sites of particular or special significance for listed marine species that are not threatened or migratory have also been included.

There is no data available that indicates that seabirds aggregate to feed in any particular location within the Commonwealth waters of the North Marine Region. However, the wetlands, floodplains, beaches and islands that lie on the coast adjacent to the Region support many important nesting, feeding and aggregation sites of international or national conservation significance for protected shorebirds and seabirds, including two Ramsar listed wetlands. These sites are under the jurisdiction of the Northern Territory and Queensland governments.

Important areas on the coast adjacent to the Region for birds include:

Joseph Bonaparte Gulf – the complex of three estuaries at the head of the Joseph Bonaparte Gulf (the Keep, Victoria and Fitzmaurice rivers) supports six significant waterbird colonies of 10 000–15 000 individuals from at least nine species, breeding in significant numbers, including the great egret (Chatto 2006). Of these, the colony on the Keep River Estuary is the second largest waterbird breeding colony in the Northern Territory and it is the only one to contain nesting glossy ibis (Chatto 2006). Extensive areas of shorebird and waterbird feeding habitat are associated with the mangroves and mudflats in this location. Significant waterbird feeding areas are located on the wetlands between the Keep and Victoria River estuaries and north of Fossil Head, while the largest migratory shorebird roost in the area occurs at Turtle Point (Chatto 2003a; 2006). Protected migratory species that occur in significant numbers include terek sandpiper, greater and lesser sand plover, ruddy turnstone, sanderling, broad-billed sandpiper and white-winged tern.

Anson Bay to Fog Bay – one of the most important areas in the Northern Territory for colonial waterbird breeding and aggregation (Chatto 2006). The floodplains of both the Daly and Finnis River each support a single colony of more than 10 000 waterbirds, with a further 16 smaller colonies in the vicinity (e.g. on the Moyle and Little Moyle rivers). All waterbird species that nest colonially in the Northern Territory (except glossy ibis) are represented in significant numbers in one or more of these colonies (Chatto 2006). There are significant feeding and roosting aggregations of great egret, cattle egret, white-winged tern, common tern and glossy ibis. The Perron Islands contain the Northern Territory's largest (and the only regular) Australian pelican rookery and are significant for roosting white-winged, lesser crested and common terns (Chatto 2006). There is extensive shorebird feeding and roosting habitat in Fog Bay, Anson Bay, on the Daly, Finnis and Reynolds River floodplains, and on Little Moyle River (Chatto 2003a; 2006). Of the protected migratory shorebirds aggregating in the area, great knot, greater sand plover and bar-tailed godwit are particularly abundant, while significant populations have also been recorded for black-tailed godwit, lesser sand plover, little curlew, whimbrel, marsh sandpiper, terek sandpiper, grey plover, red-necked stint, common greenshank and broad-billed sandpiper (Chatto 2003a).

Beagle Gulf – Darwin Harbour, Bynoe Harbour, Shoal Bay and the Adelaide River estuary support nationally significant nesting and/or foraging aggregations of seabirds, waterbirds and shorebirds. Black-naped tern, little tern and eastern reef egret breed on Bare Sand Island south-west of Darwin (Chatto 2001). This and other offshore islands in the vicinity also sustain roosting aggregations of white-winged, common and lesser crested tern (Chatto 2006). Shorebirds and waterbirds aggregate in the coastal wetlands of Beagle Gulf, with the most important region between Lee Point and Tree Point, east of Darwin. Although wetlands of this area are smaller than those further to the east in the Van Diemen Gulf, they support large numbers of waterbirds, with egret species being particularly abundant (Chatto 2006), though only modest numbers of migratory shorebirds compared with other parts of northern Australia (Chatto 2003a). Protected migratory species with abundant or significant populations in the area include the bar-tailed godwit, great knot, red knot, sanderling, grey plover, black-tailed godwit, common sandpiper, marsh sandpiper, whimbrel, terek sandpiper, grey-tailed tattler, ruddy turnstone, greater sand plover,

lesser sand plover, red-necked stint, little curlew, great egret and eastern reef egret.

Bathurst and Melville islands – Seagull Island, located off the western most tip of Melville Island, supports one of the largest seabird breeding colonies in the Northern Territory; an internationally significant colonial seabird breeding site of potentially greater than 50 000 crested terns (Chatto 2001). Little terns also breed colonially at three important sites on the northern side of Melville Island (Chatto 2001), and osprey, white-bellied sea eagle, common tern and eastern reef egret are common in the area. There are numerous nationally significant roosting, nesting and foraging aggregations of migratory shorebirds along the southern coast of Melville Island (Chatto 2003a) including important populations of great knot, red-necked stint, greater and lesser sand plover and bar-tailed godwit.

Van Diemen Gulf – the estuaries and floodplains on the southern shores of the Van Diemen Gulf (including Chambers Bay and the Adelaide, Mary, and West, South and East Alligator rivers) provide extensive shorebird and waterbird feeding habitat, and support one of the most important areas for colonial waterbird breeding in the Northern Territory (with seven significant colonies). The single largest colony of waterbirds occurs on the Adelaide River and is likely to support around 30 000 birds, predominantly egrets, herons and cormorants (Chatto 2006). The East and South Alligator River floodplains occur within Kakadu National Park, a Ramsar wetland of international significance. Both floodplains

support colonies of around 10 000–15 000 waterbirds (Chatto 2006). Protected migratory birds breeding or roosting in significant numbers on the southern coast of the Van Diemen Gulf include great egret, cattle egret, common tern, white-winged tern, osprey and white-bellied sea-eagle. There are many internationally and nationally significant roosts of migratory shorebirds along the coast of Chambers and Finke bays, and on the Adelaide, South Alligator and East Alligator river floodplains (Chatto 2003a). Little curlew, sharp-tailed sandpiper, black-tailed godwit and whimbrel occur in very large numbers. Other migratory shorebirds that are abundant throughout the area include marsh sandpiper, common sandpiper, curlew sandpiper, terek sandpiper, lesser sand plover, grey plover, eastern curlew, common greenshank, great knot, red-necked stint and broad-billed sandpiper.

Cobourg Peninsula and the Croker Islands – nationally significant colonial seabird rookeries are located on the small offshore islands to the north-east and east of Croker Island (e.g. New Year Island, Grant Island and Cowlard Island) and on the Sandy Islands off the Cobourg Peninsula (Chatto 2001). Crested tern, roseate tern, black-naped tern and bridled tern breed on these offshore islands, while the little tern nests on the shores of larger islands and on the Peninsula. The Garig Gunak Barlu National Park on Cobourg Peninsula was the first site in the world to be designated as a Ramsar wetland (in 1974). The Murganella Creek floodplain south of the Cobourg Peninsula also supports significant colonies of waterbirds and roosts of migratory shorebirds. There are



Sanderling. Photo: Joyce Gross.

significant roosting and foraging populations of marsh sandpiper, terek sandpiper, lesser sand plover, ruddy turnstone and common tern, and breeding populations of osprey, white-bellied sea-eagle, great egret and eastern reef egret. Other protected species abundant in the area include great knot, sharp-tailed sandpiper, greater sand plover, red-necked stint, black-tailed and bar-tailed godwit and glossy ibis.

Goulburn Islands – there are significant seabird breeding colonies (little tern and black-naped tern), roosting aggregations of common tern, and breeding populations of eastern reef egret on both North and South Goulburn islands and the smaller islands offshore.

Castlereagh Bay to Boucaut Bay – some of the largest flocks of migratory shorebirds in the Northern Territory (with counts of more than 30 000 birds) have been recorded in Boucaut and Castlereagh bays on the northern coast of Arnhem Land (Chatto 2003a). Shorebirds and waterbirds make use of the extensive mangrove, intertidal mudflat, floodplain, sandy and rocky beach and headland habitats in the area. Protected migratory species aggregating in the area include great knot, grey plover, black-tailed godwit, bar-tailed godwit, greater sand plover, sanderling, cattle egret, osprey, white-bellied sea-eagle and glossy ibis at Boucaut Bay; bar-tailed godwit, red knot, grey-tailed tattler, marsh and terek sandpiper, eastern curlew, ruddy turnstone, common greenshank, cattle egret, great egret, glossy ibis and white-bellied sea-eagle at Castlereagh Bay; and bar-tailed godwit,

grey-tailed tattler, red-necked stint, whimbrel and terek sandpiper along the Milingimbi coastline. There are significant roosts for seabirds including crested tern, roseate tern, little tern and bridled tern along the coast and on inshore islands (e.g. False Point, Crocodile Island, Yabooma Island).

North-west and North-east Crocodile islands– the small offshore island group to the west of the Wessel Island chain supports internationally significant nesting sites for some 10 000–30 000 colonially breeding seabirds including crested tern and bridled tern (Chatto 2001).

The Wessel Islands – nationally and internationally significant flocks of more than 15 000–20 000 migratory shorebirds have been observed in Buckingham and Arnhem bays on the east side of the Wessel Island chain, and on Elcho Island in the Cadell Straits (Chatto 2003a). Significant populations of bar-tailed godwit, black-tailed godwit, whimbrel, eastern curlew, marsh sandpiper, grey-tailed tattler, ruddy turnstone, great knot, broad-billed sandpiper and lesser sand plover aggregate in the area, while red-necked stint, grey plover and red knot are also abundant. Buckingham and Arnhem bays both support significant waterbird breeding colonies of more than 5000 birds including glossy ibis, great egret and eastern reef egret (Chatto 2006). Seabird rookeries are common on islands throughout the area, with significant breeding populations of bridled, black-naped, roseate, little and crested tern (Chatto 2001). Osprey and white-bellied sea-eagle also breed and forage in the area.



Common noddy. Photo: Fusion Films.

North-west Gulf of Carpentaria coast – this area supports a large number of nationally and internationally significant nesting and roosting aggregations of seabirds. Particularly large colonial seabird breeding colonies occur on the islands north of the Gove Peninsula. For example, Chatto (2001) recorded over 10 000 crested terns, over 10 000 bridled terns, as well as black-naped tern, roseate tern and common noddy breeding on Higginson Islet off Nhulumbuy. Other protected migratory birds that breed on and around the Gove Peninsula include little tern, Caspian tern, osprey, white-bellied sea-eagle and eastern reef egret.

Blue Mud Bay – nationally and internationally significant foraging aggregations of waterbirds and migratory shorebirds inhabit the wetlands in the northern part of Blue Mud Bay. Protected migratory species occurring in significant numbers include the black-tailed godwit, bar-tailed godwit, great knot, red-necked stint, red knot, lesser sand plover, little curlew, curlew sandpiper, red-necked stint, marsh sandpiper, black-winged stilt, whimbrel, eastern curlew, broad-billed sandpiper, ruddy turnstone, grey-tailed tattler, great egret and glossy ibis (Chatto 2003a; 2006). The islands in the mouth of the Bay (e.g. the small offshore islets near Nicol Island) support a number of significant seabird breeding colonies of bridled, black-naped, roseate, Caspian and little terns (Chatto 2001). Osprey and white-bellied sea-eagle are also abundant in the area.

Groote Eylandt and surrounds – the eastern coast of Groote Eylandt and numerous offshore islands, particularly to the north and east, host nationally significant sites for the colonial breeding and roosting of seabirds. Protected seabirds and migratory birds aggregating in the area include crested tern, roseate tern, black-naped tern, little tern, bridled tern, common tern, osprey, white-bellied sea-eagle and eastern reef egret.

Roper River and the Limmen Bight – extensive tracts of saline wetlands, mangroves and intertidal mudflats along the coast and Roper River estuary provide significant mainland foraging and roosting habitat for large numbers of migratory shorebirds, and support breeding colonies containing more than 5000–10 000 waterbirds (Chatto 2003a; Chatto 2006). There are significant populations of lesser sand plover, broad-billed sandpiper and great egret, and abundant great knot, red knot, red-necked stint, curlew sandpiper, greater sand plover, white-winged tern and glossy ibis. The small offshore islands of Low Rock and Sandy Island each support significant colonial seabird breeding colonies of more

than 10 000 crested, lesser crested, roseate, black-naped and bridled terns (Chatto 2001).

Sir Edward Pellew Group – large numbers of seabirds inhabit the Barranyi (North Island) National Park, Cape Pellew and the outer islands of the Sir Edward Pellew Group. The islands provide one of the most important areas for colonial seabird breeding in the Northern Territory with predominantly crested and roseate terns, but also bridled, black-naped and little terns nesting in the area (Chatto 2001). Over 50 000 crested terns alone have been recorded breeding on Urquhart Islet, north-east of North Island (Chatto 2001). Eastern reef egret, osprey and white-bellied sea-eagle forage and breed in significant numbers around the islands. Inshore of the islands, the mainland coast provides extensive and diverse habitat for large numbers of shorebirds and waterbirds (Chatto 2003a). The mouth of the McArthur River is an important staging point for migratory birds (National Oceans Office 2003). Significant populations of black-tailed godwit, bar-tailed godwit, whimbrel, eastern curlew, marsh sandpiper, common greenshank, grey-tailed tattler, ruddy turnstone and lesser sand plover, and large numbers of great knot, red-necked stint, curlew sandpiper and sharp-tailed sandpiper occur in the area (Chatto 2003a). White-winged tern, common tern and great egret also breed and/or roost in significant numbers around the coast (Chatto 2006).

Wellesley Islands and surrounds – there are internationally and nationally significant seabird breeding colonies and roosting aggregations of shorebirds and waterbirds on the Wellesley Islands. Brown boobies nest on Manowar and Rocky islands, while lesser frigatebirds breed on Manowar Island (Chatto 2001). North Bountiful Island supports the largest colony of crested terns in the world (Walker 1992), and little terns breed on coastal beaches throughout the area. There are significant nesting and foraging aggregations of waterbirds and roosts of migratory shorebirds on Mornington Island, including eastern curlew and Australian painted snipe.

South-eastern Gulf of Carpentaria – the area of extensive, continuous and undisturbed wetlands known as the ‘Southern Gulf Aggregation’ provides one of the three most important areas for shorebirds in Australia. The saline wetlands, salt marshes, salt pans, mangroves and intertidal mudflats along the south-eastern coast of the Gulf of Carpentaria offer very significant habitat for large numbers of shorebirds and waterbirds. The area supports more than half of the migratory waders that occur in Queensland and up to one third of Australia’s



wading birds at any one time, including 22 shorebird species listed under JAMBA and 31 shorebird species listed under CAMBA (Kiessling and Booth 2004). The coast north of Karumba is an important staging point for migratory birds (National Oceans Office 2003). Protected migratory species that occur in the area include the great knot, red knot, red-necked stint, black-tailed godwit, little curlew, common greenshank, sharp-tailed sandpiper, marsh sandpiper, terek sandpiper, common sandpiper, curlew sandpiper, broad-billed sandpiper, whimbrel, greater sand plover, lesser sand plover, grey plover, Pacific golden plover, eastern curlew, grey-tailed tattler, oriental pratincole, sanderling, bar-tailed godwit and ruddy turnstone.

Known interactions, threats and mitigation measures

At sea, birds may interact with human activities in a number of ways, including encounters with fishing vessels and entanglement in marine debris. They may also be affected by disturbance at rookeries or roosts adjacent to the Region. These interactions are discussed in more detail below.

Climate change

Climate change and rising sea levels may threaten birds, such as the brown booby, that breed on low-lying atolls and islands (Marchant and Higgins 1990). The increased incidence of inclement weather, particularly cyclones and heat, has the potential to adversely affect migratory shorebirds, waterbirds, seabirds and their habitats.

Commercial fisheries

Seabirds foraging for fish near commercial fishing operations may collide with trawl apparatus, become entangled in nets, or get caught on longline gear. Brown boobies in particular have the potential to be susceptible to long-line operations.

Discards from the Northern Prawn Fishery increase the amount of food available to species such as silver gulls, brown boobies, frigatebirds, raptors and terns. For example, corresponding with increased prawn trawling effort, lesser frigatebird breeding pairs trebled on Manowar Island in the Gulf of Carpentaria between 1982 and 1991 (Kiessling and Booth 2004). This may have led to a population increase of some species (e.g. silver gulls) to the detriment of other species through direct predation or competition for breeding sites. Large

catches of fish, squid, etc by trawlers may also reduce the food available to bird species that do not pick up trawl discards (Chatto 2001).

In recognition of the threat posed to seabirds by long-line fishing primarily in waters south of 25° S in Australia, incidental catch of seabirds during oceanic longline fishing operations has been listed under the EPBC Act as a key threatening process. A *Threat Abatement Plan 2006 for the Incidental Catch (or Bycatch) of Seabirds During Oceanic Longline Fishing Operations* is in place, and available at <www.environment.gov.au/biodiversity/threatened/publications/tap/longline>. The seabird species that inhabit areas of northern Australia where longline fishing operations occur, however, are generally not attracted to fishing vessels or longline baits (Brothers, N., 2006, pers. comm. cited in the threat abatement plan). By-catch action plans have also been developed for specific fisheries, and measures such as fishery observer programmes, weighted lines and night-setting of lines have been introduced in some fisheries.

Marine debris and pollution

The ingestion of, or entanglement in, harmful marine debris has been identified under the EPBC Act as a key threatening process causing injury and fatality to vertebrate marine life <www.environment.gov.au/biodiversity/threatened/publications/marine-debris.html>. Entanglement in marine debris such as discarded fishing gear can lead to restricted mobility, starvation, infection, amputation, drowning and smothering. The ingestion of plastic marine debris can cause physical blockages leading to starvation, or injuries to the digestive system leading to infection or death.

Marine debris can affect seabirds through either ingestion or entanglement. Ingested debris has a wide range of lethal or sub-lethal effects (Ryan *et al.* 1988). Debris can cause perforation, mechanical blockage or impairment of the digestive system, resulting in starvation. Chicks appear to be at greater threat than adults because of their high rates of ingestion and low frequency of regurgitative casting of indigestible material. When plastics are regurgitated to chicks by their parents, physical impacts and internal ulcerations are likely to lower survival rates. In addition, the chick receives less food, lowering its nutrient intake and

increasing its chances of starvation (Environment Australia 2001).

The greatest cause of entanglements amongst seabirds is monofilament line and fishing net (Huin and Croxall 1996). Fishing hooks, six-pack yokes, wire and string are also commonly reported entanglements.

The *Recovery Plan for Albatrosses and Petrels* (Environment Australia 2001) highlights marine debris as an issue of concern and outlines a number of measures to address the problem. The Australian Government is also currently developing a threat abatement plan that aims to minimise the impacts of marine debris on threatened marine species. Further information is available at www.environment.gov.au/biodiversity/threatened/publications/marine-debris.html.

Human disturbance at rookeries

Disturbance by humans at nesting sites can cause considerable losses when nest desertion leaves eggs or chicks exposed to very hot weather (Chatto *et al.* 2004a). Even in remote areas, visitors from boats or yachts can do major harm to a colony by coming ashore even just once for a short time during the breeding cycle. Driving vehicles along beaches can destroy nests and disturb adult birds, especially shorebirds and little tern colonies. Fire may kill or disturb adult birds and chicks, and has the potential to damage nesting habitat. Traditional harvesting of seabird eggs occurs at some islands adjacent to the Region.

Feral species

Weeds may invade seabird and shorebird nesting sites, and reduce the extent of habitat suitable for breeding, roosting and feeding (Chatto 2001).

Feral animals such as cats, dogs, pigs and rats can also cause considerable damage to nesting sites and reduce reproductive success through predation on eggs, chicks and breeding adults. Predation by feral cats, predation by the European red fox, predation, habitat degradation, competition and disease transmission by feral pigs, and predation by exotic rats on Australian offshore islands of less than 1000 km² (100 000 ha) have all been recognised as key threatening processes under the EPBC Act. There are threat abatement plans in place for the first three of these key threatening processes. Further information is available from www.environment.gov.au/biodiversity/threatened/ktp.html.

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D7 North Marine Region Protected Species Group Report Card – Dugongs

Current at February 2008. For updates see <www.environment.gov.au/coasts/mbp/north>.

General information

The dugong (*Dugong dugon*) is the only living member of the family Dugongidae and is only one of four living species of the order Sirenia.

Nationally protected species

The dugong is listed as migratory and marine under Section 248 of the EPBC Act and is listed under CITES Appendix I and CMS Appendix II. A Memorandum of Understanding on the conservation and management of dugongs and their habitats throughout their range was signed on the 31 October 2007. The dugong is also listed as vulnerable to extinction under the *World Conservation Union's Red List of Threatened Species* (IUCN 2000).

Ecology of protected species in the North Marine Region

Dugongs are found throughout the tropical and subtropical coastal and island waters of the Indo–West Pacific region. A significant proportion of the world's dugong populations occur in coastal waters from Shark Bay in Western Australia to Moreton Bay in Queensland. Current dugong distributions are believed to represent relict populations separated by large areas where they are either extinct or close to extinction. The most recent estimate of the Australian population is around 80 000 individuals (Marsh *et al.* 2002).

Dugongs are long-lived animals with a low reproductive rate; they have a long gestation period and a high investment in each offspring. The maximum lifespan is approximately 70 years and the pre-productive interval ranges between six and 15 years (Marsh *et al.* 2003). Female dugongs usually bear a calf every two and half to seven years, with a gestation period of about 13 months. Calving occurs in the shallow waters of tidal sandbanks and estuaries, and breeding is more likely to occur in the second half of the year (Boyd *et al.* 1999).

Dugongs feed on seagrass meadows found in shallow tidal and sub-tidal coastal waters. Preferential grazing