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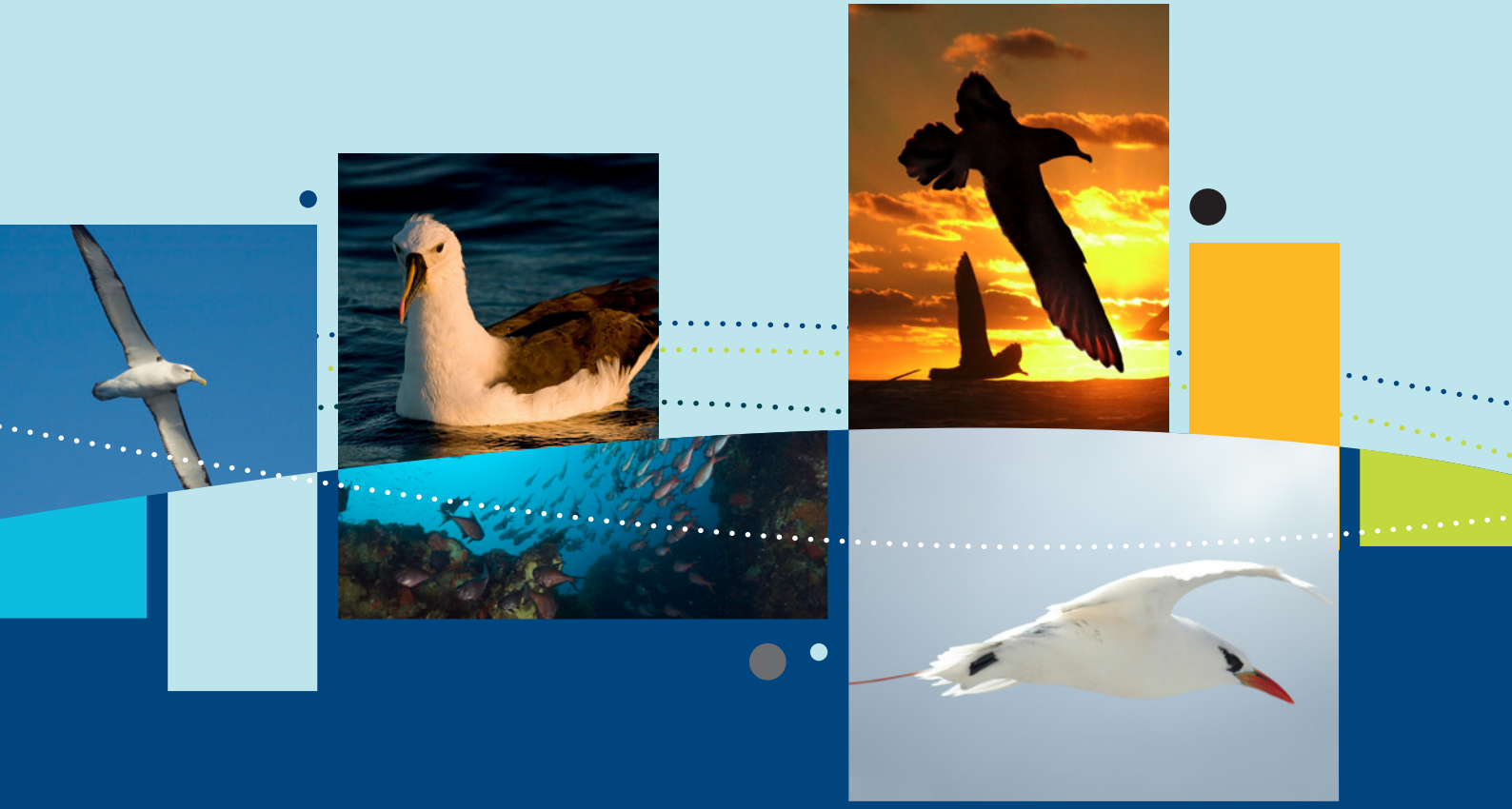

Species group report card —seabirds

Supporting the marine bioregional plan for the South-west Marine Region

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

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SPECIES GROUP REPORT CARD—SEABIRDS

Supporting the marine bioregional plan for the South-west Marine Region
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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**). A glossary of terms relevant to marine bioregional planning is located at **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
- heritage 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 South-west Marine Region

The South-west Marine Region is considered regionally and nationally significant for seabirds[1] (Surman & Nicholson 2006), with foraging and feeding habitat provided by seasonal upwellings that increase biological productivity in some areas of the region (e.g. the Eyre coastal upwellings), and nesting and roosting habitat provided on offshore islands (e.g. the Houtman Abrolhos Islands).

There are 48 seabird species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) that are known to occur in the region; other species may occur infrequently or overfly the region during migration (Attachment 1).

This report card focuses on 18 seabird species that have either a significant proportion of their Australian breeding population, or important foraging areas, in the region (Table 1). All pelagic seabirds are central-place foragers during the breeding season, with foraging ranges that vary with species, reproductive or provisioning cycle stage, and distribution and density of prey. Shipboard surveys in March 1996 suggest that bridled terns ranged up to 70 km seaward when foraging during late chick rearing (Dunlop 1997), and wedge-tailed shearwaters range 80–120 km (Johnstone & Darnell 2008a). Common (brown) noddies range further than lesser noddies or black noddies in the Houtman Abrolhos Islands—up to 80 km from the shore (Gaughan et al. 2002). Oceanic foragers such as sooty terns are thought to have foraging ranges of several hundred kilometres during chick rearing.

Indian yellow-nosed albatrosses

Indian yellow-nosed albatrosses (*Thalassarche carteri*) are one of seven species of albatross known to feed in the South-west Marine Region. Albatrosses typically feed in offshore areas during the winter months, particularly along the edge of the continental shelf and over open waters, where they glide on thermal currents, catching fish and cephalopod prey by diving into the water.

Indian yellow-nosed albatrosses breed in the sub-Antarctic islands of the southern Indian Ocean and visit Western Australia between January and November. The species usually occurs in small flocks, but occasionally forms large aggregations (up to 3000 individuals) at food-rich sites (Johnstone & Darnell 2008b). In July and August, they are very common between Cape Naturaliste and King George Sound, where a biologically important area for this species has been defined.

1 Seabirds are species of birds that spend a substantial part of their life foraging and breeding in the marine environment, such as petrels, storm-petrels, albatrosses, shearwaters, terns, noddies, gannets, tropicbirds, penguins and gulls.

Petrels

Great-winged petrels (*Pterodroma macroptera*), soft-plumaged petrels (*Pterodroma mollis*) and white-faced storm-petrels (*Pelagodroma marina*) regularly visit the South-west Marine Region. These species range widely within the region, feeding on small fish, cephalopods (octopus, squid and cuttlefish) and crustaceans along the edge of the continental shelf and over open waters. They are often observed near the continental shelf break. Soft-plumaged petrels are common off the south coast and west continental shelves, south of the Tropic of Capricorn. Great-winged petrels are the only petrel species that breeds in the region, with an estimated 33 000 breeding pairs on the islands of the Recherche Archipelago—the only breeding population of great-winged petrels in Australia. In Western Australia, white-faced storm-petrels breed in tens of thousands on many islands off the west and south coasts, from the Houtman Abrolhos Islands to Daw Island off Esperance, and forage well offshore (up to 100 km from the coast) (Johnstone & Darnell 2008b). They can occur in flocks of up to 350 individuals. Storm-petrels feed on small crustaceans and fish in the top few centimetres of the sea.

Shearwaters

Wedge-tailed shearwaters (*Ardenna pacifica* formerly known as *Puffinus pacificus*), little shearwaters (*Puffinus assimilis tunneyi*), flesh-footed shearwaters (*Ardenna caneipes* formerly known as *Puffinus carneipes*) and short-tailed shearwaters (*Ardenna tenuirostris* formerly known as *Puffinus tenuirostris*) are regularly found within the South-west Marine Region and breed in the south-west. The only rookeries of the south-west Australian subspecies of little shearwaters occur on islands off south-west Western Australia—between 27 000 and 62 000 pairs have been recorded (Baker et al. 2002).

About 104 000 pairs of flesh-footed shearwaters breed on islands between Eucla and Cape Leeuwin (Surman & Nicholson 2006). From early September to late May, flesh-footed shearwaters forage up to 100 km offshore along the south and extreme south-west coasts. From late April to late June, and from late August to early November, they are common passage migrants over seas off the lower west coast, mostly well offshore. Large numbers of flesh-footed shearwaters have been observed in a pre-migration departure zone between Perth and Geographe Bay in several years (but not every year) (Johnstone & Darnell 2008b). After breeding, flesh-footed shearwaters on the south coast of Western Australia migrate into the north-western Indian Ocean, moving parallel to the western coastline as far as North West Cape (Powell 2009).

Wedge-tailed shearwaters have important breeding sites on West Wallabi and Pelsaert Islands in the Houtman Abrolhos Islands (hosting one million and 75 000 breeding pairs, respectively; Surman & Nicholson 2006) and Rottnest Island (11 745 breeding pairs; Bancroft et al. 2004). The Rottnest Island colony has been growing rapidly over recent decades, driven by immigration, presumably from colonies to the north (Dunlop 2009). Wedge-tailed shearwaters forage 10–300 km off the west coast, usually singly, but occasionally in flocks and rafts of up to 150 birds when aggregated over tuna (Johnstone & Darnell 2008b).

Terns and noddies

Light-backed terns including Caspian terns (*Hydroprogne caspia*), roseate terns (*Sterna dougallii*) and fairy terns (*Sternula nereis*) feed by plunge-diving on small baitfishes in coastal waters, often within sight of land. The dark terns, including bridled terns (*Onychoprion anaethetus*) and sooty terns (*Onychoprion fuscata*), and the noddies have much larger foraging ranges that encompass open shelf waters, the shelf edge or deep water oceanic environments. Off the Western Australian coast, their prey is mainly planktonic fishes and squid (Dunlop 1997; Surman & Nicholson 2009). Sooty terns, common noddies and lesser noddies rely heavily on foraging tuna to aggregate prey at the surface (Jaquemet et al. 2004).

Common noddies (*Anous stolidus*) and the Australian subspecies of lesser noddies (*Anous tenuirostris melanops*) occur in the South-west Marine Region, and both breed in significant numbers. The Australian subspecies of lesser noddies nests in white mangroves (*Avicennia marina*), which only occur in small, scattered patches on a few of the Houtman Abrolhos Islands (Dunlop 2004; Garnett & Crowley 2000). These mangrove stands are unique micro-ecosystems and support approximately 68 000 breeding pairs spread over three islands (Surman & Nicholson 2006). Nesting colonies move periodically, because nesting birds retard tree growth and sometimes kill trees (Garnett & Crowley 2000). The common noddy has a major breeding area (130 000 pairs) on Pelsaert Island in the Houtman Abrolhos Islands (Dunlop et al. 2001) with a smaller satellite population (around 1 300 pairs) breeding on Lancelin Island (Dunlop 2005). Noddies breed annually in Australian waters. During non-breeding periods, lesser noddies tend to remain near breeding sites; however, they can forage well out to sea and have been observed hundreds of kilometres from breeding sites over the open ocean. In contrast, common noddies move away from breeding sites to feed in tropical waters during non-breeding periods. Both species forage for a diverse range of food including post-larval fish, squid, pelagic molluscs and insects (Surman & Nicholson 2006).

Little penguins

Little penguins (*Eudyptula minor*) are the only penguin species that occur regularly in the South-west Marine Region. The largest breeding population is in the Perth region, with around 700 pairs (JN Dunlop, pers. comm., 28 May 2008)—this represents the westernmost limit of little penguin distribution and the northernmost limit in Western Australia (DSEWPaC 2010). The population of little penguins on Penguin Island, near Perth, has been studied for over 20 years by researchers from Murdoch University and others, in collaboration with the Department of Environment and Conservation. In South Australia, the population has been estimated at 20 000–50 000 breeding pairs (Robinson et al. 1996), with large colonies at Pearson Island (around 15 000 pairs; S Goldsworthy, SARDI Aquatic Sciences, pers. comm., 29 July 2008) and Troubridge Island (around 3 000 pairs; Wiebkin 2010). The South Australian population is likely to comprise less than 50 per cent of Australia's entire little penguin population; however, the South-west Marine Region covers about half their distribution in Australia (SD Goldsworthy, SARDI Aquatic Sciences, pers. comm., 29 July 2008).

Pacific gulls

Pacific gulls (*Larus pacificus*) are the dominant large gull throughout the South-west Marine Region. They breed in small numbers on islands (usually 1–2 pairs per island), with larger populations at the Recherche Archipelago (at least 21 pairs), the Houtman Abrolhos Islands (approximately 51 pairs) and the Brothers in Coffin Bay, South Australia (10 pairs) (reviewed in Surman & Nicholson 2006). Recent unpublished work suggests there are probably two distinct populations of Pacific gulls in Western Australia—one on the south coast and another further north, between Lancelin and Shark Bay. The northern population is small, comprising approximately 200 pairs; the south coast population is slightly larger. Copley (1996) reports a population in South Australia with between 76 and 170 pairs. Intense persecution during the colonial period through to the 1930s probably eliminated the breeding population on the islands near Fremantle, and these populations have not recovered. Shellfish are an important part of the diet of Pacific gulls in Western Australia.

Black-faced cormorants

Black-faced cormorants (*Phalacrocorax fuscescens*) occur in the South-west Marine Region, usually foraging in shallow inshore waters, including sheltered marine gulfs, bays and inlets, and on reefs (del Hoyo et al. 1992; Marchant & Higgins 1990). The species forages in large numbers around the Recherche Archipelago.

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 South-west 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 18 species listed in Table 1 for the following behaviours: resting, foraging, migration and breeding. Biologically important areas are included in the South-west Marine Region Conservation Values Atlas (**www.environment.gov.au/cva**).

Table 1: Seabirds for which biologically important areas have been defined within the South-west Marine Region

Species	Conservation status	Proportion of the Australian population breeding in the region
Indian yellow-nosed albatross (*Thalassarche carteri*)	Vulnerable, migratory, marine	Not breeding in the region
Soft-plumaged petrel (*Pterodroma mollis*)	Vulnerable, marine	Not breeding in the region
Great-winged petrel (*Pterodroma macroptera*)	Marine	100%
White-faced storm-petrel (*Pelagodroma marina*)	Marine	Not known
Flesh-footed shearwater (*Ardenna carneipes*)	Migratory, marine	72%
Short-tailed shearwater (*Ardenna tenuirostris*)	Migratory, marine	Not known
Wedge-tailed shearwater (*Ardenna pacifica*)	Migratory, marine	71%
Little shearwater (*Puffinus assimilis*)	Marine	58%
Bridled tern (*Onychoprion anaethetus*)	Migratory, marine	50%
Caspian tern (*Hydroprogne caspia*)	Migratory, marine	Not known
Roseate tern (*Sterna dougallii*)	Migratory, marine	60%
Fairy tern (*Sternula nereis*)	Marine	72%
Sooty tern (*Onychoprion fuscata*)	Marine	72%
Australian lesser noddy (*Anous tenuirostris melanops*)	Vulnerable, marine	100%
Common noddy (*Anous stolidus*)	Migratory, marine	67%
Little penguin (*Eudyptula minor*)	Marine	Not known
Pacific gull (*Larus pacificus*)	Marine	Not known
Black-faced cormorant (*Phalacrocorax fuscescens*)	Marine	Not known

2. Vulnerabilities and pressures

Vulnerabilities

The life patterns of seabirds, including long life spans, delayed reproduction and small numbers of young in any one year, make them vulnerable to a range of pressures in the marine environment. The factors that make some seabirds more vulnerable to pressures include their foraging and breeding behaviours. Foraging behaviour includes reliance on multispecies foraging assemblages (e.g. tuna or cetaceans) for prey availability and dependence on relatively productive, but spatially limited, oceanographic features within range of breeding colonies. Foraging behaviour also affects interactions with fishing operations.

It is common for both parent seabirds to participate in chick-rearing duties and for pairs to be monogamous, at least seasonally. Some species, such as albatrosses, petrels and dark terns, use the same nest site over many years. Seabirds are also normally philopatric; that is, the pre-breeding age birds return to their colony of birth. On-island disturbances such as predation or prolonged food failure may reduce philopatric behaviour in favour of dispersal (Dunlop 2009). Many species cover large areas in search of food. Pressures on foraging seabirds in the South-west Marine Region may also affect other breeding populations in the region (e.g. on islands or along the coast), or well outside the region (e.g. species such as albatross, which nest on sub-Antarctic islands).

There is no long-term monitoring data for cold-water species other than little penguins in the Perth area. Pelagic burrow-nesting species (e.g. white-faced storm-petrels, little shearwaters, flesh-footed shearwaters, short-tailed shearwaters and great-winged petrels) do not have accurate population estimates for any colony, or any long-term figures for reproductive performance.

Analysis of pressures

On the basis of current information, pressures have been analysed for the 18 seabirds discussed in this report card. The 18 seabirds have either a significant proportion of their Australian breeding population, or important foraging areas, in the region (Table 1). A summary of the pressure analysis for seabirds is provided in Table 2. 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 in the plan.

Table 2: Outputs of the seabird species pressure analysis for the South-west Marine Region

Note: To maintain uniformity among all bioregions, this table has been added subsequently to the review by independent experts.

Pressure	Source	Species					
		Indian yellow-nosed albatross	Great-winged petrel	Soft-plumaged petrel	White-faced storm petrel	Flesh-footed shearwater	Little shearwater
Sea level rise	Climate change						
Changes in sea temperature	Climate change						
Changes in oceanography	Climate change						
Ocean acidification	Climate change						
Chemical pollution/ contaminants	Agricultural activities Aquaculture operations Shipping Urban development (urban and/or industrial infrastructure) Vessels (other)						
Nutrient pollution							
Changes in turbidity							
Marine debris	Aquaculture infrastructure Fishing boats Land-based activities Oil rigs Renewable energy infrastructure Shipping Urban development Vessels (other)						
Noise pollution							
Light pollution	Fishing boats Land-based activities Oil and gas infrastructure Onshore and offshore activities Onshore and offshore mining operations Renewable energy infrastructure Vessels (other)						

Legend of concern; of potential concern; of less or no concern

Table 2 continued: Outputs of the seabird species pressure analysis for the South-west Marine Region

Note: To maintain uniformity among all bioregions, this table has been added subsequently to the review by independent experts.

Pressure	Source	Species					
		Indian yellow-nosed albatross	Great-winged petrel	Soft-plumaged petrel	White-faced storm petrel	Flesh-footed shearwater	Little shearwater
Physical habitat modification	Dredging (and/or dredge spoil) Onshore construction Urban/coastal development						
Human presence at sensitive sites							
Nuisance species							
Extraction of living resources							
Bycatch	Commercial fishing						
Oil pollution	Oil rigs Onshore and offshore mining operations Shipping Vessels (other)						
Collision with vessels							
Collision/entanglement with infrastructure							
Disease	Aquaculture operations Fishing Shipping Tourism						
Invasive species							

Legend of concern; of potential concern; of less or no concern

Table 2 continued: Outputs of the seabird species pressure analysis for the South-west Marine Region

Note: To maintain uniformity among all bioregions, this table has been added subsequently to the review by independent experts.

Pressure	Source	Species					
		Short-tailed shearwater	Wedge-tailed shearwater	Bridled tern	Caspian tern	Fairy tern	Roseate tern
Sea level rise	Climate change						
Changes in sea temperature	Climate change						
Changes in oceanography	Climate change						
Ocean acidification	Climate change						
Chemical pollution/ contaminants	Agricultural activities Aquaculture operations Onshore and offshore mining operations Renewable energy operations Shipping Urban development (urban and/or industrial infrastructure) Vessels (other)						
Nutrient pollution							
Changes in turbidity							
Marine debris	Aquaculture infrastructure Fishing boats Land-based activities Oil rigs Renewable energy infrastructure Shipping Urban development Vessels (other)						
Noise pollution							

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Light pollution	Fishing boats Land-based activities Oil and gas infrastructure Onshore and offshore activities Onshore and offshore mining operations Renewable energy infrastructure Vessels (other)						
Physical habitat modification							
Human presence at sensitive sites							
Nuisance species							
Extraction of living resources	Commercial fishing – prey depletion						
Bycatch							
Oil pollution	Oil rigs Onshore and offshore mining operations Shipping Vessels (other)						
Collision with vessels							
Collision/entanglement with infrastructure							
Disease	Aquaculture operations Fishing Shipping Tourism						
Invasive species							

Legend of concern; of potential concern; of less or no concern

Table 2 continued: Outputs of the seabird species pressure analysis for the South-west Marine Region

Note: To maintain uniformity among all bioregions, this table has been added subsequently to the review by independent experts.

Pressure	Source	Species					
		Sooty tern	Australian lesser noddy	Common (brown) noddy	Pacific gull	Little penguin	Black-faced cormorant
Sea level rise	Climate change						
Changes in sea temperature	Climate change						
Changes in oceanography	Climate change						
Ocean acidification	Climate change						
Chemical pollution/ contaminants	Agricultural activities Aquaculture operations Onshore and offshore mining operations Renewable energy operations Shipping Urban development (urban and/or industrial infrastructure) Vessels (other)						
Nutrient pollution							
Changes in turbidity							
Marine debris	Aquaculture infrastructure Fishing boats Land-based activities Oil rigs Renewable energy infrastructure Shipping Urban development Vessels (other)						
Noise pollution							

Legend of concern; of potential concern; of less or no concern

Table 2 continued: Outputs of the seabird species pressure analysis for the South-west Marine Region

Note: To maintain uniformity among all bioregions, this table has been added subsequently to the review by independent experts.

Pressure	Source	Species					
		Sooty tern	Australian lesser noddy	Common (brown) noddy	Pacific gull	Little penguin	Black-faced cormorant
Light pollution	Fishing boats Land-based activities Oil and gas infrastructure Onshore and offshore activities Onshore and offshore mining operations Renewable energy infrastructure Vessels (other)						
Physical habitat modification	Dredging (and/or dredge spoil) Onshore construction Urban/coastal development						
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Extraction of living resources	Commercial fishing – prey depletion						
Bycatch							
Oil pollution	Oil rigs Onshore and offshore mining operations Shipping Vessels (other)						
Collision with vessels	Fishing Tourism						
Collision/entanglement with infrastructure							
Disease	Aquaculture operations Fishing Shipping Tourism						
Invasive species							

Legend of concern; of potential concern; of less or no concern

Sea level rise—climate change

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 to 1 m by 2100, relative to 2000 levels (CC Commission 2011).

Predicted rising sea levels and increased intensity of storms and storm surges are *of concern* or *of potential concern* to a range of seabirds breeding adjacent to the South-west Marine Region. Sea level rise is likely to reduce existing breeding habitat, particularly for burrow and surface-nesting species on low-lying islands (Chambers et al. 2009). For example, the Houtman Abrolhos Islands, which rarely exceed 3 m above sea level, support important breeding colonies of Australian lesser noddies, common noddies, bridled terns, wedge-tailed shearwaters, little shearwaters, sooty terns, roseate terns and Caspian terns. Seabirds nesting on these islands (and other low-lying coastal sites and islands in the region) will be impacted by loss of habitat and increased effects of storms (compounded by the predicted increase in frequency and intensity of storms). The distribution and abundance of mangrove stands on the Houtman Abrolhos Islands (a roosting site for some species) will change with sea level rise, but ultimate consequences for this habitat are unknown.

The effects of rising sea level in the region include a decrease in the size of the little penguin colony on Troubridge Island, South Australia (where approximately 3 000 birds breed), due to erosion caused by increased wave action and storms, and a lack of soil-stabilising vegetation (Wiebkin 2010).

Changes in sea temperature and changes in oceanography—climate change

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 2030 (Lough 2009).

Changes in sea temperature and changes in oceanographic patterns are *of concern* or *of potential concern* to a number of seabirds in the South-west Marine Region, with implications for the timing of breeding, reproductive success and species distribution. The south-west of Western Australia is one of three hotspots in the Indian Ocean where rising temperature trends exceed the Indian Ocean basin average (Feng et al. 2009). Changes in sea surface temperature are likely to have implications for the productivity of the region, with effects on a broad range of species (Feng et al. 2009), including pelagic foragers such as albatrosses and petrels.

The strength of the Leeuwin Current has decreased slightly since the 1970s. This weakening is expected to continue, although this prediction currently has low confidence (Feng et al. 2009). Changes in oceanographic patterns are *of concern* to a number of seabirds in the region, with implications for the timing of breeding, reproductive success and species distribution. Observed changes might be signalling a southward redistribution of northern

and western coast meta-populations of tropical species, driven by changes in the frequency, duration and intensity of the El Niño/La Niña – Southern Oscillation and rising background sea temperatures.

Evidence of impacts that may be related to changes in oceanographic processes in the South-west Marine Region includes:

- timing of breeding—nesting occurs later in the year on the Houtman Abrolhos Islands due to delays in prey availability. In contrast, at frontier colonies further south, nesting occurs earlier and is more consistent (Dunlop 2009; Gaughan et al. 2002; Surman & Nicholson 2009)
- reproductive success—reduced reproduction and extensive reproductive failure have been associated with strong El Niño events for wedge-tailed shearwaters, sooty terns, common noddies and Australian lesser noddies at the Houtman Abrolhos Islands (Gaughan et al. 2002; Surman & Nicholson 2006, 2009). However, in recent years, reproductive failure has occurred under both El Niño and La Niña conditions at the Houtman Abrolhos Islands, signalling a potential shift (Surman & Nicholson 2009)
- distribution—since 1900, wedge-tailed shearwaters, roseate terns, bridled terns, common noddies and sooty terns have extended their ranges southwards and/or seen rapid growth in their southernmost colonies (Dunlop 2004, 2009).

A colony of approximately 400 pairs of bridled terns was recently documented on Investigator Island off Munglinup, west of the Recherche Archipelago; the colony is approximately 10 years old. This extends the range of bridled terns by around 800 km from the previous limit just east of Cape Leeuwin (JN Dunlop, pers. comm., 17 December 2010). Bridled terns are now thought to be breeding further east on Termination Island in the western Recherche Archipelago, although this is yet to be confirmed. Unlike sooty terns and the two noddies, bridled terns use oligotrophic shelf waters (JN Dunlop, pers. comm., 17 December 2010). The foraging habitat of bridled terns appears to be expanding southwards as the sea temperature rises. Their range has expanded from the Houtman Abrolhos Islands to the Recherche Archipelago, with the largest colonies living further south of the previous distribution in the region (Dunlop 2009). This species seems to be responding positively and therefore it is considered of less or no concern with respect to changes in temperature and oceanographic processes.

These shifts might be signalling a southward redistribution of north and west coast metapopulations of tropical species, driven by changes in the frequency, duration and intensity of El Niño, and rising sea temperatures. It is uncertain whether future conditions will provide productive foraging zones of the same scale further south, or what the future size of the metapopulations could be. For example, common noddies require areas of relatively high productivity (e.g. shelf edge upwellings) within foraging range of their colonies; these features are uncommon south of the Houtman Abrolhos Islands. The changes in tern distributions suggest that there may be new, smaller scale pockets of prey resources on the shelf edge

with significant gaps in between, rather than a uniform southward shift in prey resources. The absence of mangrove nesting habitat south of the Houtman Abrolhos Islands may restrict their southward movement, although lesser noddies are sometimes seen in the Perth region.

Species redistribution is probably constrained by the availability of islands within the foraging range of prey resources, and the stability of the biophysical processes affecting prey. The islands between Lancelin and Shoalwater at 31° S and 32° S (including Rottnest Island and its satellites) are an important area for frontier colonies, and may ultimately become the centre of the species' range. The Perth Canyon system may be contributing to increased productivity in this area, supporting frontier common noddy and sooty tern colonies on Lancelin Island. However, these islands are too small to support colony sizes found on the Houtman Abrolhos Islands, and are in an area of intense human activity. In the longer term, the Recherche Archipelago could become a core breeding area for tropical species, with unknown consequences for the cool water and temperate species that currently dominate this system (JN Dunlop, pers. comm., 28 May 2008).

Ocean acidication—climate change

Ocean acidity is *of potential concern* to all seabird species in the South-west Marine Region. Driven by increasing levels of atmospheric carbon dioxide and subsequent chemical changes in the ocean, acidification is already underway and detectible. Since pre-industrial times, acidification has lowered ocean pH by 0.1 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).

While some organisms might be able to adapt (Orr et al. 2009), anticipated changes to phytoplankton and zooplankton have the potential to detrimentally affect ecosystem processes and the structure of ecological communities. Seabirds might be affected by large-scale changes in the relative abundance of parts of the food chain.

Chemical pollution or contaminants

Chemical pollution is *of potential concern* for the following species in the South-west Marine Region: Caspian terns, Australian lesser noddies, Pacific gulls, flesh-footed shearwaters and little penguins.

Seabird populations that live in proximity to human settlements and, in particular, industrialised sites, such as the Perth metropolitan waters or King George Sound, are at risk of bioaccumulation of heavy metals, particularly from major dredging projects. Dredging activities have the potential to release heavy metals deposited over time in the sediment (e.g. mercury, lead, into the pelagic food chain). This may pose a risk to seabirds and other

predator species foraging in the area. Dredging guidelines (DEWHA 2009b) are in place to mitigate environmental impacts. Effectiveness of management in reducing contamination and bioaccumulation in seabird species at industrialised sites of the region has not been assessed.

Chemical contaminants including tributyltin (TBT; an active ingredient in antifouling paints used on large vessels), heavy metals, pesticides and polychlorinated biphenyls, are a potential threat to little penguins in the Perth area (Cannell 2004), in light of the small size and relative isolation of this population.

Species such as Pacific gulls that feed near ports in the region may be exposed to bioaccumulating pollutants through their diet (JN Dunlop pers. comm., 28 May 2008). As top predators, gulls are vulnerable to bioaccumulation of chemical pollutants, such as organophosphates, organochlorines, PCBs and heavy metals.

Other potential sources of pollutants include waste water disposal, storm water runoff and antifoulants on vessel hulls and aquaculture structures.

Marine debris

Marine debris is listed under the EPBC Act as a key threatening process and is here considered *of potential concern* for some seabirds in the South-west Marine Region. Seabirds may ingest debris, which may cause perforation, blockage or impairment of the digestive system; or ingest toxic debris that may affect survival and reproductive success (EA 2001). Seabirds may become entangled in monofilament line, fishing nets, six-pack yokes, wire and string—this can restrict their movement and ability to forage or avoid predators, or constrict growth and circulation, resulting in infection or asphyxiation (DEWHA 2009b). Information on the amount and type of marine debris in the region is limited, although some community-based monitoring programs have been operating for a number of years (Taylor et al. 2007). Seabirds occurring in the region that are known to interact with marine debris include Indian yellow-nosed albatrosses, flesh-footed shearwaters, little penguins and bridled terns (Ceccarelli 2009; JN Dunlop, pers. comm. 28 May 2008). Impacts on Indian yellow-nosed albatrosses, particularly within the area of the south-west region where the species forages at high density, are not understood. Impacts on little penguins and flesh-footed shearwaters in the region have been recorded. Given the isolation of the south-west little penguin populations, impacts might be substantial if the pressure increases. The observed association between bridled terns and flotsam aggregations in down-welling zones may make this species more susceptible to plastic ingestion and oiling than other pelagic species (Dunlop 1997, 2008).

Light pollution

Lighting along the coast and on marine infrastructure is known to impact seabirds (JN Dunlop, pers. comm., 28 May 2008) and has the potential to result in substantial impacts on some affected species that might be subject to other pressures. Lighting from both land-based (e.g. lighthouses, buildings) and offshore (e.g. boats, oil rigs) sources is *of potential concern* to wedge-tailed shearwaters, bridled terns, Australian lesser noddies, flesh-footed shearwaters and little shearwaters in the South-west Marine Region. Lighting may disorient seabirds that are foraging, or departing from and returning to breeding colonies. Shearwater fledglings of all species have been killed as a result of coastal lighting in towns adjacent to breeding islands (e.g. Lancelin, Esperance and Albany). Bridled terns are very susceptible to attraction and disorientation by any offshore lighting and commonly land on vessels at night on migration and in the wintering area (JN Dunlop, pers. comm., 28 May 2008).

In the Houtman Abrolhos Islands, spotlights from fishing camps disorient hundreds of shearwaters annually, and wedge-tailed shearwaters are frequently killed as a result of lighting associated with a mobile phone tower on Rat Island (JN Dunlop, pers. comm., 28 May 2008). While this pressure in itself is unlikely to cause substantial effects to populations, the implications of increasing light pollution and its interaction with other pressures, as well as species distribution shifts, should be carefully considered in assessing coastal and marine infrastructure development.

Lighting mainly affects fledging shearwaters at coastal towns and ports, but at present it is unlikely to be significant at the population level. Future development of offshore infrastructure (e.g. petroleum industry) in this region may increase the population effects of this impact for some species and at some locations. Wedge-tailed shearwaters aggregate in large numbers off Perth in preparation for migration. Any sea installation in this area would have the potential to impact on a large number of birds.

Physical habitat modification

Physical habitat modification is *of potential concern* for little penguins and Australian lesser noddies in the South-west Marine Region. The little penguin population breeding in the Perth region may be affected by habitat degradation due to coastal development in one of its prey nurseries (whitebait), and possibly by changes in prey distribution and availability caused by the Dawesville Cut (Cannell 2004). Dredging projects may drive away prey schools or contaminate seabird food chains.

The range of Australian lesser noddies is restricted to the Houtman Abrolhos Islands, where they nest solely in mature mangroves. Modification of this habitat may have severe consequences for the Australian lesser noddy population (Surman & Nicholson 2006).

Nuisance species

Increasing populations of nuisance species, such as silver gull and pied cormorant, is *of potential concern* for Australian lesser noddies and white-faced storm petrels, through predation on eggs and chicks and competition for nesting sites. For example, silver gulls are known to eat other seabird eggs and chicks, and may displace other nesting seabirds through competitive exclusion from nesting sites (Surman & Nicholson 2006). Silver and kelp gulls are thought to be associated with declines in breeding populations of the white-faced storm petrel in New South Wales, although no observations exist from within the region. There is evidence of an increase in the number of silver gulls on some of the inhabited islands in the Houtman Abrolhos Islands (Dunlop 2004) and in the Port Lincoln area, where they may impact upon seabird species nesting on the Sir Joseph Banks Group (Surman & Nicholson 2006). Pied cormorants can damage woody vegetation required by other species for nesting, through mechanical damage and toxic effects from guano. Mangrove dieback on the Houtman Abrolhos Islands is associated with an increase in the pied cormorant breeding population. Australian lesser noddies only breed on three islands in the Houtman Abrolhos group and require mature mangroves as nesting habitat. Any activity likely to result in an increase in pied cormorants (e.g. aquaculture) may impact upon available nesting habitat for Australian lesser noddies.

Extraction of living resources

Extraction of living resources is assessed as *of potential concern* because of the effects it might have on the availability of fish species that have an important role as prey or associated species in the ecology of some of the protected seabirds in the South-west Marine Region.

Some seabirds are highly dependent on specific prey species (Gaughan et al. 2002) or on predatory fish driving bait fish to the surface, and there is concern that declines in the number of predatory fish may have implications for availability of prey for seabirds. A range of seabirds foraging in the region (including sooty terns, roseate terns, short-tailed shearwaters, wedge-tailed shearwaters, Australian lesser noddies and common noddies) depend on large pelagic predators to drive prey to the surface. For some species, such as sooty terns, this association is thought to be obligate (JN Dunlop, pers. comm., 28 May 2008; Jaquemet et al. 2007). It should be noted that the effect of tuna fishing in the Indian Ocean is difficult to separate from the probable decline in the productivity of the eastern Indian Ocean off Western Australia due to the weakening Leeuwin Current and the two pressures are likely to interact in their implications for protected seabirds.

Potential future increases in the catch of small pelagic fish might also affect seabirds that rely on them as forage fish, particularly in areas such as the Eyre Peninsula coastal ecosystems, where seasonal upwellings support large assemblages of small pelagic fish and attract short-

tailed shearwaters and little penguins. Australian lesser noddies, common noddies, short-tailed shearwaters, wedge-tailed shearwaters, and sooty terns rely on the availability of particular species of small pelagic fishes (Gaughan et al. 2002). Wedge-tailed shearwaters rely on species that are also targeted by fishing in the region.

Bycatch

Bycatch is *of potential concern* for a number of species of protected seabirds in the South-west Marine Region. Seabirds foraging alongside commercial fishing operations may interact with vessels in several ways: birds may collide with trawl apparatus, become entangled in nets, ingest discarded hooks or be caught on longlines. The incidental catch of seabirds in longlines is listed under the EPBC Act as a key threatening process for a number of species, including Indian yellow-nosed albatrosses. A Threat Abatement Plan (DEWR 2006) for the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations is in place. Actions by the fishing industry under the Threat Abatement Plan have successfully reduced the level of interaction and seabird mortalities. The rate of coverage of independent scientific monitoring of interactions in the Western Tuna and Billfish Fishery has been high and shown low levels of interactions (Ward and Curran 2004).

Flesh-footed shearwaters interact with purse seine fishing, mainly during the late chick-rearing period (March–April) (DEH 2005a). Between 10-20 per cent of trapped birds drown. A variety of mitigation measures put in place since the 2005–06 breeding season have substantially reduced mortalities, and further measures have recently been adopted and will be reviewed in 2011 (DEWHA 2009a).

A recent review of wildlife bycatch in Commonwealth fisheries recommends that seabird bycatch in trawl fisheries be assessed to determine whether they are impacting on protected seabirds populations (Bensley, Stobutzki and Begg 2010; Phillips et al 2010).

Oil pollution

Australia has a strong system for regulating industry activity that is the potential source of oil spills and this system has been strengthened further in response to the Montara oil spill. While oil spills are unpredictable events and their likelihood is low based on past experience, their consequences, especially for threatened species at important areas, could be severe.

Seabirds are vulnerable to oil spills due to the amount of time they spend on or near the surface of the sea and on foreshores. Seabirds may also come in contact with oil spills while searching for food, since several species of fish are able to survive beneath floating oil (AMSA 2010). Seabirds are considered to be significantly affected by oil spills from the direct toxicity of oil; direct oiling of foraging seabirds resulting in fatalities; a reduction in the availability of prey due to exposure of fish eggs and larvae to oil slicks and sheens; degradation of breeding

habitat for ground-nesting seabirds; hypothermia; dehydration; and an increased risk of predation (AMSA 2010). Chemicals used to disperse oil pollution can themselves be toxic to marine life (AMSA 2011). In addition, even at very low levels, petroleum-based products have been shown to kill seabirds in the embryonic phase (AMSA 2010).

Oil pollution is *of potential concern* for all seabirds foraging and breeding in the South-west Marine Region. Birds foraging at sea are highly vulnerable to oiling, which in some instances may have population-level implications—for example, at breeding times. Potential impacts may include direct oiling of foraging seabirds, reduced availability of prey due to exposure of fish eggs and larvae to oil slicks and sheens, and pollution of shorelines and degradation of breeding habitat for ground-nesting seabirds. The intensity and distribution of activities implicated in oil spills – such as oil production and transport – are likely to increase in the region.

Collisions with vessels

Mortality of the little penguin breeding population near Perth may be increasing due to collisions with boats as a result of the rapidly increasing numbers of recreational craft (JN Dunlop, pers. comm., 28 May 2008). Due to the small size and relative isolation of the population and the current lack of data with respect to the rate of interaction, this pressure is *of potential concern* for this species in the region.

Disease

This pressure is *of potential concern* for protected seabirds species in the South-west Marine Region that have specialised diets, relying on one or a few forage species, and are particularly vulnerable to outbreaks of disease in the prey species. The introduction of pathogens in forage fish, such as the outbreaks in 1995 and 1998 of herpes virus in pilchards, has the potential to impact seabird species feeding on small pelagic fish. In particular, disease may impact species with a highly specific diet, such as little penguins, flesh-footed shearwaters and wedge-tailed shearwaters.

3. Relevant protection measures

All seabirds are protected as listed marine species under section 248 of the EPBC Act. While there are some differences in the protective management measures in place for species listed under different categories, it is 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. All seabirds are also protected fauna under state legislation operating in state waters.

Alongside the EPBC Act, a broad range of sector-specific management measures to address environmental issues and mitigate impacts applies 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, port 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.

Protection and conservation measures administered under the EPBC Act and that are relevant to the conservation values described in this Report Card are listed below.

EPBC Act conservation plans and action plans

- *Recovery Plan for Albatrosses and Giant-petrels* (EA 2001)
- *National Recovery Plan for Ten Species of Seabirds* (DEH 2005b)
- *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 2009c)

International agreements

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

- Agreement on the Conservation of Albatrosses and Petrels (ACAP), developed under the Convention on the Conservation of Migratory Species of Wild Animals 1979—**www.acap.aq**
- Japan–Australia Migratory Bird Agreement 1974—**www.austlii.edu.au/au/other/dfat/treaties/1981/6.html**
- China–Australia Migratory Bird Agreement 1986—**www.austlii.edu.au/au/other/dfat/treaties/1988/22.html**
- Republic of Korea–Australia Migratory Bird Agreement 2007—**www.austlii.edu.au/au/other/dfat/treaties/2007/24.html**
- Convention on the Conservation of Migratory Species of Wild Animals 1979/1983 (the Bonn Convention or CMS)—**www.cms.int**.

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

- **www.environment.gov.au/coasts/species/marine-species-list.html** (listed marine species)
- **www.environment.gov.au/epbc/protect/species-communities.html** (listed threatened species)
- **www.environment.gov.au/epbc/protect/migratory.html** (listed migratory species)
- **www.environment.gov.au/cgi-bin/sprat/public/sprat.pl** (species profile and threats database).

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ATTACHMENT 1: SEABIRD SPECIES OCCURRING IN THE SOUTH-WEST MARINE REGION

Table A1: Listed seabird species known to occur in the South-west Marine Region

Species (common name/ scientific name)	Conservation status
Albatrosses	
Northern royal albatross (*Diomedea sanfordi*)	Endangered, migratory, marine
Black-browed albatross (*Thalassarche melanophris*)	Vulnerable, migratory, marine
Indian yellow-nosed albatross (*Thalassarche carteri*)	Vulnerable, migratory, marine
Shy albatross (*Thalassarche cauta*)	Vulnerable, migratory, marine
Sooty albatross (*Phoebetria fusca*)	Vulnerable, migratory, marine
Southern royal albatross (*Diomedea epomophora*)	Vulnerable, migratory, marine
Wandering albatross (*Diomedea exulans*)	Vulnerable, migratory, marine
Petrels	
Southern giant-petrel (*Macronectes giganteus*)	Endangered, migratory, marine
Northern giant-petrel (*Macronectes halli*)	Vulnerable, migratory, marine
Blue petrel (*Halobaena caerulea*)	Vulnerable, marine
Soft-plumaged petrel (*Pterodroma mollis*)	Vulnerable, marine
White-chinned petrel (*Procellaria aequinoctialis*)	Migratory, marine
Wilson's storm-petrel (*Oceanites oceanicus*)	Migratory, marine
Cape petrel (*Daption capense*)	Marine
Great-winged petrel (*Pterodroma macroptera*)	Marine
White-faced storm-petrel (*Pelagodroma marina*)	Marine

Species (common name/ scientific name)	Conservation status
Shearwaters	
Flesh-footed shearwater (*Ardenna carneipes*)	Migratory, marine
Short-tailed shearwater (*Ardenna tenuirostris*	Migratory, marine
Sooty shearwater (*Ardenna grisea*)	Migratory, marine
Streaked shearwater (*Calonectris leucomelas*)	Migratory, marine
Wedge-tailed shearwater (*Ardenna pacifica* formerly known as *Puffinus pacificus*)	Migratory, marine
Fluttering shearwater (*Puffinus gavia*)	Marine
Little shearwater (*Puffinus assimilis*)	Marine
Terns	
Australian lesser noddy (*Anous tenuirostris melanops*)	Vulnerable, marine
Bridled tern (*Onychoprion anaethetus*)	Migratory, marine
Caspian tern (*Hydroprogne caspia*)	Migratory, marine
Common noddy (*Anous stolidus*)	Migratory, marine
Lesser crested tern (*Thalasseus bengalensis*)	Migratory, marine
Roseate tern (*Sterna dougallii*)	Migratory, marine
Arctic tern (*Sterna paradisaea*)	Marine
Crested tern (*Thalasseus bergii*)	Marine
Fairy tern (*Sternula nereis* formerly known as *Sterna nereis*)	Marine
Gull-billed tern (*Gelochelidon nilotica*)	Marine
Sooty tern (*Onychoprion fuscata*)	Marine
Prions	
Antarctic prion (*Pachyptila desolata*)	Marine
Fairy prion (*Pachyptila turtur*)	Marine
Salvin's prion (*Pachyptila salvini*)	Marine
Gulls	
Kelp gull (*Larus dominicanus*)	Marine
Pacific gull (*Larus pacificus*)	Marine
Silver gull (*Chroicocephalus novaehollandiae*)	Marine

Species (common name/ scientific name)	Conservation status
Other	
Arctic jaeger, Arctic skua (*Stercocarius parasiticus*)	Migratory, marine
Eastern Osprey (*Pandion Cristatus* formerly known as *Pandion haliaetus*)	Migratory, marine
White-bellied sea eagle (*Haliaeetus leucogaster*)	Migratory, marine
Australasian gannet (*Morus serrator*)	Marine
Black-faced cormorant (*Phalacrocorax fuscescens*)	Marine
Little penguin (*Eudyptula minor*)	Marine
Pelican, Australian pelican (*Pelecanus conspicillatus*)	Marine
Red-tailed tropicbird (*Phaethon rubricauda*)	Marine

Table A2: Listed seabird species known to overfly the South-west Marine Region

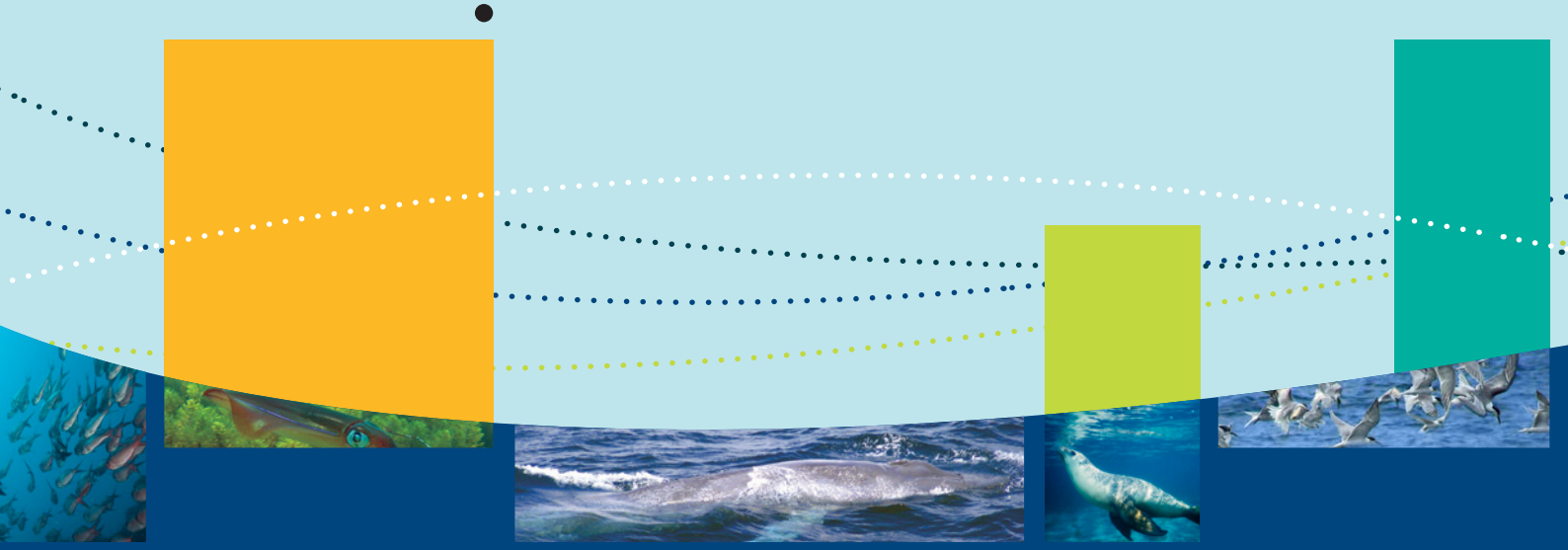
Species (common name/ scientific name)	Conservation status
Cape Barren goose (*Cereopsis novaehollandiae grisea*)	Vulnerable, marine
Common greenshank, greenshank (*Tringa nebularia*)	Migratory, marine
Common sandpiper (*Actitis hypoleucos*)	Migratory, marine
Curlew sandpiper (*Calidris ferruginea*)	Migratory, marine
Sharp-tailed sandpiper (*Calidris acuminate*)	Migratory, marine
Sanderling (*Calidris alba*)	Migratory, marine
Fork-tailed swift (*Apus pacificus*)	Migratory, marine
Grey plover (*Pluvialis squatarola*)	Migratory, marine
Pacific golden plover (*Pluvialis fulva*)	Migratory, marine
Rainbow bee-eater (*Merops ornatus*)	Migratory, marine
Red knot, knot (*Calidris canutus*)	Migratory, marine
Red-necked stint (*Calidris ruficollis*)	Migratory, marine
Ruddy turnstone (*Arenaria interpres*)	Migratory, marine
Hutton's shearwater (*Puffinus huttoni*)	Marine

Table A3: Listed seabird species known to occur in the South-west Marine Region on an infrequent basis

Species (common name/ scientific name)[a]	Conservation status
Albatrosses	
Amsterdam albatross (*Diomedea amsterdamensis*)	Endangered, migratory, marine
Tristan albatross (*Diomedea dabbenena*)	Endangered, migratory, marine
Buller's albatross (*Thalassarche bulleri*)	Vulnerable, migratory, marine
Campbell albatross (*Thalassarche impavida*)	Vulnerable, migratory, marine
Gibson's albatross (*Diomedea gibsoni*)	Vulnerable, migratory, marine
Grey-headed albatross (*Thalassarche chrysostoma*)	Vulnerable, migratory, marine
Salvin's albatross (*Thalassarche salvini*)	Vulnerable, migratory, marine
Light-mantled sooty albatross (*Phoebetria palpebrata*)	Migratory, marine
Yellow-nosed albatross, Atlantic yellow-nosed albatross (*Thalassarche chlororhynchos*)	Migratory, marine
Petrels	
Grey petrel (*Procellaria cinerea*)	Migratory, marine
Leach's storm-petrel (*Oceanodroma leucorhoa*)	Migratory, marine
Black-bellied storm-petrel (*Fregetta tropica*)	Marine
Gould's petrel (*Pterodroma leucoptera*)	Marine (subspecies *P. l. leucoptera* listed as endangered and migratory)
Grey-backed storm-petrel (*Garrodia nereis*)	Marine
Kerguelen petrel (*Lugensa brevirostris*)	Marine
Terns	
Common tern (*Sterna hirundo*)	Migratory, marine
Little tern (*Sterna albifrons*)	Migratory, marine
White-winged black tern (*Chlidonias leucoptera*)	Migratory, marine
Antarctic tern (*Sterna vittata*)	Marine
Whiskered tern (*Chlidonias hybrida*)	Marine
White tern (*Gygis alba*)	Marine

Species (common name/ scientific name)[a]	Conservation status
Other	
Orange-bellied parrot (*Neophema chrysogaster*)	Endangered, migratory, marine
Australian painted snipe (*Rostratula australis*)	Vulnerable, migratory, marine
Latham's snipe, Japanese snipe (*Gallinago hardwickii*)	Migratory, marine
Marsh sandpiper, little greenshank (*Tringa stagnatilis*)	Migratory, marine
Cattle egret (*Ardea ibis*)	Migratory, marine
Eastern great egret, white egret (*Ardea modesta* formerly known as *Ardea alba*)	Migratory, marine
Lesser frigatebird (*Fregata ariel*)	Migratory, marine
Oriental plover, oriental dotterel (*Charadrius veredus*)	Migratory, marine
Hooded plover (eastern subspecies) (*Thinornis rubricollis rubricollis*)	Marine
South polar skua (*Catharacta maccormicki*)	Migratory, marine
White-throated needletail (*Hirundapus caudacutus*)	Migratory, marine
Broad-billed prion (*Pachyptila vittate*)	Marine
Cape gannet (*Morus capensis*)	Marine
Great skua (*Catharacta skua*)	Marine
Slender-billed prion (*Pachyptila belcheri*)	Marine
Southern fulmar (*Fulmarus glacialoides*)	Marine
Erect-crested penguin (*Eudyptes sclateri*)	Marine
Fiordland penguin (*Eudyptes pachyrhynchus*)	Marine
King penguin (*Aptenodytes patagonicus*)	Marine
Rockhopper penguin (*Eudyptes chrysocome*)	Marine

a These species are considered vagrant species in the region.



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