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Descriptions of the wildlife species that commonly occur in the marine and estuarine waters of NSW

by

Carla Ganassin and Philip Gibbs

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EXECUTIVE SUMMARY

Descriptions of the marine wildlife (i.e. non-fish groups of marine vertebrates) that commonly occur in the estuarine and marine waters of NSW are presented in this report. In all, five reptile species, 20 mammal species, and 122 bird species, are described. Their distribution, habitat, seasonal movements, size, age at maturity, diet, social and foraging behaviour, identified threats to survival and conservation status under the relevant state, national and international legislation are described. This technical information is presented as a compilation of published literature as a readily available resource for management and educational purposes.
1. INTRODUCTION

This report presents descriptions of the marine wildlife species (i.e. non-fish groups of marine vertebrates including mammals, reptiles and birds) that commonly occur in the estuarine and marine waters (out to 80 nm) of NSW. This technical information is presented here as an all-in-one readily available resource for management and educational purposes. It was produced in conjunction with a study that investigated the broad-scale interactions between the fisheries managed by NSW DPI and the marine wildlife species that occur in the estuarine and marine waters of NSW (Ganassin and Gibbs 2005).

The marine wildlife species that commonly occur off NSW are described in this report, as these species are a regular component of the marine ecosystem off NSW and their survival could be threatened by activities that occur in this area. These descriptions, of five reptile species, 20 mammal species, and 122 bird species in the following chapters, cover a large proportion of the marine wildlife species that have been reported off NSW.

The descriptions include information about their distribution, habitat, seasonal movements, size, age at maturity, diet, social and foraging behaviour, identified threats to survival and conservation status under the relevant state, national and international legislation. Definitions of the categories of threatened and protected species used under the relevant threatened species legislation are provided in Appendix 1. All the information in this document is sourced from published literature.
2. MAMMALS

2.1. CETACEANS

Unless otherwise specifically referenced, the following information on cetaceans was obtained from *The Action Plan for Australian Cetaceans* (Bannister et al. 1996).

2.1.1. Risso’s dolphin (*Grampus griseus*)

**Distribution:** Risso’s dolphin occurs in all oceans across both hemispheres from the equator to about 60° (Kruse et al. 1999). In Australia, this dolphin has been recorded from southwestern Western Australia, South Australia, Victoria, New South Wales and Queensland. Stranding records range from approximately 23°S to 39°S. In NSW, the species has been recorded from 15 strandings, mostly between December and June (Smith 2001). It has been suggested that this species undertakes a seasonal migration, in association with changing sea surface temperatures (Leatherwood et al. 1980).

**General comments:** Risso’s dolphin occurs in tropical, subtropical, temperate and subantarctic waters. This pelagic species occurs well offshore in deep oceanic and continental shelf waters (Leatherwood et al. 1980) and is seen in inshore waters and frequently over the continental slope. It is found where sea temperatures are 15°-30°C. Fraser Island has the only known ‘resident’ population in Australia. The maximum age of this species is >17 years and it grows to a maximum of 4.1 m. It is said to be sexually mature at 2.6-3.0 m. It feeds in pelagic waters primarily on squid (both pelagic and neritic), some octopus and possibly fish. It lives in groups of 25 to several hundred individuals but may also be solitary. It dives long and deep, and is not a regular bow-rider. It has been seen in company with striped dolphins, pilot whales, common dolphins and other pelagic cetaceans. Although no abundance estimates are available for Australian waters, it is believed to be reasonably abundant throughout the main part of its range.

**Identified threats:** Current threats to the Risso’s dolphin include their incidental capture in the Sri-Lankan gill-net fishery and northern Australian waters, direct capture of a small number of individuals in Indonesia and the Solomon Islands, and illegal capture in northern Australian waters.

**Conservation status:** NSW (*NPW Act*) - Protected; Commonwealth (*EPBC Act*) – Protected; International (*IUCN*) – Data deficient.

2.1.2. Bottlenose dolphin (*Tursiops truncatus*)

**Distribution:** The bottlenose dolphin is a cosmopolitan species, and it is not found in polar seas (i.e. between 65°N and 55°S). It occurs in all Australian states, the Northern Territory and Norfolk Island. There are separate inshore and offshore forms of this species. The offshore *T. t. aduncus* occurs in New South Wales north of Port Macquarie, through Queensland and Northern Territory into Western Australia, south to Perth. The inshore *T. t. truncatus* occurs in southern Queensland, north to at least Hervey Bay, through New South Wales, Victoria, Tasmania, South Australia, and in Western Australia at least to Albany. Both forms of the species occur widely in NSW waters, and are regularly observed (Smith 2001). It is the most frequent cetacean species to strand in NSW (Smith 2001). The species can be migratory in temperate waters.

**General comments:** Bottlenose dolphins occur from tropical to temperate and occasionally subantarctic waters. Inshore forms occur as resident groups with a limited home range in very shallow coastal water, often entering bays, estuaries, coastal lagoons and the tidal reaches of rivers (Wells and Scott 1999). Offshore forms occur in continental shelf and slope waters or well beyond, where individuals range widely and may undertake regular seasonal migrations, apparently to follow their prey (Walker 1981). They are common in several locations including Shark Bay and...
Cockburn Sound (WA), Moreton Bay and adjacent offshore waters (Queensland), Jervis Bay (NSW), Port Phillip Bay (Victoria), and Adelaide (SA). In NSW, there are resident, breeding populations of the species at Port Stephens, Jervis Bay, Twofold Bay and many other sites (Smith 2001). Their maximum age is around 42 years (male) and 43 years (female) and maximum length around 3.12 m (male) or 2.92 m (female). Males are sexually mature at 14.5 years / 2.4 m and females at 9-11 years / 2.27-2.38 m. They calve every three to six years in summer after a 12.3 month gestation period. They have a broad diet including teleosts, cephalopods, elasmobranchs and crustaceans. Demersal, benthic and reef-associated species are taken. They may feed in association with human activities such as prawn trawling or fish farming. Their ability to echolocate has been demonstrated experimentally. They can occur in groups of >1000 individuals, however in NSW they are mostly observed in groups of one to fifty animals. The mean group size from studies in Australia was between five and ten individuals. Only local population estimates are available for Australian waters. In NSW, the resident population of Jervis Bay has been estimated at about 47 individuals (Mandelc 1995).

Identified threats: Bottlenose dolphins are currently threatened by habitat destruction and degradation, noise pollution, boat-strike (Smith 2001), harassment or disturbance (particularly close to major cities), incidental capture in aquaculture nets, shark nets, trawl-nets and drift-nets, illegal killing, live capture in Queensland and overfishing of prey species. Bottlenose dolphins are illegally killed for sport, bait or their perceived predation on commercial fish stocks. The species is also potentially threatened by pollution, disease, and tourism including dolphin watching, feeding and swims.

Conservation status: NSW (NPW Act) - Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Data deficient.

2.1.3. Pantropical spotted dolphin (Stenella attenuata)

Distribution: The pantropical spotted dolphin can be found in both hemispheres in all oceans between 40°N and 40°S (Perrin and Hohn 1994). In Australia, it has been recorded off the Northern Territory, Western Australia (south to Augusta), Queensland and New South Wales. In NSW, the species has been recorded from six strandings, the most recent in February 1998, and two unconfirmed sightings (Smith 2001). Seasonal movements north / south are known off Japan and inshore / offshore in the eastern tropical Pacific.

General comments: Pantropical spotted dolphins are found in tropical and subtropical waters (22°C or greater) and occasionally in temperate waters. They are pelagic, oceanic and can be found on the continental shelf and along the continental slope. They live to a maximum of 50 years and reach a maximum length of 2.57 m (male) and 3.4 m (female). Males are sexually mature at 12-15 years / 1.9-2.0 m and females at 10-12 years / 1.8-2.0 m. They calve every two to four years, after an 11.2-11.5 month gestation period. Calving season peaks in spring and autumn. They feed near the surface and mostly eat epipelagic and mesopelagic fish, and squid. Other foods such as worms and crab larvae are also eaten. Their diet varies with region and reproductive state, with lactating females eating a greater proportion of fishes than squids. Their diet has also been noted as overlapping greatly with yellowfin tuna. They can occur in groups of a few individuals to over 1000, and average <100 individuals in a group. Offshore pods are usually larger than coastal ones. They are often seen with other species of dolphin, tuna and seabirds, probably feeding in aggregations. They ride bow waves. Home range is several hundred kilometres or more and daily movements of 30-50 km are made. Sharks are known to take dolphins in association with purse-seining operations. There are no population estimates for Australian waters.

Identified threats: The main threat to this species occurs from fishing activities outside Australian waters. In particular, the Taiwanese gill-net shark fishery incidentally captures large numbers of the populations found in Australian waters, and the species is directly caught in the Philippines and Solomon Islands. In Australian waters, shark meshing activities in Queensland and NSW capture low numbers of the species.
Conservation status: NSW (NPW Act) - Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Lower risk, conservation dependent.

2.1.4. Striped dolphin (*Stenella coeruleoalba*)

**Distribution:** Striped dolphins are found in both hemispheres across all oceans between 50°N and 50°S. Australian records are from Western Australia (south to Augusta), Queensland and New South Wales. In NSW, striped dolphins have been recorded from 13 strandings between Byron Bay and Sussex Inlet (Smith 2001). In the north Pacific, the species is migratory where it moves north and south in relation to a warm current. The same may be true off the coast of southern Africa.

**General comments:** Striped dolphins are pelagic and occur in deep water and the outer edge of the continental slope. They are found in tropical, subtropical and warm temperate waters, and possible vagrants have been recorded in colder waters. They can reach a maximum age of 58 years and a maximum length of 2.6 m (male) and 2.5 m (female). Males reach sexual maturity at 15 years / 2.0-2.5 m and females at 7-10 years / 1.9-2.4 m. They calve every 1.5-4 years after a gestation period of 12 months. They feed on small (<300 mm length) mesopelagic fish, shrimp and squid. They can occur in groups of up to several thousand individuals but generally occur in groups of a few hundred. They ride bow waves. They may feed at depths of about 200 m or may take prey usually found at such depths when they come to surface at night. There are no population estimates for the species in Australia.

**Identified threats:** Current threats to this species concern captures from fishing activities. In particular, direct and incidental catches in Sri Lanka are high, small numbers are taken in the Solomon Islands and large numbers are taken by the Japanese drive fishery.

**Conservation status:** NSW (NPW Act) - Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Lower risk, conservation dependent.

2.1.5. Common dolphin (*Delphinus delphis*)

**Distribution:** The common dolphin occurs across both hemispheres in all oceans. It is not found in the higher latitudes, with the Subtropical Convergence being the furthest record south. In Australia, the species has been recorded from all states and the Northern Territory. They occur along the whole NSW coast, throughout the year, with no obvious seasonal changes in abundance and are often observed (Smith 2001). It is one of the most frequent cetacean species to strand (Smith 2001). It is not known to be migratory, but seasonal movements have been reported. Two species of the common dolphin have been distinguished in Australian waters, the short-beaked common dolphin (*D. delphis*), and the long-beaked common dolphin (*D. capensis*).

**General comments:** Common dolphins are pelagic and occur in temperate to tropical waters, both inshore and offshore (Evans 1994). The species may be associated with high topographical relief of the ocean floor, escarpments and areas of upwelling. Males of the species live to 22 years while females reach a maximum age of 20 years. The maximum length of the species is 2.32 m (male) and 2.18 m (female). For males sexual maturity is reached at 3-12 years / 1.7-2.0 m and for females at 2-7 years / 1.5-1.9 m. They calve every 1.3-2.6 years after a 10-11 month gestation period. The species calves all year with peaks in spring and autumn. They are opportunistic feeders, feeding at the surface and at depth (to at least 280 m) on small shoaling and mesopelagic fish and cephalopods. Their diet varies with stock and season. They may feed from human fishing operations and aggregate with tuna possibly in a feeding association. Some aggregations observed in Australian waters number thousands. They ride the bow waves of boats and large whales. They are seen with other dolphin species and larger cetaceans (fin, humpback, blue, southern right whales). Although there are no population estimates for Australian waters, they are considered common.
Identified threats: Current threats to the species include intentional killing (usually by shooting) in most states, incidental catches in the eastern tropical pacific, Australia and possibly other regions, small direct captures in some fisheries around the world, and accumulation of organochlorines and heavy metals in some dolphins from Australian waters.

Conservation status: NSW (NPW Act) - Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database

2.1.6. Melon-headed whale (*Peponocephala electra*)

Distribution: Melon-headed whales are found in both hemispheres across the Indian, Pacific and Atlantic Oceans between about 35°N and 35°S. In Australia, it has been recorded from Western Australia, Queensland and New South Wales. The species has been recorded stranded from NSW 20 times, between Tweed Heads and Sydney, (DEC Atlas of NSW Wildlife 02/01/2003). It is not known to be migratory.

General comments: Melon-headed whales are pelagic found in deep oceanic waters, generally in upwelling areas, and they are generally not seen close to shore unless the water depth drops off quickly (Smith 2001). They inhabit warm tropical and subtropical waters (usually >25°C). While they are mainly equatorial, they can also be found in temperate waters. They live to a maximum of >20 years and reach a maximum length of 2.75 m. Sexual maturity is reached at 13 years / 2.12-2.64 m for males or 6 years / 2.29-2.57 m for females. Calving occurs from August-December after a 12 month gestation period. They feed on squid and a variety of small fish. They occur in large herds of 150-1500 animals or groups of less than 40. They have been observed swimming with Fraser’s dolphin, spotted and spinner dolphins. They are known to herd other melon-headed whales. Population numbers in Australian waters have not been estimated, however the species may be more common than records suggest.

Identified threats: The species is currently threatened by incidental catches in northern Australian waters, gill-nets in Sri Lanka and purse-seine nets in the eastern tropical Pacific. They are directly captured in low numbers by small cetacean fisheries in several places, including Japan, Indonesia and Sri Lanka. Possible illegal catches in northern Australian waters also threaten the species.

Conservation status: NSW (NPW Act) - Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

2.1.7. False killer whale (*Pseudorca crassidens*)

Distribution: False killer whales have a circumglobal distribution between 60°N and 50°S (Odell and McClune 1999). North-south and inshore seasonal movements appear to occur in the northeastern Pacific and in some other areas, apparently associated with warm currents and seasonal availability of prey. The species occurs in all Australian states and the Northern Territory. The species has been recorded stranded in NSW 14 times, between Tweed Heads and Jervis Bay, the most recent in May 1997 (Smith 2001). A pod of about 50 false killer whales have been seen swimming close to the shore off Coffs Harbour in October 1991 (Smith 2001). A seasonal movement inshore or along the continental shelf of the species in Australia is indicated by the majority of herd strandings occurring from May to September on the south and south-eastern coasts. Strandings in NSW have occurred between May to January, excluding September (Smith 2001).

General comments: False killer whales prefer tropical to temperate oceanic waters, and only approach close to land where the continental shelf is narrow. They are possibly attracted to zones of enhanced prey abundance along the continental slope. Males reach a maximum length of 5.96 m and females 5.06 m. Their age at sexual maturity varies between populations, generally between 8-14 years for both sexes. They calve every 6.9 years throughout the year after a 15.1-15.6 month gestation period. They feed on squid and large pelagic fish. They can also attack stressed dolphins
escape tuna purse-seine nets. They occur in herds of 20 to 50 individuals. Large aggregations of 100 to 800 individuals can occur when smaller herds congregate to exploit locally abundant prey. They are often seen with other cetaceans, approach vessels and ride bow-waves. Although the species is widely distributed, they are apparently not abundant anywhere. There are no population estimates for the species in the Southern Hemisphere.

**Identified threats:** Current threats to the species include culling off western Japan to protect their finfish fishery, incidental capture in tuna purse-seine and other nets and long-line fisheries elsewhere in the Pacific Ocean, and possible entanglement in drift-nets set in international waters and in lost or discarded netting.

**Conservation status:** NSW (*NPW Act*) - Protected; Commonwealth (*EPBC Act*) – Protected; International (*IUCN*) – Not in database.

### 2.1.8. Killer whale (*Orcinus orca*)

**Distribution:** Killer whales have a cosmopolitan distribution and occur from the polar regions to the equator in all oceans. In Australia, they have been reported from all states, but not the Northern Territory. They are believed to concentrate around Tasmania and are frequently sighted in South Australia, Victoria and the Antarctic south of 60°S. Smith, in 2001, noted that there were 24 records of killer whales in NSW. Most of the records originate from south of Broken Bay, between May and November, although there are also records during the other months except February and December (Smith 2001). Following a reduction of their numbers from whaling activities, the numbers visiting NSW waters appears to be increasing (Smith 2001). They are not known to migrate, but seasonal movements in response to food supply are possible.

**General comments:** The pelagic killer whale is found in oceanic and shelf waters. While the species is found in both warm and cold waters, it may be more common in cold, deep water. Off Australia, they are often seen along the continental slope and on the shelf, and near seal colonies. Macquarie Island is a key locality for the species in the Australian region as it is regularly sighted there. In the Southern Hemisphere, most killer whales occur in relatively warm waters in winter, and then migrate to the Antarctic in summer (Mikhalev *et al.* 1981). They reach a maximum age of 40 years and a maximum length of 9.8 m for males and 8.5 m for females. Males are sexually mature at 16 years / 5.2-6.2 m while females are sexually mature at 10 years / 4.6-5.4 m. They calve every 3-8 years after a 12-17 month gestation period. Killer whales are a top-level carnivore and often hunt in packs. Their diet differs seasonally and regionally. The specific diet of Australian killer whales is not known but there are reports of attacks on dolphins, young humpbacks, blue whales, sperm whales, dugongs and Australian sea lions. They are also known to herd bottlenose dolphins and common dolphins. Stomach contents from the Antarctic contained fish, minke whales, pinnipeds and squid. They are usually sighted in groups of less than 30. Off southern Australia, group sizes of up to 52 have been reported with most sightings being in groups of less than ten. There are reported cases of killer whales forming a symbiotic relationship with whalers at Eden (NSW), where killer whales received tongues of other whales caught by humans in return for help with procuring whales. There are no population estimates for continental Australian waters. In the Antarctic south of 60°S, the population has been preliminarily estimated at 70,000.

**Identified threats:** The species is currently threatened from illegal shooting of individuals plundering catch, and incidental deaths, although none of these have been reported in Australian waters.

**Conservation status:** NSW (*NPW Act*) - Protected; Commonwealth (*EPBC Act*) – Protected; International (*IUCN*) – Lower risk, conservation dependent.
2.1.9. **Short-finned pilot whale (Globicephala macrorhyncus)**

**Distribution:** Short-finned pilot whales have a circumglobal distribution from the equator to 41°S and 45°N. In the Australian region they occur in oceanic waters and continental seas and have been recorded from the Northern Territory and all states except Victoria. Records on the southern coasts may reflect the influence of warm, south-flowing Indian and Pacific Ocean currents. In NSW, the species has been recorded from 11 strandings, including two mass strandings, between Brunswick Heads to Culburra, the most recent in April 2000 (Smith 2001). They are known to seasonally move between inshore and offshore areas in response to prey abundance, however this is not apparent from the meagre Australian data.

**General comments:** Short-finned pilot whales occur in tropical to temperate oceanic waters, and approach coastal seas. Their maximum age is 46 years (males) and 63 years (females) and their maximum length is 5.89 m (male) and 4.8 m (female). Males are sexually mature at 14.6 years / 4-5 m while females are sexually mature at 9 years / 2.9-3.6 m. Females calve every five years until they become 34 years old. Calving peaks in July to August after a 14.9 month gestation period. They feed mainly on squid, cuttlefish, octopus and some fish. They occur in groups of 10 to 30, but commonly occur in herds of several hundreds often accompanied by dolphins. They are capable of diving to at least 600 m. They have been seen with the appearance of squid feeding tuna, and herd and possibly attack *Stenella* and common dolphins escaping tuna purse-seine nets in eastern tropical Pacific. They are widespread and apparently common, however there are no estimates of Southern Hemisphere populations taken.

**Identified threats:** They are currently threatened by entanglement in drift-nets set, lost or discarded in international waters. There are active fisheries of this species in Japanese and Caribbean waters (Smith 2001).

**Conservation status:** NSW (NPW Act) - Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Lower risk, conservation dependent.

2.1.10. **Arnoux’s beaked whale (Berardius arnuxii)**

**Distribution:** Arnoux’s beaked whales are found across the Southern Hemisphere south of about 34°S to the Antarctic ice edge. The majority of strandings and sightings have come from New Zealand and elsewhere in the western South Pacific Ocean (Smith 2001). In Australia, they have stranded on the shores of Western Australia, South Australia and Tasmania and have possibly been sighted inshore off South Australia and the south coast of New South Wales. Between 1962 and 1984, 28 large beaked whales, tentatively identified as this species, were reported mostly on the continental slope between Wollongong and Eden, and occasionally in deeper water further out to sea (Paterson and Parker 1994). In May 1997, part of a skeleton of this species was trawled up off Brush Island in southern NSW (Smith 2001). There is perhaps a seasonal movement of the species to the continental slope in summer.

**General comments:** Arnoux’s beaked whales occur widely in deep oceanic waters, within the temperate, subantarctic and Antarctic zones, particularly in the vicinity of sea mounts and submarine escarpments where higher prey densities generally occur. They are uncommon in continental seas. They reach a maximum age of 50+ years and a maximum length of around 9.34 m. Sexual maturity is reached at 8.5 m for males and 9.0 m for females. Little is known about their diet. They are known to feed on octopus and perhaps also squid and fish. They generally occur in groups of six to ten and occasionally in groups of up to 50 or more. They are very shy of vessels. The species is a predator, but the mode of capture is not known. They can dive deeply possibly to at least 1000 m for 15-30 minutes. There is no information about the population size.

**Identified threats:** They are threatened by entanglement in drift-nets and other nets set, lost or discarded in international waters.
Conservation status: NSW (NPW Act) - Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Lower risk, conservation dependent.

2.1.11. Strap-toothed beaked whale (Mesoplodon layardii)

Distribution: Strap-toothed beaked whales are found only across the Southern Hemisphere between 25°S and 60°S. In Australia, the species has stranded in all states except the Northern Territory, mostly on the southern and eastern coasts. The species occurs south of 38°S throughout the year, and occurrences north of this appear to be seasonal, mostly during mid- to late summer. There are records of 14 strandings of this species in NSW, between Byron Bay and Kioloa (Smith 2001).

General comments: Strap toothed beaked whales seem to prefer the deep oceanic waters of the temperate to subantarctic regions. They may feed on squid, fish and crustaceans, in zones of higher productivity adjacent to the continental slope and use adjacent waters for calving. They reach a maximum length of 6.13 m (male) and 6.25 m (female). They are sexually mature at around 5 m. Females calve in summer-autumn after a 9-12 month gestation period. Little is known about their behaviour. They occur singly or in groups of two or three. They are generally wary of ships, and rise 10-15 minutes after diving from the vessel at least 400 m away from it. They are apparently able to dive deeply, and are probably fast and active pursuers of prey. There are no population estimates for this species, however they are possibly seasonally common off southern Australia.

Identified threats: No major threats to the species survival are known at present (Smith 2001).

Conservation status: NSW (NPW Act) - Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Data deficient.

2.1.12. Sperm whale (Physeter macrocephalus)

Distribution: Sperm whales are found throughout the world’s oceans in deep water off the continental shelf, i.e. in water >200 m deep. Females and young males are restricted to warmer waters north of around 45°S in the Southern Hemisphere, and adult males travel to and from colder waters. In Albany (WA), the species is concentrated in a narrow area only a few miles wide at the shelf edge and move westward throughout the year. Similar concentrations are known elsewhere. Off the west coast of Western Australia, where the shelf slopes less steeply, sperm whales are less concentrated close to the shelf edge and are more widely dispersed offshore. In the open ocean, sperm whales in the Southern Hemisphere generally move southwards in summer and northwards in winter. Northern Hemisphere sperm whales have a separate migration that consists of similar seasonal movements to those in the south. Key localities for the species in Australia are near the continental shelf between Cape Leeuwin and Esperance (WA), southwest of Kangaroo Island (SA), off Tasmania’s west and south coasts, off New South Wales (including Wollongong), and off Stradbroke Island (Queensland). They occur in all Australian states. The sperm whales off eastern Australia (Division 6 stock) are said to be a separate stock than those off western Australia (Division 5 stock) (Smith 2001).

Sperm whales are commonly sighted off NSW out to the edge of the Australian Exclusive Economic Zone, mostly between August and April (Smith 2001), however this seasonality may represent a bias towards the tuna fishing season when observations were made (Paterson 1982). The species rarely occurs within the 5 km limit of NSW waters. Small groups of the species have been sighted twice in such waters, off Eden and Broken Bay (DEC Atlas of NSW Wildlife 02/01/2003). The species has stranded 22 times along most of the coast of NSW, (Smith 2001).

The population of sperm whales dramatically declined during historical whaling operations that ceased in 1978. The current number of sperm whales is unknown, however the ‘Australian’ population of the species is likely to be in the tens of thousands.

General comments: Sperm whales are pelagic and are found offshore only in deep water. Their population is centred in temperate or tropical waters where breeding / nursing schools, and groups
of young males occur. They concentrate in areas where the seabed rises steeply from great depth, this is probably associated with concentrations of their major food source in areas of upwelling. They reach a maximum age of around 60 years and a maximum length of 18.3 m (males) or 12.5 m (females). Males are sexually mature at 18-21 years / 11.0-12.0 m while females are sexually mature at 7-13 years / 8.3-9.2 m. They calve every four to six years between November – March after a 14-15 month gestation period. They feed mostly on oceanic cephalopods that are taken at depth, and some deep-sea angler fish and mysid shrimps are also eaten. At the surface, their swimming speed rarely exceeds 7.5 km / hr, however they can swim to 30 km / hr when disturbed. They are deep divers and can do so for over 60 minutes. Maximum diving depths between 1135 m to 3195 m have been recorded, although the mean diving depth is much shallower. They probably use echolocation. Breeding schools of sperm whales include females of all ages and immature and younger pubertal males. Large, socially mature males accompany schools only during the breeding season, and then for short periods of possibly only a few hours. The average school size of such a group is 25 animals, although they have been reported to number up to the low thousands. Bachelor schools of sperm whales consist of older pubertal males and sexually, but not socially, mature males, all of similar size and age. Socially mature males leave such schools to associate with breeding schools, either alone or in small groups of usually less than six animals.

**Identified threats:** The species is currently threatened from direct disturbances such as collision with large vessels on shipping lanes beyond the edge of the continental shelf, seismic operations in this area, net entrapment in deep-sea gill-nets and pollution leading to accumulation of toxic substances in the body.

**Conservation status:** NSW (TSC Act) - Vulnerable; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

### 2.1.13. Pygmy sperm whale (*Kogia breviceps*)

**Distribution:** Pygmy sperm whales appear to have a cosmopolitan distribution but do not occur in polar and sub-polar seas. They have been recorded stranded from all Australian states but not the Northern Territory. They are not known to migrate or exhibit strong seasonal movements. It is one of the most frequent species to strand in NSW, with 49 strandings reported (Smith 2001; DEC Atlas of NSW Wildlife 02/01/2003). Strandings in NSW have occurred throughout the year, although more frequently in October to March, from Byron Bay to Twofold Bay, with similar numbers in northern and southern NSW (Smith 2001).

**General comments:** Pygmy sperm whales occur in tropical, subtropical and temperate waters, beyond the edge of the continental shelf. They reach a maximum length of about 3.3 m. They are sexually mature at about 2.7 m. It is thought that they calve every two years in spring in temperate to tropical seas after a 9-11 month gestation period. They mate in summer. They mostly feed on squid, benthic fish and crabs. They use echolocation. They occur individually or in groups of up to six animals. They frequently lie almost motionless at the surface. There is no information on the population of this species.

**Identified threats:** They are threatened from seismic operations, collision with large vessels, entanglement in fishing gear and pollution leading to accumulation of toxic substances in body tissues.

**Conservation status:** NSW (NPW Act) - Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

### 2.1.14. Southern right whale (*Eubalaena australis*)

**Distribution:** Southern right whales occur across the Southern Hemisphere between around 30° and 60°S. They feed in summer in the higher latitudes of their range (between about 45°S and 55°S) and generally move to the lower latitudes for breeding in winter. They approach coasts in winter. In
Australia, the species is a winter-spring visitor, occurring around the southern coastline from Perth (WA) to Sydney (NSW), including Tasmania. Their Australian range is possibly extending further north as sightings have been reported from Shark Bay and North West Cape (WA) and Byron Bay (NSW).

The species is regularly observed close to shore along the NSW coast between May and November, and there are a couple of January records (Smith 2001). The species has mostly been sighted in southern and central NSW (south of Newcastle), although there are some records further north, the furthest from Byron Bay (Smith 2001). The draft recovery plan for the species identifies Twofold Bay and coastal waters 5 km north and south as an area of frequent use by the species, however the plan acknowledges that other areas may become important as the population recovers (Burnell and McCulloch 2001). New-born calves are regularly sighted in NSW waters (Smith 2001). After calving in NSW waters, the population perhaps moves offshore before migrating to more southerly waters in summer (Smith 2001).

The population of southern right whales dramatically declined during historical whaling operations that ceased in the 1960s. Population estimates are difficult for this species, given its irregular movement and calving cycle. The numbers of southern right whales off southern Western Australia have increased since 1977 at around 10% per year. The Australian population remains small compared with its likely size before exploitation (Smith 2001). The numbers of southern right whales that visit NSW in any one year is probably less than ten (Warneke 1996).

General comments: In summer, southern right whales are pelagic and feed in the open Southern Ocean. In winter, they occur close to the coast, particularly calving females. Data from South Africa indicates that over the winter, females with calves generally occur in shallow waters, sometimes less than 5 m deep, and that all whales generally occur within 1.85 km of the shore (Best 1990). Consistent calving locations in Australia in recent years have been at Doubtful Island Bay and east of Israelite Bay (WA), the head of the Great Australian Bight (SA), and off the South Australian gulfs and Warrnambool (Victoria). They live to a maximum of 50+ years and reach a maximum length of 17.5 m. Sexual maturity is reached around nine to ten years / 12-13 m. They generally calve every three years in preferred onshore localities during June-August after an 11-12 month gestation period. They mate from July-August. The data implies that there is no feeding near the coast in winter, calving females effectively fast for a little over four months. These baleen whales feed mainly on smaller plankton and copepods, taken primarily in the open ocean, presumably south of 40°S, in summer at or near the surface. Near shore, their swimming speeds are generally slow, however they are capable of reaching 15+ km / hr over short distances.

Identified threats: Southern right whales are threatened by direct disturbance, especially when they are close to the coast. The disturbance can result from whale watching activities, recreational and research related boating activities, collision with large vessels, swimmers, divers, low-flying aircraft, coastal industrial activity, defence operations, entanglement in fishing gear, plastic debris, and pollution leading to the accumulation of toxic substances in body tissues. Ingestion of or entanglement in harmful marine debris also affects this species (Threatened Species Scientific Committee 2003).

Conservation status: NSW (TSC Act) - Vulnerable; Commonwealth (EPBC Act) – Endangered; International (IUCN) – Lower risk, conservation dependent.

2.1.15. **Minke whale (Balaenoptera acutorostrata)**

**Distribution:** Minke whales occur worldwide. There appears to be three subspecies of minke whales based in the North Atlantic, North Pacific and Southern Hemisphere (‘dark-shoulder form’). They migrate between cold water feeding grounds and warmer water breeding grounds, however this migration is not necessarily predictable as they possibly do not migrate far into warm waters and populations in the North Pacific apparently do not migrate at all. Dark-shoulder minke whales feed on major grounds in Antarctic waters, and they migrate further south than most baleen whales, except the blue whale. There is also a dwarf form of minke whale reported throughout the Southern
Hemisphere. Off Australia, this dwarf form seems to extend southwards to 12°S on the east coast and 20°S on the west coast. It generally does not travel to the Antarctic, although it has been recorded as far as 58-65°S. Off eastern Australia, the dark-shoulder form may not migrate as far north as the dwarf form, with its most northerly record being 21°S. Minke whales have been recorded from all Australian states, but not the Northern Territory.

Both the dark-shoulder and dwarf forms of minke whales occur off NSW. In NSW, they have been reported stranded and have been observed close to the shore along the coast on a number of occasions (Smith 2001). Minke whales have been reported to occur in NSW from June to November, between Twofold Bay and Minnie Water (Smith 2001).

**General comments:** Minke whales are oceanic, but are not restricted to deep water and do occur close to coasts. They are widely distributed in tropical, temperate and polar waters. The dark-shoulder form reaches a maximum age of <50 years and maximum length of 9.8 m (male) and 10.7 m (female). Males are sexually mature at five to eight years / 7.3 m, females are sexually mature at six to eight years / 7.9 m. They calve every year in temperate to tropical waters in June-July after a ten month gestation period. They mate from August-September. The dwarf form calves in May-June. Dark-shoulder minke whales feed mostly on krill. Dwarf minke whales have been found to feed on myctophids, fish and krill. Minke whales have been reported to evade moving ships and seek out and approach stationary or slow moving vessels. They occur singly or in groups of two or three, though feeding concentrations of the dark-shoulder form may be encountered. The Southern Hemisphere population was recently estimated to be 700,000 animals in total. The population of the species in Area V (130-170°W) on the east coast of Australia is around 210,000 animals. Estimates exclude the dwarf form.

**Identified threats:** Threats include seismic operations, collision with large vessels, entanglement in fishing gear, defence operations, and pollution leading to the accumulation of toxic substances in body tissues. The minke whale is a commercially harvested species. The Japanese can catch around 300 animals per year in areas IV and V for scientific purposes (Smith 2001).

**Conservation status:** NSW (NPW Act) - Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Lower risk, near threatened.

### 2.1.16. Blue whale (Balaenoptera musculus)

**Distribution:** Occurring throughout the world’s oceans, blue whales migrate between warm water breeding grounds in tropical and subtropical waters and cold water feeding grounds in polar and subpolar waters. There are three subspecies of blue whale, the spatially disjunct northern and southern ‘true’ blue whale and the pygmy blue whale (Smith 2001). In the Southern Hemisphere, ‘true’ blue whales occur between 20°S and 60-70°S. Pygmy blue whales only occur in the Southern Hemisphere, particularly in the Indian Ocean, and migrate to north of 50°S in summer. Blue whales have been recorded from all Australian states. Recent strandings in Australia have mostly been pygmy blue whales. Their migration paths are widespread and do not obviously follow coastlines or oceanographic features.

The waters off the far south coast of NSW, and the adjacent waters off Victoria, are one of only three recognised aggregation areas for blue whales in Australia (Environment Australia 2001a). Blue whales have been sighted in NSW waters on a number of occasions mostly between Bermagui and Green Cape, mostly in October and November (Smith 2001). While there are no confirmed records of pygmy blue whales in NSW waters, it is likely that some NSW sightings of blue whales may have been this species as it is the more common subspecies in adjacent Victorian waters.

The population of ‘true’ blue whales dramatically declined during historical whaling operations that fully ceased in the early 1970s. The current Southern Hemisphere population of ‘true’ blue whales has been estimated at 610 and pygmy blue whales at 4,300 (Smith 2001). This is only a small proportion of the original population.
General comments: Blue whales mostly occur along the edges of continental shelves and along ice fronts, and also in both deep oceanic waters and shallow inshore zones (Smith 2001). ‘True’ blue whales reach a maximum age of 80-90 years and a maximum length of 30.5 m. ‘True’ blue males reach sexual maturity at 22 m and females at 23-24 m (5-10 years of age). They give birth to a single calf every two to three years in the tropical open ocean in winter after a 10-11 month gestation period (Rafic 1999). They mate in winter. Pygmy blue whales reach a maximum age of less than 50 years and a maximum length of 24.4 m. Pygmy blue whales calve every two to three years in tropical open oceans in winter after a 10-11 month gestation period. They mate in winter. ‘True’ blue whales feed almost exclusively on one species of krill in Antarctic waters. Pygmy blue whales feed further north on smaller krill, and have been reported feeding off southern Australia. They exhibit both shallow and deep diving behaviour, and can dive for up to 30 minutes. They are usually solitary animals or occur in groups of two to three. In one day they may consume two to four tonnes of food.

Identified threats: The numbers of blue whales have been so severely depleted that the species vulnerability to other threats is exacerbated (NSW Scientific Committee 2002a). The species is threatened by seismic operations, collision with large vessels, entanglement in fishing gear, defence operations, pollution leading to the accumulation of toxic substances in body tissues and anthropogenic climate change (NSW Scientific Committee 2002a). Ingestion of or entanglement in harmful marine debris also affects this species (Threatened Species Scientific Committee 2003).

Conservation status: NSW (TSC Act) - Endangered; Commonwealth (EPBC Act) – Endangered; International (IUCN) – Endangered.

2.1.17. Humpback whale (Megaptera novaeangliae)

Distribution: Humpback whales occur throughout the world’s oceans. Northern and Southern Hemisphere populations are distinct, because of seasonal migration separation. Humpback whales are found off coastal Australia in winter and spring and are recorded from all states, except the Northern Territory. They migrate annually between warm water breeding grounds in winter, at around 15-20°S, to cold water (Antarctic) feeding grounds in summer, to 60-70°S. Off Australia, wintering animals off the west coast (Group IV population) are shown to be distinct from those off the east coast (Group V population). The latter is more closely related to those wintering off Tonga. Humpback whales may occur close to the coast on migration. Not all animals migrate south each year there are some summer sightings in the Coral Sea. There is a reported sex ratio bias towards males in the east coast migration perhaps not all females migrate north each year.

Humpback whales are regularly sighted in NSW waters when migrating (Smith 2001). They generally pass close to the coast (rarely venturing >10 km from shore) (Bryden 1985), mainly between June and November on their northward migration (peaking in June-July) and September and November on the southward migration (Smith 2001).

The humpback whale population has been greatly reduced by historical whaling activities that ceased in 1963. Recent estimates of the population migrating along the east coast (Group IV) were between 3,000-4,000 and that along the west coast (Group V) were between 14,000-19,000. Australian populations of the species are increasing at a rate of around 10% per year.

General comments: Humpback whales are pelagic and are found in Antarctic waters during summer and temperate-subtropical / tropical coastal waters in winter. Key localities for the east coast population are the south coast of New South Wales, off Coffs Harbour, Cape Byron, Stadbroke Island, Hervey Bay and islands in the Great Barrier Reef, especially the Whitsunday passage area. The exact location of breeding grounds is unknown, although much breeding of the east coast population occurs in central Great Barrier Reef area. However, there is probably a wide range of opportunity for breeding, over several degrees of latitude on each coast. There is evidence that some animals calve in northern NSW waters when migrating north (Smith 2001). They live to a maximum of 50 years and reach a maximum length of 18 m. Males reach sexual maturity at 11.6 m and females at 13.7 m (4-10 years of age). They calve every two to three years, sometimes twice.
every three years, or even annually. They calve in tropical coastal waters between June-October after an 11–11.5 month gestation period. Mating occurs between June-October. Feeding areas are concentrated in Antarctic waters, where they almost exclusively feed on Antarctic krill. There is some evidence of them feeding on fish and plankton swarms in warmer waters, for example off Eden in NSW. Feeding behaviour off Eden has been repeatedly observed in recent years during the southward migration (Warneke 1996). Only negligible amounts of food are taken while in NSW waters (Chittleborough 1965). Feeding in subtropics off northwest Western Australia and eastern Australia is uncertain, however it is unlikely. The species exhibits both shallow and deep diving behaviour, and can dive for up to 15 minutes.

Identified threats: Humpback whales are more likely to be directly disturbed when they are closer to human activities on their migration and in breeding areas. Whale watching, research and pleasure vessels, aircraft, swimmers, divers, coastal seismic activity, defence operations, collision with large vessels, entanglement in fishing gear or shark nets and pollution leading to the accumulation of toxic substances in body tissues can all directly disturb humpback whales. Ingestion of or entanglement in harmful marine debris affects this species (Threatened Species Scientific Committee 2003).

Conservation status: NSW (TSC Act) - Vulnerable; Commonwealth (EPBC Act) – Protected; International (IUCN) – Vulnerable.
2.2. PINNIPEDS

Unless otherwise specifically referenced, the following information on seals was obtained from *The Action Plan for Australian Seals* (Shaughnessy 1999).

2.2.1. New Zealand fur-seal (*Arctocephalus forsteri*)

**Distribution:** In Australia, New Zealand fur-seals breed in southern Australia on the south coasts of Western Australia, South Australia and on Maatsuyker Island (Tasmania). They have recently been reported breeding on a couple of islands in northeastern Bass Strait (Arnould *et al.* 2000). They also breed in New Zealand and Macquarie Island. There are >30 breeding populations in Australian waters. Non-breeding New Zealand fur-seals are occasionally reported from the west coast of Western Australia, Victoria, Bass Strait, New South Wales (mainly Montague Island), Queensland (south of Fraser Island) and New Caledonia. Montague Island is the only known regular haul-out site for New Zealand fur-seals in NSW. Here the highest numbers of this species occur between July to October (Shaughnessy *et al.* 2001). A newly established seal colony on the western side of this island is said to mostly consist of New Zealand fur-seals, these seals can also be found on the colony on the northern side of this island which predominantly consists of Australian fur-seals (D. Pridell, NSW DEC, pers. comm. 2005). Although considered a non-breeding colony a New Zealand fur-seal pup was born on Montague Island over the summer of 1999/2000, and survived for at least four months (Shaughnessy *et al.* 2001). It is suspected that both male and female fur-seals haul-out on the island (Shaughnessy *et al.* 2001). Outside of Montague Island, there are scattered records of New Zealand fur-seals hauling-out along the NSW coast north to Yamba (Smith 2001). They generally do not stay at such locations for extended periods (Smith 2001). Animals on the east coast of Australia may have moved there from New Zealand or from South Australia. Seals tagged at Kangaroo Island have been reported at Tathra, Montague Island, Jervis Bay and Sydney.

New Zealand fur-seals in Australian waters suffered a severe decline in numbers from commercial sealing operations in the late 18th and early 19th centuries. Their former range used to extend to the Furneaux Group in eastern Bass Strait where it was quite abundant. New Zealand fur-seals in Australian waters were recently estimated to number 34,700 in the early 1990s. The population of this species in Australian waters is increasing, however it is probably still lower now than it was historically. The recolonisation of Bass Strait breeding sites illustrates the increasing population of this species (Arnould *et al.* 2000).

**General comments:** New Zealand fur-seals prefer rocky parts of islands with mixed terrain and boulders. At sea, they seem to occur only within continental shelf waters. They reach a maximum length of 100-150 cm (females) or 150-250 cm (males). After females reach sexual maturity at six years, they breed every year after an eight to nine month gestation period. Their breeding season is from November-January. They principally feed on fish and cephalopods, and also seabirds. They also feed at fishing boats.

**Identified threats:** Threats to this species include the illegal shooting of seals that interact with commercial and recreational fishing gear, entanglement or capture of seals in fishing gear, such as nets used in tuna farming and deep water trawl nets (from the hoki fishery in New Zealand, and perhaps also the Australian south east trawl fishery), and reduced prey item availability from fishing operations (NSW Scientific Committee 2002b). Entanglement and ingestion of plastic debris also threatens this species (NSW Scientific Committee 2002b).

**Conservation status:** NSW (*TSC Act*) - Vulnerable; Commonwealth (*EPBC Act*) – Protected; International (IUCN) – Not in database.
2.2.2. **Australian fur-seal (*Arctocephalus pusillus*)**

**Distribution:** The Australian fur-seal breeds on five Bass Strait islands, and a small breeding colony is becoming established at Wright Rock. Their range extends to South Australia, south Tasmania and New South Wales and several haul-out sites are known in each state. The species once bred more widely with breeding colonies at Seal Rocks in NSW and southern Tasmania. In NSW, Montague Island is the main site for the species. The species predominantly hauls-out on the northern side of the island, throughout the year, but mostly during winter (July to October) when the highest numbers are found (Shaughnessy et al. 2001). A maximum of 540 Australian fur-seals were recorded on Montague Island in October 1998 (Shaughnessy et al. 2001). Although it is generally thought that only male fur-seals haul-out on Montague Island, there are indications that the island is also used by female fur-seals (Shaughnessy et al. 2001). The colonies of Australian fur-seals on the island are non-breeding, although there are records of odd unsuccessful breeding events, the vicinity lacks important features of other breeding colonies, and any fur-seal pups born on the island would probably not survive the weaning period (Shaughnessy et al. 2001). Steamers Beach and Green Cape are other sites in NSW where Australian fur-seals regularly haul-out. Seals also come ashore irregularly at other sites all along the coast from Nadgee Nature Reserve to Tweed Heads. This occurs throughout the year, but most frequently between July and November (Smith 2001).

The Australian fur-seal population was dramatically reduced from commercial sealing activities. In 1991, the total population size for Australian waters was estimated at between 47,000 and 60,000, with pup production estimated at 13,335. Despite some recent increases, the overall population level in Australia is likely to be much lower now than it was historically.

**General comments:** Australian fur-seals prefer rocky parts of islands with flat, open terrain. At sea, they remain mainly within continental shelf waters (Smith 2001). On average, females reach a maximum length of 157 cm and males 216 cm. The maximum age for females is >21 years and males >19 years. After females reach sexual maturity at three to six years (males reach sexual maturity at around five years) they breed annually between October to December after an eight to nine month gestation period. They principally feed on fish and cephalopods, and also seabirds. In Tasmanian waters, they predominantly feed in winter on adult fish, such as red bait, leatherjackets and jack mackerel and, in summer on adult squid, primarily Gould’s squid. Australian fur-seals also feed at fishing boats.

**Identified threats:** The species is threatened by reduced prey item availability from fishing operations, illegal shooting of seals that compete with fishing activities and entanglement in fishing gear debris (NSW Scientific Committee 2002c). Entanglement in and ingestion of plastic debris is a threat to this species (NSW Scientific Committee 2002c).

**Conservation status:** NSW (*TSC Act*) - Vulnerable; Commonwealth (*EPBC Act*) – Protected; International (IUCN) – Not in database.
2.3. SIRENIANS

2.3.1. Dugong (*Dugong dugon*)

Unless otherwise specifically referenced, the following information on the dugong was obtained from the *Review of the Conservation Status of Marine Mammal Species in New South Wales* (Smith 2001).

**Distribution:** The dugong occurs in the Indian and western Pacific Oceans, between about 27°N and 27°S. It is now found in small relict populations separated by large areas where it is extinct or close to extinction. The resident populations around the northern shoreline of Australia from Shark Bay (WA) to Moreton Bay (Qld) support most of the current world population of the species. Dugongs usually only occur in NSW as occasional stragglers usually in waters north of Jervis Bay, although they have been reported as far south as Twofold Bay. In 1992-93, there was an influx of dugongs (many of them dead) from Hervey Bay in NSW waters. This was due to a large loss of habitat following floods and a cyclone. NSW waters act as a refuge area for Queensland’s dugongs. The minimum size of the Australian population of dugongs was estimated to be 85,000. Populations in the southern Barrier Reef and Hervey Bay area have declined in recent years.

**General comments:** Dugongs are found in the shallow coastal parts of tropical and subtropical waters. They feed on a wide variety of seagrass species and algae, although usually only in very small amounts if seagrasses are abundant. They live for up to 70 years, reach sexual maturity after nine years and calve every three to seven years (Marsh *et al.* 1984).

**Identified threats:** Dugongs are threatened by coastal development, poor catchment management leading to siltation and the loss of seagrass beds, traditional hunting, collision with boats and incidental mortality in gillnets and shark protection nets. Isolated dugong populations are vulnerable to local extinction following stochastic events such as floods or cyclones (NSW Scientific Committee 2002d). The dugong could also be affected by human induced climate change (Threatened Species Scientific Committee 2001).

**Conservation status:** NSW (*TSC Act*) - Endangered; Commonwealth (*EPBC Act*) – Protected; International (IUCN) – Vulnerable.
3. REPTILES

3.1. TURTLES

Unless otherwise specifically referenced, the following information on turtles was obtained from the Draft Recovery Plan for Marine Turtles in Australia (Environment Australia 1998a).

3.1.1. Green turtle (Chelonia mydas)

Distribution: Green turtles occur worldwide and are found in tropical and subtropical waters, with vagrants extending to higher latitudes (Cogger 2000). In Australia, green turtles live year round in coastal waters from central Western Australia, through the Northern Territory and Queensland to central New South Wales. Breeding is largely restricted to areas north of 27°S (Cogger 2000), and they are most abundant within 1000 km of their nesting beaches. In NSW, they are found in small numbers in coastal waters (Cogger 2000). The species is the most frequently recorded marine reptile (112 records) on the DEC Atlas of NSW Wildlife (20/02/2003). It is probably relatively common in northern NSW waters, from where there are records of mostly unsuccessful nestings (Cogger 2000). A nesting record, near Coffs Harbour was successful (NSW NPWS 2002).

Green turtles have been hunted intensively in the past, except in Australia where it was, and continues to be hunted in relatively small numbers by indigenous communities (Cogger 2000). Recent downward trends in nesting rates for the Queensland stock may be the result of intense hunting pressure in non-Australian waters (Cogger 2000).

General comments: Green turtles inhabit subtidal and intertidal seagrass beds and coral reefs with a good cover of seaweed. Adult turtles feed on seaweeds and seagrasses, whereas immature turtles feed on jellyfish, small molluscs, crustaceans and sponges. They do not form obvious social groups and feed as individuals. Green turtles are long-lived species that become sexually mature after 50 years when they are generally between 91.5–122.5 cm CCL. Adult females breed about every six years. On average, 115 eggs are laid in a clutch. They may migrate up to 2,600 km from feeding grounds in Indonesia, Papua New Guinea, New Caledonia, Fiji, Queensland, Northern Territory, Western Australia and New South Wales to breed and nest in southern and northern Great Barrier Reef, northwest Northern Territory, Gulf of Carpentaria, Western Australia, Coral Sea and Ashmore Reef. Nesting generally occurs from late November to January and earlier in the Northern Territory from July to December. The Australian nesting populations are genetically distinct from those in neighbouring countries. Some green turtles that feed in Australia are part of stocks that breed in other countries and vice versa.

Identified threats: Green turtles are taken as bycatch in trawl fisheries, gill nets, shark meshing operations and can become entangled in trap ropes. Other influences include boat strike, disease, tourism activities, indigenous harvesting and ingestion of fishing line.

Conservation status: NSW (TSC Act) - Vulnerable; Commonwealth (EPBC Act) – Vulnerable; International (IUCN) – Endangered.

3.1.2. Loggerhead turtle (Caretta caretta)

Distribution: Loggerhead turtles are found worldwide, inhabiting tropical and warmer temperate waters, often straying into higher latitudes (Cogger 2000). In Australia, loggerhead turtles live year round in coastal waters from southern Western Australia, through the Northern Territory and Queensland to southern New South Wales. Breeding is largely restricted to areas north of 27°S (Cogger 2000), and they are most abundant within 100 km of their nesting beaches. In NSW coastal waters, they occur in moderate numbers in
the far north and are far less numerous in the southern parts of the State (Cogger 2000). Successful breeding events have been recorded in far northern NSW (NSW NPWS 2002). The eastern Australian population of loggerhead turtles is in severe decline, it has reduced by 86% over the past 23 years to less than 500 breeding females (C. Limpus, Queensland EPA, pers. comm., 2003).

**General comments:** Loggerhead turtles occur within continental shelf waters and forage over coral reef, rocky reef, bay or estuarine habitats. They also forage on the deeper soft-bottomed habitats throughout the coastal waters of the continental shelf. Adult and large immature turtles eat shellfish and crabs, while immature turtles eat sea urchins, jellyfish and sea anemones. They do not form obvious social groups and feed as individuals. They feed off the substrate surface, from within the water column, and at or near the surface on floating prey and discarded trawl bycatch (C. Limpus, Queensland EPA, pers. comm., 2003). They reach sexual maturity at about 30 years or more and grow to an average of one metre in size. On average, 127 eggs are laid in a clutch. Loggerhead turtles migrate 2,600 km from feeding grounds in the Northern Territory, New South Wales and Queensland to traditional nesting sites on the eastern and western Australian coastlines. Some nesting turtles also migrate from as far as Indonesia, Papua New Guinea, Solomon Islands and New Caledonia. Australian nesting populations are genetically distinct from those in other countries. The southern Great Barrier Reef and adjacent mainland near Bundaberg is the breeding centre of the eastern Australian population. Mating occurs from late October to early December, followed by nesting from late October to early March. Breeding and nesting occurs on average every 2-5 years.

**Identified threats:** The loggerhead turtle is threatened by fishing interactions, ingestion of synthetic materials, boat strike, predation at rookeries, disease, coastal development, tourism and indigenous harvesting. Fishing interactions include incidental capture in trawling, gill netting, pelagic long line and shark meshing gear and entanglement in float lines from traps.

**Conservation status:** NSW (TSC Act) - Endangered; Commonwealth (EPBC Act) – Endangered; International (IUCN) – Endangered.

### 3.1.3. Hawksbill turtle (*Eretmochelys imbricata*)

**Distribution:** Hawksbill turtles occur worldwide and are found in tropical and warm temperate waters and often extend to higher latitudes (Cogger 2000). In Australia, they are most abundant within tropical waters of Western Australia, Northern Territory and Queensland. Breeding areas in Australia are restricted to north of 26°S (Cogger 2000). They can be found in small numbers in NSW coastal waters (Cogger 2000). There is possibly one or more resident communities in far northern NSW and no breeding has been recorded in this area (Cogger 2000). Tarvey has noted resident animals around Julian Rocks near Byron Bay (L.Tarvey, NSW DEC, pers. comm., 2003).

Hawksbill turtles were intensively harvested in the past. Australia may have globally significant stocks of this species, considering the pressures it faces in the Asia / Pacific region.

**General comments:** Hawksbill turtles inhabit mostly subtidal and intertidal coral and rocky reef habitats of the continental shelf. They use a parrot-like beak to feed on sponges, seagrasses, algae, soft corals, shellfish, sea squirts and molluscs. They do not form obvious social groups and feed as individuals. Their average shell length is 80 cm. They reach sexual maturity after about 40 years. On average, 130 eggs are laid in a clutch. Breeding females migrate up to 2,400 km from feeding grounds in New South Wales, Northern Territory, Queensland, Western Australia, Indonesia and Papua New Guinea to traditional breeding and nesting sites in tropical Northern Australia. In addition, many migrate to breeding sites in neighbouring countries including Papua New Guinea, Vanuatu, and the Solomon Islands. The Australian nesting populations are genetically distinct from those in other countries. Breeding occurs year round in the Northern Territory population, between January–April in the Torres Strait and the northern Great Barrier Reef populations and between August–November in Western Australia.
Identified threats: The hawksbill turtle is threatened by fishing interactions, ingestion of synthetic materials, boat strike, predation at rookeries and indigenous harvesting. Fishing interactions include incidental capture in trawling and gill netting gear and ghost fishing by lost nets.

Conservation status: NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Vulnerable; International (IUCN) – Critically endangered.

3.1.4. Leatherback turtle (Dermochelys coriacea)

Distribution: Leatherback turtles occur across the world’s tropical waters and adults are frequently recorded from higher latitudes (Cogger 2000). In Australia, adult and large immature leatherback turtles are most regularly encountered in temperate waters of Queensland and Western Australia and in New South Wales, Victoria and Tasmania. Small numbers are found in coastal NSW waters (Cogger 2000). There is possibly one or more resident communities in far northern NSW (Cogger 2000). Breeding events in NSW have been recorded near Ballina in 1993 (Tarvey 1993) and near Forster in 1995, the latter was unsuccessful (NSW NPWS 2002). In Australia, the species may have always occurred in small numbers.

General comments: Leatherback turtles are the largest of the marine turtles, with shells averaging 1.6 metres in length and with a total weight of up to 500 kg. They may reach sexual maturity at around 10 years of age and produce an average of 90 eggs per clutch. They are oceanic and feed on jellyfish and other soft bodied invertebrates within the water column. The major breeding and nesting sites in the Asia / Pacific occur in Indonesia, Malaysia, Papua New Guinea and the Solomon Islands. Animals from these nesting aggregations use the continental waters of Australia to feed and migrate to temperate waters where they feed within the water column. Leatherback turtles rarely nest in Australian waters, there are perhaps fewer than 40 nesting records in total (NSW NPWS 2002). Annual nesting attempts in eastern Australia occur near the Bundaberg coastline and sporadic nesting occurs at other widely scattered sites in Queensland, New South Wales and the Northern Territory.

Identified threats: The leatherback turtle has been incidentally caught in trawling, gill netting and offshore long line fishing gear. They are also occasionally entangled in trap buoy-lines. Ingestion of synthetic materials, predation at rookeries and some indigenous harvesting also threaten the species.

Conservation status: NSW (TSC Act) - Vulnerable; Commonwealth (EPBC Act) – Vulnerable; International (IUCN) – Critically endangered.
3.2. SNAKES

Unless otherwise specifically referenced, the following information on marine snakes was obtained from *The Status of Marine Reptiles in New South Wales* (Cogger 2000).

3.2.1. Yellow-bellied sea snake (*Pelamis platurus*)

**Distribution:** Yellow-bellied sea snakes occur in the tropical and warm temperate regions from the east coast of Africa through the Indian and Pacific Oceans to the west coast of central and northern South America. In Australia, the species is found in tropical and warm temperate waters, extending to higher latitudes in summer. Yellow-bellied sea snakes are common along the whole coast of NSW and occur year round here. Gravid females of the species have been recorded in NSW during winter.

**General comments:** Yellow-bellied sea snakes are a surface-dwelling pelagic species found in the open ocean, large estuaries and coral lagoons. The species is thought to normally occur in deeper waters offshore. It normally dives if approached closely by boat. It typically feeds on small surface fishes, especially juveniles, which are attracted to slicks of floating vegetation and other debris.

**Identified threats:** No threats have been identified for this species.

**Conservation status:** NSW (*TSC Act*) - Protected; Commonwealth (*EPBC Act*) – Protected; International (IUCN) – Not in database.
4. BIRDS

4.1. AVIFAUNA

Unless otherwise specifically referenced, the following information on the birds that commonly occur in the marine, estuarine and coastal regions of NSW was obtained from the Handbook of Australian, New Zealand and Antarctic Birds – Volumes 1 to 4 (Marchant and Higgins 1990, 1993, Higgins and Davies 1996, Higgins 1999).

4.1.1. Musk duck (Biziura lobata)

**Distribution:** The musk duck is endemic to the southeastern and southwestern parts of Australia. It is widespread throughout NSW, mostly in the Murray-Darling Basin.

**General comments:** The musk duck is found on terrestrial wetlands, estuarine habitats and sheltered inshore waters where it prefers deeper waters. They prefer to nest within dense vegetation, and use open water to feed and display. Regular breeding areas in NSW are in the far northeast of the state (north of Grafton) and the Murray-Murrumbidgee valleys. They form flocks in winter and in some areas in summer. The species is rarely on land. They feed by diving to at least 6 m on aquatic invertebrates, a few fish, hardhead ducklings and a variety of aquatic plant material. They usually feed alone, but have been recorded feeding in a group.

**Identified threats:** Threats include capture in fishing nets and the destruction and modification of breeding habitat by drainage, clearing, grazing, burning, increased salinity and increased inundation.

**Conservation status:** NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

4.1.2. Black swan (Cygnus atratus)

**Distribution:** The black swan is endemic to Australia and has been introduced to New Zealand. It is widespread throughout Australia, and is absent from the driest parts of Western Australia and Cape York. It is most common in the eastern and southwestern parts of Australia, occurring elsewhere less regularly or as an occasional vagrant. The species is especially common in southern and eastern NSW.

**General comments:** The black swan occurs in temperate and tropical terrestrial wetlands, sheltered estuarine and maritime habitats. It is a terrestrial and aquatic species that feeds mostly whilst swimming in shallow or deep open water on aquatic plants. They prefer large permanent still clear waters. On the coast, they are common on large salt lakes, coastal lagoons, estuaries, inlets, salt pans and saltmarshes and also occur in bays and other sheltered inshore waters. They breed in fresh, brackish or non-tidal saline wetlands, with the appropriate vegetation and open water requirements. The southern and eastern parts of NSW form part of their main breeding areas. Nesting can occur throughout the year if conditions are favourable. Their use of the underwater habitat is limited to depths reached by up-ending, around 1 m. They are found in pairs, family parties or very large flocks.

**Identified threats:** Threats include the destruction and modification of breeding habitat by drainage, clearing, grazing and burning and predation by feral cats.

**Conservation status:** NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.
4.1.3. **Australian shelduck (Tadorna tadornoides)**

**Distribution:** The Australian shelduck is endemic to Australia and occurs as a vagrant in Norfolk Island and New Zealand. It occurs in the southeastern (mostly south of 30°S) and southwestern (mostly south of 25°S) parts of Australia. In NSW it is widespread in the southern parts of the State, south of a line from the upper Lachlan River to Ivanhoe and Broken Hill. It has also been recorded near Grafton, Newcastle and Macquarie Marshes.

**General comments:** The Australian shelduck can be found on grasslands, croplands, terrestrial wetlands, estuarine waters and occasionally wooded grasslands. It is equally at home in terrestrial and aquatic habitats. They seek an open aspect, including large wetlands with expanses of open water, mudflats or wide beaches. The greatest densities occur on waters near rich dry-land feeding grounds. They are common on estuarine mudflats, salt lakes, coastal lagoons and saltpans and are also found on tidal rivers, saltmarsh and sheltered inland waters. They breed throughout their range between mid-winter and spring. They swim well and rarely dive, on water they feed only where the bottom can be reached from surface. Their diet includes a diverse range of vegetation and insects. They occur solitarily, in pairs or in flocks during the moulting season.

**Identified threats:** This species can be shot during the hunting season.

**Conservation status:** NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

4.1.4. **Pacific black duck (Anas superciliosa)**

**Distribution:** The Pacific black duck occurs in Australia, New Zealand and its surrounding islands. The species occurs extralimitally in Indonesia, New Guinea, the Solomon Islands, New Caledonia, Fiji, Tonga, Samoa, and the Cook and Society Islands. The species can be found throughout Australia, except in the arid regions. It is found throughout NSW, especially the Murray-Darling Basin and northeastern NSW.

**General comments:** The Pacific black duck can be found on temperate and tropical terrestrial wetlands and sheltered estuarine and marine waters. They prefer shallow productive wetlands of low salinity. They are generally less common in saline habitats and may use this habitat more so during periods of drought or the dry season. They are regular on salt pans and estuaries and occur less frequently on coastal lagoons, saltmarshes, the tidal parts of creeks and rivers, and sheltered inshore waters. Breeding occurs throughout its range across a variety of habitats, including almost any wetland type. They feed mostly on plant material and probably also aquatic insects and crustaceans in shallow or deep water, and on wetland shores. They occur in groups, pairs and also large flocks.

**Identified threats:** Threats include the destruction and modification of breeding habitat by drainage, increased salinity, grazing, clearing and burning and shooting during the hunting season.

**Conservation status:** NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

4.1.5. **Grey teal (Anas gracilis)**

**Distribution:** The grey teal is found in Australia and New Zealand and occurs as a vagrant in Indonesia, New Guinea, New Caledonia, the Solomon Islands, Lord Howe Island and Macquarie Island. The species is found throughout Australia, but mostly occurs in the eastern and southwestern regions, including all of NSW.

**General comments:** The grey teal occurs on terrestrial wetlands, sheltered estuarine and marine waters, and occasionally on farm dams in grasslands. The species favours the more productive inland waters when available. Coastal waters, including estuaries, coastal lagoons, inshore waters,
saltmarshes and the tidal reaches of rivers, are used as a non-breeding refuge during the dry season or drought. Breeding occurs mainly south of 20°S on inland habitats. This mainly aquatic species feeds mostly on the seeds of aquatic plants mostly in shallow open water <1m deep. They are found in pairs, family parties or very large flocks.

Identified threats: The destruction or modification of breeding habitat by drainage, increased salinity, clearing, grazing and burning, flood mitigation schemes, and shooting during the hunting season.

Conservation status: NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

4.1.6. Chestnut teal (Anas castanea)

Distribution: The chestnut teal is endemic to Australia, occurring mostly in the southwest and southeast of the continent. It is widespread and locally common in NSW. It also occurs as a vagrant to New Guinea and Lord Howe Island.

General comments: The chestnut teal inhabits terrestrial wetlands and estuarine habitats. The species can tolerate high salinity waters and regularly occurs on estuaries, inlets, mangrove swamps, salt pans, coastal lagoons, saltmarsh and the lower reaches of rivers. It often uses large coastal wetlands as refuges in summer or during the drought. Breeding occurs mainly in coastal regions, on islands or shores in swamps, lakes, coastal lagoons and mangroves. They feed from or just below the surface on seeds, insects, some vegetable material and molluscs and crustaceans in more littoral habitats by dabbling, up-ending or pecking. They can be found in pairs and in small or large flocks.

Identified threats: Threats include habitat destruction and modification by drainage, increased salinity, grazing, clearing and burning, urban and recreational development on estuaries, predation by foxes and shooting during the hunting season.

Conservation status: NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

4.1.7. Hoary-headed grebe (Poliocephalus poliocephalus)

Distribution: The hoary-headed grebe is mostly found in Australia and parts of New Zealand. It occurs in all Australian states, being least common north of 20°S and is generally absent from the central and arid regions. It is commonly found throughout NSW.

General comments: This species occurs on terrestrial and estuarine wetlands throughout temperate to tropical Australia, preferring large open waterbodies 0.5-3.0 m deep, with submerged vegetation. In coastal regions, flocks have been recorded on estuaries, inlets, bays, lagoons, mangrove swamps and more rarely on inshore waters off unindentured shores. In the better-watered parts of southeast Australia, large flocks assemble in bays and estuaries during winter. It breeds throughout southeast and southwest Australia generally from October to January. It feeds throughout daylight mostly on aquatic arthropods, largely by deep diving. Dives normally last 17.5 seconds. This species regularly occurs in groups, from small parties to large flocks.

Identified threats: Artificial regulation on floodwaters may prevent breeding in some areas. The species is also vulnerable to oil slicks in coastal areas.

Conservation status: NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Not protected under this Act; International (IUCN) – Not in database.
4.1.8. Great crested grebe (*Podiceps cristatus*)

**Distribution:** The great crested grebe is found throughout Europe, Africa, Asia and Australasia. It is located throughout most of the eastern half of Australia and in its south west and other scattered locations. In NSW, it is frequently reported in the east and south of the state and is more scattered in the state’s west.

**General comments:** The great crested grebe favours large deep open bodies of freshwater and it can be found on rivers, swamps, lakes, estuaries and bays and occasionally on inshore waters along exposed coasts. Non-breeding concentrations of this species can be found on large saline lakes, estuaries and bays, especially during winter. Breeding occurs on freshwater wetlands. There is some local movement of this species between breeding and non-breeding sites. It mostly feeds on fish, by diving in clear water. It mostly occurs in pairs, but can form flocks.

**Identified threats:** Threatened by increased salinity, grazing, frequent burning, ground-water extraction and reduction of breeding habitat.

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Not protected under this Act; International (IUCN) – Not in database.

4.1.9. Little penguin (*Eudyptula minor*)

**Distribution:** Little penguins, found only in Australia and New Zealand, once ranged from Swan River in Western Australia through Tasmania and up to Moreton Bay in Queensland, and may still occasionally venture that far. They are relatively common in the waters of southern Australia, breeding mainly on offshore islands. In NSW, they are increasingly reported southwards along the coast and there are few reports of the species north of Port Stephens.

**General comments:** Little penguins occur in temperate seas within the summer isotherms of 20°C in the north and 13°C in the south. They generally breed from August to February on the coastal mainland or islands of Australia and New Zealand. Breeding locations in Australia range from Port Stephens in NSW along the eastern and southern coasts, including around Tasmania, and as far north as Fremantle on the west coast. There are approximately 19 breeding locations in NSW. The birds are often found in bays, harbours and estuaries and feed mainly in inshore waters around the mainland coast of breeding islands and also out to the continental shelf and slopes. Observations of little penguins in the Tasman Sea found 2% were over the open ocean, 10% were over the continental slope and 88% were over the continental shelf (Reid *et al.* 2002). Adults tend to remain centred on their breeding colonies throughout the year, while immatures are dispersive. Little penguins appear to be opportunistic feeders, foraging in relatively shallow waters. When feeding their young, they generally do not disperse far from their colonies and their daily foraging range is usually between 10-30 km. They usually feed by pursuit-diving up to depths of 30 m on small shoaling fish or cephalopods, less often crustaceans. Their diet consists mainly of small schooling fish, like anchovies (*Engraulis australis*), pilchards (*Sardinops neopilchardus*), squid (Order *Teuthida*) and to a lesser extent krill. When swimming in search of food, little penguins are unlikely to swim faster than 6km/h. They usually feed singly, occur in pairs within breeding colonies and at sea are either solitary or occur in small groups.

**Identified threats:** Threats include the alteration of breeding habitat, residential development, disturbance, trampling of burrows by cattle, predation of birds by introduced foxes, dogs and cats, oil pollution, plastic pollution, capture in fishing nets, the killing of birds for use as crayfish bait and commercial fishing activities that harvest penguin food resources (NSW NPWS 2000a).

**Conservation status:** NSW (*NPW Act*) – Protected (The population of this species in the Manly Point area is listed as an Endangered Population under the *TSC Act*); Commonwealth (*EPBC Act*) – Protected; International (IUCN) – Not in database.
4.1.10. Southern giant-petrel (Macronectes giganteus)

**Distribution:** The southern giant-petrel has a circumpolar pelagic range from Antarctica to approximately 20°S. During the species’ breeding season, in summer, it is mostly found in Antarctic waters. In winter, its range extends into subtropical waters and it is mostly found north of 50°S. The species is a common visitor off the entire NSW coast, mostly during winter.

**General comments:** Found in Antarctic to subtropical waters, this marine species occurs over both pelagic and inshore waters. Observations of southern giant-petrels in the Tasman Sea found 40% over the open ocean, 43% over the continental slope and 16% over the continental shelf (Reid et al. 2002). Over summer, it nests annually on Antarctic and subantarctic islands, including Heard and Macquarie Islands, Antarctica and South America, with about 30% of the potential breeding population not attempting to breed each year. Adults are present around Antarctic breeding colonies all year, while immatures disperse north during winter. The species is an opportunistic scavenger and predator and feeds mostly on smaller seabirds, cephalopods, krill, fish and animal carcasses, from the surface of the sea and sometimes on land. Very occasionally, the species will dive to shallow depths to capture their prey (Harper 1987). The species regularly attends fishing vessels (NSW Scientific Committee 2001a). They are often solitary at sea or occur in small groups of up to four. However, they will congregate round sources of food, fishing vessels and sewage outfalls.

**Identified threats:** Southern giant-petrels are adversely affected by longline fishing activities (Environment Australia 1998b), the ingestion of or entanglement in harmful marine debris (Threatened Species Scientific Committee 2003), the accumulation of chemical contaminants, predation from cats and rats on breeding islands, habitat degradation from introduced animals on breeding islands, human disturbance and hunting. Within NSW waters, the species is potentially threatened by the loss of southern cuttlefish populations, illegal longline fishing operations and oil spills (NSW Scientific Committee 2001a).

**Conservation status:** NSW (TSC Act) – Endangered; Commonwealth (EPBC Act) – Endangered; International (IUCN) – Vulnerable.

4.1.11. Northern giant-petrel (Macronectes halli)

**Distribution:** The northern giant-petrel is found over the southern oceans generally north of the Antarctic convergence between 30 and 64°S. In summer, the species is usually found south of 40-45°S. It is a regular winter visitor to Australian waters, and occurs offshore in southern waters from Fraser Island in the east to Shark Bay in the west (Environment Australia 1998b).

**General comments:** This marine species occurs mainly in subantarctic, Antarctic and also subtropical waters in winter-spring. Predominantly pelagic, it can also occur on inshore waters. Observations of northern giant-petrels in the Tasman Sea found 18% over the open ocean, 35% over the continental slope and 47% over the continental shelf (Reid et al. 2002). Breeding occurs on subantarctic islands, including Macquarie Island in summer. Juveniles disperse widely during winter and adults are present at colonies and adjacent seas throughout the year. They are an opportunistic scavenger and predator, and commonly follow ships. Males generally feed on the carcasses of penguins, seals and cetaceans, while females obtain live prey at sea including cephalopods, small seabirds and fish. They feed on or near the surface of the sea and dive to depths of 2 m. They congregate around food, when they commonly follow ships, or when washing and preening.

**Identified threats:** This species is incidentally caught by longline fishing operations in Commonwealth waters (Environment Australia 1998b). Ingestion of or entanglement in harmful marine debris also affects this species (Threatened Species Scientific Committee 2003). Predation by cats, rats and skuas at breeding islands and the accumulation of chemical contaminants also affects this species (Garnett and Crowley 2000).
Conservation status: NSW (NPW Act) – Vulnerable; Commonwealth (EPBC Act) – Vulnerable; International (IUCN) – Lower risk, near threatened.

4.1.12. Cape petrel (Daption capense)

Distribution: The southern circumpolar distribution of the Cape petrel extends north to around 24°S. The species is generally confined to between 60-63°S in summer and extends northwards in winter. In Australia, Cape petrels are a regular winter visitor to the southern half of its coast. On Australia’s east coast, they have been recorded south of 27°S.

General comments: In summer, Cape petrels contract towards breeding sites on Antarctica and Antarctic and subantarctic islands and are restricted to inshore and shelf waters in Antarctic and subantarctic seas. During winter, they disperse over pelagic waters across Antarctic, subantarctic and subtropical zones. In Australia they are found both well offshore and inshore. Observations of Cape petrels in the Tasman Sea found 9% were over the continental shelf, 52% over the continental slope and 39% over the open ocean (Reid et al. 2002). They feed during the day or night mainly on krill, cephalopods and fish, mostly from or just below the surface by diving, seizing, plunging, and pursuring, reaching depths of one metre. They can form large flocks when gathering food, but otherwise occur singly or in small groups. They are attracted to sewage outfalls and habitually follow ships to scavenge refuse.

Identified threats: Cape petrels may get caught on longlines, but are usually displaced by larger scavengers and therefore less vulnerable. Predation by cats and rats.

Conservation status: NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

4.1.13. Great-winged petrel (Pterodroma macroptera)

Distribution: The great-winged petrel occurs between the latitudes of approximately 30-60°S from the mid-Atlantic Ocean east to 150°W in the southern Pacific Ocean. In Australia, they occur on all coasts within their range. In the Tasman Sea, they are found between 27-47°S. The great-winged petrel is a common visitor to the NSW coast, where it occurs throughout the year, most frequently between October and April.

General comments: This marine species is widely but sparsely distributed over pelagic subtropical and subantarctic waters. In the Tasman Sea, it may concentrate over intrusions of warm water. Observations of foraging great-winged petrels in the Tasman Sea found 21% over the open ocean, 64% over the continental slope and 15% over the continental shelf (Reid et al. 2002). It breeds during autumn-winter on subtropical and subantarctic islands, none of which are off NSW, on islands off New Zealand and on headlands on mainland New Zealand. It disperses from these islands when not breeding, and can be seen near breeding islands throughout the year. The great-winged petrel feeds at night mostly on cephalopods and some fish and crustaceans, from the sea surface, largely by seizing and dipping, in association with other seabirds. They feed around trawlers usually in tight monospecific groups away from other seabirds. Usually solitary at sea, they can form loose groups at sources of food, and when seas are calm during the day.

Identified threats: This species is incidentally caught on longline fishing gear in Australian waters (Environment Australia 1998b). Predation by cats and rats on some breeding islands are a threat to this species.

Conservation status: NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.
4.1.14. Providence petrel (*Pterodroma solandri*)

**Distribution:** Providence petrel occurs mainly in the subtropical parts of the southwest Pacific Ocean, including the Tasman Sea, however some birds migrate to the north Pacific and Bering Seas. The species can be observed in moderate numbers in the waters off the eastern Australian coast between Fraser Island and southeast Tasmania from March to November. It may also be observed in this area during December to February, although it is generally rare or absent. During this period it appears to be more widely spread in the north Pacific. In NSW, the species occurs along the entire coast, however, it has been recorded most often off the north coast.

**General comments:** This marine, pelagic species occurs on subtropical and tropical waters of the southwest Pacific and in colder waters in the North Pacific. Observations of foraging providence petrels in the Tasman Sea found 87% over the open ocean, 4% over the continental slope and 9% over the continental shelf (Reid *et al.* 2002). It breeds during winter, in dense concentrations on two mountaintops at Lord Howe Island and in smaller colonies on Phillip Island. Adults arrive at their breeding colonies between mid-February and March. It feeds on fish, cephalopods, crustaceans and offal, and favoured feeding grounds are located within the Tasman Sea and along the edge of the continental shelf off the east coast of Australia. Like other members of the gadfly family, this species probably feeds from the water’s surface. They have been observed feeding at night and near fishing boats.

**Identified threats:** The species is threatened from predation by cats and it may be sensitive to the impact of feral pigs and goats.

**Conservation status:** NSW (*TSC Act*) – Vulnerable; Commonwealth (*EPBC Act*) – Protected; International (IUCN) – Vulnerable.

4.1.15. Kermadec petrel (*Pterodroma neglecta*)

**Distribution:** The Kermadec petrel occurs in the subtropical Pacific Ocean between 20 and 35°S, dispersing to the central North Pacific. Breeding colonies are located in the South Pacific Ocean, 25-35°S, from off Lord Howe Island to Juan Fernandez Island. Non-breeding petrels migrate trans-equatorially, with individuals recorded as far north as 28°N in the central Pacific Ocean and 21°N in the eastern Pacific Ocean. The species is a vagrant to the east coast of Australia. Breeding birds from the small colony off Lord Howe Island can be found in the waters off eastern Australia. Three single beachcasts of the species have been recorded from the NSW coastline at Kingscliff, Tuggerah Beach and Jervis Bay in the 1970s. Four birds were recorded off central NSW in 1985 and 1986 (Reid *et al.* 2002).

**General comments:** This marine species is found in tropical and subtropical waters. It breeds during either summer-autumn or spring-summer. Breeding locations include Ball’s Pyramid off Lord Howe Island and Phillip Island near Norfolk Island. Birds disperse from breeding locations during the non-breeding season. Breeding birds from the closest colonies to NSW (Lord Howe and Kermadec Islands) depart from their colonies in April. Very little is known about its diet, it probably feeds on squid and crustaceans. It forages far from its breeding islands and feeds on or just below the water’s surface by seizing or dipping. It is usually solitary at sea.

**Identified threats:** The species is threatened by predation from cats and rabbits on breeding islands and its breeding habitat is sensitive to the impacts of introduced rabbits and goats. Harvesting of eggs by humans is also a threat to this species.

**Conservation status:** NSW (*TSC Act*) – Vulnerable; Commonwealth (*EPBC Act*) – Vulnerable; International (IUCN) – Not in database.
4.1.16. White-necked petrel (*Pterodroma cervicalis*)

**Distribution:** The white-necked petrel occurs within the Pacific Ocean, in its southwest during the breeding season and moving into the north Pacific Ocean during the non-breeding season. During the breeding season, the white-necked petrel occurs around Kermadec Island, Fiji and Tonga and in waters to their south, waters north of New Zealand, and across to the east coast of Australia. In Australia, the species occurs well off the Queensland and NSW coasts, generally between December and April.

**General comments:** In Australia, this marine, pelagic species is observed over and beyond shelf-break waters and is rarely seen from land. It breeds from October to June on Macauley and Kermadec Islands. Their diet is virtually unknown, but they probably feed from the surface on cephalopods by seizing, dipping and pattering. Although typically solitary, they may form flocks at food.

**Identified threats:** The elimination of goats on Macauley Island has removed the threat of habitat damage by the activity of goats.

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Protected; International (IUCN) – Vulnerable.

4.1.17. Black-winged petrel (*Pterodroma nigripennis*)

**Distribution:** The black-winged petrel mostly occurs in the north Tasman Sea and areas extending eastwards into the central southern Pacific Ocean. Within Australia, the species has been sighted in scattered areas along the southern Queensland, NSW and Tasmanian coastline, mostly during summer. In NSW, they have been observed ashore at Muttonbird Island, Byron Bay, Lord Howe Island, Norfolk Island, Newcastle, Cronulla, Batemans Bay, Solitary Island, Wollongong and Eden.

**General comments:** Black-winged petrels are marine, pelagic seabirds of the subtropical and tropical southwest and central Pacific Ocean. Within the Australasian region, they have been observed over warm waters and in cool seas where there were intrusions of warm water. They breed during summer in colonies on tropical and subtropical islands and inlets in the southwestern Pacific Ocean, including Norfolk and Lord Howe Islands. When not breeding, the species migrates from its breeding grounds to the northern and eastern Pacific. While at sea, it is usually solitary, although it does form loose groups of up to 20 when feeding. They are thought to mainly feed on squid and prawns, which they catch by seizing from the surface or shallow diving, often in association with a number of other birds.

**Identified threats:** The species is threatened from predation by cats, rats, pigs and goats on breeding colonies.

**Conservation status:** NSW (*TSC Act*) – Vulnerable; Commonwealth (*EPBC Act*) - Protected; International (IUCN) – Not in database.
4.1.18. Gould’s petrel (*Pterodroma leucoptera leucoptera*)

**Distribution:** Cabbage Tree Island, near Port Stephens (NSW), was thought to be the only breeding site for this endemic species, but some nesting birds were also found on nearby Boondelbah Island in 1995 (NSW NPWS 2000b). The species distribution during its non-breeding season (May–October) is unknown, but it is thought to forage predominantly in the Tasman Sea (NSW NPWS 2000b). Beach washed specimens and sightings at sea extend from the Queensland border south to Eyre on the south coast of Western Australia (NSW NPWS 2000b).

**General comments:** The at sea distribution of this marine, pelagic species is poorly known. Observations of foraging non-breeding Gould’s petrels in the Tasman Sea found 39% over the open ocean, 58% over the continental slope and 3% over the continental shelf (Reid *et al.* 2002). The species is rarely observed at sea less than 10 km from its breeding islands. Adult birds begin arriving at their breeding colony on Cabbage Tree Island from mid to late September, and the fledglings depart the island from late March to early May, and are thought to then remain at sea for several years. They feed off squid, but their diet is otherwise unknown. Like other members of the gadfly group of petrels, the Gould’s petrel is also likely to feed on surface fish and krill (NSW NPWS 2000b). Little is known about their social organisation, they are usually seen singly during the non-breeding period.

**Identified threats:** A successful rabbit eradication program conducted on Cabbage Tree Island has eliminated the previously listed threat of nesting habitat degradation by rabbit grazing activity (NSW NPWS 2000b). Bird-lime trees have not yet been fully removed from Cabbage Tree Island, and the species is still threatened from entanglement in the sticky fruit of this tree (NSW NPWS 2000b). The species is also currently threatened by predation from avian predators, such as ravens and currawongs, and noise disturbance from military jet aircraft activity (NSW NPWS 2000b). This species is also particularly affected by the ingestion of or entanglement in harmful marine debris (Threatened Species Scientific Committee 2003).

**Conservation status:** NSW (*TSC Act*) – Endangered; Commonwealth (*EPBC Act*) – Endangered; International (*IUCN*) – Vulnerable.

4.1.19. Antarctic prion (*Pachyptila desolata*)

**Distribution:** The Antarctic prion is largely found in the southern parts of the Indian and Atlantic Oceans and the Southern Ocean. In the south Pacific, it is rare in its central parts. The species remains between the pack-ice and 50°S during the breeding season and shifts northwards to subantarctic and subtropical regions in the non-breeding season. In Australia, the species is often beachcast along the south coast and, to a lesser extent, the east coast. In NSW, beachcast specimens have occurred along the entire coast between 1970-1976.

**General comments:** The Antarctic prion is a marine, pelagic species occurring in Antarctic, subantarctic and subtropical waters. It breeds between mid October to early April on subantarctic and Antarctic islands that are free of pack-ice in summer. There is one record of breeding on the Antarctic continent. Flocks of many thousands of the species occur near breeding grounds. Observations of Antarctic prions in the Tasman Sea found 84% were over the open ocean, 4% were over the continental slope and 12% were over the continental shelf (Reid *et al.* 2002). The species largely feeds on crustaceans, and smaller amounts of fish, cephalopods and gastropods from or just below the surface by seizing, filtering, dipping and diving. The species has been seen feeding only during the day, in association with other seabirds.

**Identified threats:** Predation by introduced animals on breeding islands. Fishing for krill around subantarctic islands could also threaten this species (Garnett and Crowley 2000).

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Protected; International (*IUCN*) – Not in database.
4.1.20.  **Fairy prion (Pachyptila turtur)**

**Distribution:** The fairy prion has a circumpolar distribution in the subantarctic and subtropical waters of the Southern Hemisphere. It is most abundant in south east Australian, New Zealand and Indian Ocean waters. In Australia, it mostly occurs along the southeast coast and is commonly seen offshore over the continental shelf and in pelagic waters. In NSW, the species is common and has been reported throughout the whole year and is most numerous between June-August. It has been cast upon the entire NSW coast.

**General comments:** The fairy prion is a marine, pelagic species occurring in subtropical and subantarctic waters. It breeds from September-March on subantarctic and subtropical islands in the Southern Hemisphere, including islands in Bass Strait. During the non-breeding season, the species appears to move north into subtropical waters. Observations of fairy prions in the Tasman Sea found 8% were over the open ocean, 9% were over the continental slope and 83% were over the continental shelf (Reid et al. 2002). They feed on or just below the surface, mostly on krill and other small crustaceans with small amounts of fish and pteropods, by seizing, dipping, pattering and plunging. They gather around fishing boats, often in association with other seabirds.

**Identified threats:** Predation by introduced animals on breeding islands and habitat degradation by rabbits threaten this species.

**Conservation status:** NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

4.1.21.  **Streaked shearwater (Calonectris leucomelas)**

**Distribution:** The streaked shearwater is found in the northwest Pacific Ocean off Korea, China and Japan during the Southern Hemisphere winter. During the Southern Hemisphere summer, the species moves into the tropical western Pacific Ocean, mostly to equatorial seas north of New Guinea and some numbers can be found off the south coast of New Guinea. It occurs as a vagrant in the east Pacific Ocean. In Australia, the species is fairly common in the northern seas from Timor to Torres Strait, and is a regular uncommon visitor in the east, at least between Brisbane and Wollongong. The species is uncommon in NSW, but is regularly recorded between late December to April along the north coast south to Wollongong. Usually the species is seen as a single bird, however a group of more than 30 has been sighted off Sydney.

**General comments:** This pelagic species migrates between the northwest and tropical western Pacific Ocean. In northern Australia it occurs over pelagic and inshore waters, usually >18 km from the mainland coast, but elsewhere can sometimes occur closer inshore. It breeds in the Northern Hemisphere on islands off Korea, China and Japan during the Southern Hemisphere winter, and is usually found within 180 km of land during this time. The species feeds from or below the sea surface, but does not completely submerge.

**Identified threats:** There is little information on the threats to this species.

**Conservation status:** NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.
4.1.22. **Wedge-tailed shearwater** (*Puffinus pacificus*)

**Distribution:** The wedge-tailed shearwater is found throughout the tropical and subtropical parts of the Pacific and Indian Oceans. In Australia, the species is a common breeding and non-breeding visitor to the coastal and pelagic waters of eastern and western Australia, and occurs as a vagrant along the northern and southern coastlines. The species is common along the entire coastline of NSW, mostly between August–May, and breeds on 32 coastal islands from Cook Island to Montague Island.

**General comments:** The wedge-tailed shearwater occurs in the offshore, pelagic and inshore parts of tropical and subtropical waters. Observations of sooty shearwaters in the Tasman Sea found 5% were over the open ocean, 78% were over the continental slope and 16% were over the continental shelf (Reid *et al.* 2002). The species breeds throughout its range, mainly on vegetated islands, atolls and cays, and one colony breeds on mainland Australia. In Australia, breeding occurs during summer along the east and west coasts. Of the 32 breeding islands along the NSW coast, the main ones are Muttonbird, Broughton, Montague and Five Islands. Birds leave these islands around April-May. Their diet in Australasian waters is not very well known, but in the tropics they mostly feed on fish, some cephalopods and a few insects, jellyfish and prawns, often in association with other seabirds. Food is taken from the surface and to depths of 2-3 m, by seizing, plunging, pursuing and dipping. In Australia, the species has been observed feeding along junction between inshore and offshore water masses. The species may congregate around food or breeding islands.

**Identified threats:** This species is incidentally caught on longline fishing gear in Australian waters (Commonwealth of Australia 2003). Destruction of breeding habitat and the activity of introduced predators at breeding islands threatens this species.

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Protected; International (IUCN) – Not in database.

4.1.23. **Buller’s shearwater** (*Puffinus bulleri*)

**Distribution:** During their breeding season Buller’s shearwaters occur around the coast of New Zealand extending westward into the Tasman Sea, regularly reaching Australia in small numbers. During the non-breeding season the species disperses over the eastern and northern Pacific Ocean. In Australia, the species has been recorded along the east coast from Queensland to Tasmania, mostly during the breeding season (September–May). Over 39 records between Ballina to Eden recorded from NSW.

**General comments:** Buller’s shearwater is a marine, pelagic species found in subtropical waters. Breeding birds feed in the open waters of the continental shelf along the New Zealand coast, mainly in water greater than 180 m deep. In Australia, the species has been found in inshore waters. The species breeds on islands off New Zealand during summer. It probably feeds mostly on crustaceans and fish, mostly from the surface and often in association with other seabirds, by seizing, filtering, dipping, diving, plunging and pursuing. It can congregate around shoals of fish. Very large flocks commonly seen around breeding grounds.

**Identified threats:** There is little information on the threats to this species.

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Protected; International (IUCN) – Vulnerable.
4.1.24. **Flesh-footed shearwater** (*Puffinus carneipes*)

**Distribution:** The flesh-footed shearwater is a trans-equatorial migrant, widely distributed across the southern Indian Ocean and southwest Pacific Ocean in the breeding season, migrating north of the subtropical convergence to the northern Pacific Ocean and Arabian Sea. They are a breeding and non-breeding visitor to the coastal and pelagic waters of southern Australia, where they are locally common in all months of the year. In NSW, the species is fairly common from September-May mostly in the north east of the state, with breeding birds foraging around Lord Howe Island from August to May. It is scarce at other times of the year and in the southeast of the state.

**General comments:** This pelagic species occurs in subtropical waters mainly over the continental shelves and slopes and occasionally inshore. Observations of flesh-footed shearwaters in the Tasman Sea found 1% were over the open ocean, 88% were over the continental slope and 11% were over the continental shelf (Reid *et al.* 2002). It breeds from late September to May on islands off the western and central coasts of southern Australia, Norfolk Island, Lord Howe Island, New Zealand and Ile Saint-Paul in the Indian Ocean. Individuals recorded in NSW waters can include foraging breeding birds from Lord Howe Island. Their diet is poorly known but probably includes fish and cephalopods. They feed mostly during the day by seizing from the surface or plunging or diving to about 5 m below, often from behind fishing vessels. They forage singly but can congregate around food. They can form rafts off breeding colonies.

**Identified threats:** Threats include longline fishing operations in Commonwealth waters (Environment Australia 1998b), predation by cats, foxes, raptors and skinks at breeding colonies, human disturbance and destruction of nesting sites.

**Conservation status:** NSW (*TSC Act*) – Vulnerable; Commonwealth (*EPBC Act*) – Protected; International (*IUCN*) – Not in database.

4.1.25. **Sooty shearwater** (*Puffinus griseus*)

**Distribution:** The sooty shearwater occurs around the world. The species is found in the Southern Hemisphere during the southern summer where it breeds around New Zealand, southern Australia and southern South America and ranges south to 67°S. In the non-breeding season, the species mostly moves to the Northern Pacific Ocean, but some individuals move into the North Atlantic Ocean or remain in the Southern Hemisphere. In Australia, the species occurs off the southern and southeastern coastlines. The species is a moderately common visitor in NSW and is most numerous between October-February.

**General comments:** The pelagic species is found in subtropical, subantarctic and Antarctic waters. The species mainly occurs in offshore and pelagic waters, but occasionally occurs inshore especially during rough weather. Observations of sooty shearwaters in the Tasman Sea found 35% were over the open ocean, 28% were over the continental slope and 37% were over the continental shelf (Reid *et al.* 2002). It breeds during summer, mainly on subtropical and subantarctic islands. In Australia, it breeds on islands off both NSW and Tasmania. The islands on which the species breeds in NSW are Broughton Island, Little Broughton Island, Cabbage Tree Island, Boondelbah Island, Bird Island, Lion Island, Bowen Island, Montague Island, Muttonbird Island, and Tollgate Islands. It migrates in huge continuous flocks, arriving at breeding colonies in late September and leaving in April. It feeds on a wide variety of pelagic animals including cephalopods, fish and crustaceans, in association with other seabirds. It mostly feeds by diving, from the surface or a height of 3-5 m, and can dive to depths of 70 m (Commonwealth of Australia 2003).

**Identified threats:** This species is incidentally caught on longline fishing gear in Australian waters (Commonwealth of Australia 2003). Introduced predators on breeding islands. Habitat destruction by introduced animals on breeding islands.
Conservation status: NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

4.1.26. Short-tailed shearwater (*Puffinus tenuirostris*)

**Distribution:** The short-tailed shearwater fully migrates through the Pacific Ocean. In the Northern Hemisphere, it is found north of Berring Strait and in the northeast Pacific along the western coast of North America. The species returns to the Southern Hemisphere through the central Pacific Ocean to breed on islands off southern Australia. In Australia, the species occurs as a common breeding visitor in the waters of southern and eastern Australia, at least as far north as 17°S. The species commonly occurs in NSW between September-March, is less common between April-May and is rare during June-July.

**General comments:** When in its breeding range, this species occurs mainly over inshore and offshore continental shelf waters. Observations of short-tailed shearwaters in the Tasman Sea found 2% were over the open ocean, 8% were over the continental slope and 89% were over the continental shelf (Reid et al. 2002). When migrating, it crosses pelagic tropical waters. These waters have a limited food supply and may not be able to sustain the species on its migration, subsequently mass mortality occurs if the species cannot reach the cool productive waters. It breeds from late September to early May on the inshore islands, headlands and promontories of mainland southeastern Australia. In NSW, breeding occurs on Cabbage Tree, Broughton, Little Broughton, Boondelbah, Bird, Martin, Big, Bowen, Brush, Grasshopper, Wasp, Tollgate and Montague Islands. The species arrives suddenly at breeding colonies, in large numbers. In September and October, a continuous stream of migrating birds occurs off eastern NSW and Victoria. After breeding, the migration north occurs from March to May. It feeds on fish, cephalopods and krill from and below the sea surface, diving to depths of 12 m. It feeds in small groups or large flocks, often in association with other seabirds. It can form large rafts in nearby waters when breeding and over feeding patches.

**Identified threats:** This species is incidentally caught on longline fishing gear in Australian waters (Commonwealth of Australia 2003). Modification of breeding habitat and predation by animals introduced to breeding islands.

Conservation status: NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

4.1.27. Fluttering shearwater (*Puffinus gavia*)

**Distribution:** The fluttering shearwater ranges throughout the New Zealand seas and westward to southern Australia, with vagrants occurring in New Caledonia and Vanuatu. In Australia, it is a locally common non-breeding visitor on the southeast coast as far north as 24°S. In NSW, it is locally common between July-February and is rare other months.

**General comments:** The fluttering shearwater is a marine species occurring in subtropical waters frequently on the continental shelf. It occurs commonly inshore, often in harbours, inlets, bays and straits. It is pelagic only when migrating. Observations of fluttering shearwaters in the Tasman Sea found 2% were over the open ocean, 5% were over the continental slope and 92% were over the continental shelf (Reid et al. 2002). It breeds between August-February on coastal islands off New Zealand. It feeds mostly by pursuit-plunging or pursuing prey to depths of greater than 10 m, mostly on fish, particularly pilchards and sprats, and some coastal krill, sometimes in associations with other seabirds. It is usually recorded in flocks and gathers to feed over tidal eddies, current lines and sewage outfalls.

**Identified threats:** Introduced predators at breeding islands threaten this species.

Conservation status: NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.
4.1.28. Hutton’s shearwater (*Puffinus huttoni*)

**Distribution:** Adult Hutton’s shearwaters are found in eastern New Zealand waters and mostly immature birds regularly move to Australian seas where it occurs as an uncommon non-breeding visitor around the entire coast. In NSW, the species is uncommon between September-February and is regular but rare in the other months.

**General comments:** This marine, pelagic species is mainly found in the subtropical waters around New Zealand and Australia. It favours coastal and continental shelf waters and is occasionally found inshore in bays, river mouths, kelp beds beside rocky shores and near beaches. Observations of Hutton’s shearwaters in the Tasman Sea found 4% were over the continental slope and 96% were over the continental shelf (Reid *et al.* 2002). It breeds from August to April in one area on the South Island of New Zealand. It feeds mostly on small fish and krill on or below the sea surface and dives to unknown depths. At sea it may be solitary or occur in groups, it congregates around food.

**Identified threats:** Predation and habitat destruction by introduced animals threaten this species.

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Protected; International (*IUCN*) – Endangered.

4.1.29. Little shearwater (*Puffinus assimilis*)

**Distribution:** The little shearwater has a circumpolar distribution across the Atlantic, Pacific and southern Indian Oceans, generally north of the Antarctic Convergence and reaching 40°N in the Northern Hemisphere. As the species tends to remain in seas near breeding colonies throughout the year, it is reasonably common in seas off southwest and southeast Australia, Kermadec Island and far southeast New Zealand and less common elsewhere in the Australasian region. In NSW, the little shearwater has been recorded along the coast and in breeding colonies on islands off Lord Howe Island and near Norfolk Island (NSW NPWS 1999a).

**General comments:** This pelagic species frequently occurs on continental shelf waters in subantarctic, subtropical and occasionally tropical seas. Observations of little shearwaters in the Tasman Sea found 69% were over the open ocean, 20% were over the continental slope and 11% were over the continental shelf (Reid *et al.* 2002). In the Australian region the species breeds during winter on subtropical and subantarctic islands off south western Australia and New Zealand, including near Lord Howe and Norfolk Islands. It forages far out to sea and feeds on cephalopods, krill and small fish both from the surface and by plunging diving. It can occur singly, in pairs and rarely in flocks.

**Identified threats:** Disturbances on breeding islands by visitors and human habitation and the accidental introduction of feral animals, such as rats, cats and dogs to breeding refuges threaten the species. The species is also vulnerable to the loss of nesting habitat from development and erosion.

**Conservation status:** NSW (*TSC Act*) – Vulnerable; Commonwealth (*EPBC Act*) – Protected; International (*IUCN*) – Not in database.
4.1.30. Wandering albatross (*Diomedea exulans*)

**Distribution:** The wandering albatross has a southern circumpolar distribution over the Antarctic, subantarctic and subtropical waters of the Atlantic, Pacific and Indian Oceans. The species can be found in southern Australian waters throughout the year. It has been recorded along the entire coast of NSW (NSW Scientific Committee 1996) and is most abundant here from mid-June to mid-September. All populations of this species that have been monitored have decreased over the past 20 years (NSW Scientific Committee 1996). The most recent global population estimate of this species is 55,000 individuals, with around 8,500 pairs breeding annually (Gales 1998).

**General comments:** In the Australasian region, this highly dispersive marine species occurs inshore, offshore and in pelagic waters, regularly feeding in sheltered harbours and straits, and has been recorded gathering at sewage outfalls. Observations of wandering albatrosses in the Tasman Sea found 49% were over the open ocean, 45% were over the continental slope and 6% were over the continental shelf (Reid *et al.* 2002). The species breeds every two years on about nine subantarctic and Antarctic islands, including Macquarie Island, during summer. They feed mostly on cephalopods and fish by scavenging, seizing food from the surface, shallow plunging or pursuit plunging, and do most of their hunting at night. The species frequently attends fishing vessels for food (Brothers 1991).

**Identified threats:** Threats to this species include their incidental capture by longline fishing operations in Commonwealth waters (Environment Australia 1998b), harmful marine debris that it ingests or becomes entangled in (Threatened Species Scientific Committee 2003), being shot for bait or to prevent scavenging bait from dropline fishing gear, accumulation of chemical contaminants and human disturbance (Garnett and Crowley 2000). On Macquarie Island, it is affected by an elevated number of Antarctic skuas (Garnett and Crowley 2000).

**Conservation status:** NSW (*TSC Act*) – Endangered; Commonwealth (*EPBC Act*) – Vulnerable; International (*IUCN*) – Vulnerable.

4.1.31. Antipodean albatross (*Diomedea antipodensis*)

**Distribution:** The antipodean albatross only breeds in New Zealand, on Antipodes and Campbell Island (Garnett and Crowley 2000). It occurs across the southern Pacific Ocean, east to the coast of Chile and west to eastern Australia (Garnett and Crowley 2000). This albatross regularly occurs in small numbers off the New South Wales south coast from Green Cape to Newcastle during winter where they feed on cuttlefish (NSW Scientific Committee 2001a).

**General comments:** This species breeds every two years, mostly on Antipodes Island, with a small number of breeding pairs on Campbell Island. Egg laying begins in January (Antipodes Island) and February (Campbell Island), and chicks usually fledge the following year in January and March (Gales 1998). This pelagic species feeds on squid, fish and crustaceans (Garnett and Crowley 2000).

**Identified threats:** Threats to this species include its incidental capture in longline fishing operations in Commonwealth waters (Environment Australia 1998b), harmful marine debris that it ingests or becomes entangled in (Threatened Species Scientific Committee 2003), suffering from colliding with the cables and warps used on fishing trawlers (Gales 1998) and being shot to protect bait (Garnett and Crowley 2000). Within NSW waters, potential threats to the species are the loss of the southern cuttlefish populations, illegal longline fishing and oil spills (NSW Scientific Committee 2001b).

**Conservation status:** NSW (*TSC Act*) – Vulnerable; Commonwealth (*EPBC Act*) – Vulnerable; International (*IUCN*) – Vulnerable.
4.1.32.  **Gibson’s albatross (Diomedea gibsoni)**

**Distribution:** The Gibson’s albatross breeds on three islands around New Zealand and in the subantarctic Auckland Island group. Non-breeding birds are usually found between 30° and 50°S. Males and females of this species forage in different areas, females in the Tasman Sea around 40°S and males further south or in the mid-Pacific Ocean. This species regularly occurs off the NSW coast usually between Green Cape and Newcastle (NSW Scientific Committee 2001).

**General comments:** This species breeds every two years, with most eggs laid between December and January and chicks fledging the following year in January to February (Gales 1998). It feeds pelagically on squid, fish and crustaceans (Garnett and Crowley 2000).

**Identified threats:** Threats to this species include its incidental capture by longline fishing operations in Commonwealth waters (Environment Australia 1998b), suffering from colliding with the cables and warps used on fishing trawlers (Gales 1998), harmful marine debris that it ingests or becomes entangled in (Threatened Species Scientific Committee 2003) and predation by introduced animals at breeding colonies (NSW Scientific Committee 2001c). Within NSW waters, the species is potentially threatened from the loss of southern cuttlefish populations, illegal longline fishing and oil spills (NSW Scientific Committee 2001c).

**Conservation status:** NSW (**TSC Act**) – Vulnerable; Commonwealth (**EPBC Act**) – Vulnerable; International (**IUCN**) – Not in database.

4.1.33.  **Southern royal albatross (Diomedea epomophora)**

**Distribution:** This species is found across the Southern Oceans, from 36°S to 55°S (Environment Australia 2001b). It breeds on four islands around New Zealand (Gales 1998). It is found off southern Australia at all times of the year, especially between July and October, from Byron Bay to southwestern Western Australia (Environment Australia 2001b). In NSW, the species has mostly been recorded around the central coast from Coffs Harbour to Bellambi (Pizzey and Doyle 1985).

**General comments:** Around Australia, this species has mostly been recorded over the continental slope areas (Environment Australia 2001b). The species breeds every two years and lays its eggs in November-December and chicks fledge October-November (Gales 1998). It feeds pelagically, primarily on squid and fish (Garnett and Crowley 2000) by seizing, plunging and near fishing vessels at times.

**Identified threats:** Threat to this species include its incidental capture by longline fishing operations in Commonwealth waters (Environment Australia 1998b), suffering from colliding with the warps and cables used on fishing trawlers (Gales 1998) and harmful marine debris which it ingests or becomes entangled in (Threatened Species Scientific Committee 2003).

**Conservation status:** NSW (**NPW Act**) – Protected; Commonwealth (**EPBC Act**) – Vulnerable; International (**IUCN**) – Vulnerable.

4.1.34.  **Northern royal albatross (Diomedea sanfordi)**

**Distribution:** The species has a circumpolar distribution over the Southern Ocean from 36°S to at least 52°S (Environment Australia 2001b), and is most common in New Zealand and South American waters. It breeds biennially at Chatham Island and Taiaroa Head on New Zealand’s South Island, from November to September (Gales 1998). Non-breeders of all age groups of this species appear to wander widely between breeding seasons (Environment Australia 2001b). In Australia, the species is generally found offshore in southeastern waters from Coffs Harbour in the east to Eyre Peninsula in the west, especially in Tasmanian and South Australian waters (Environment Australia 1998b). The infrequent records of this species in NSW (Environment Australia 2001b) are from off Coffs Harbour to Bellambi (Pizzey and Doyle 1985).
General comments: Observations of northern royal albatrosses in the Tasman Sea found 81% were over the continental slope, 14% over the continental shelf and 6% over the open ocean (Reid et al. 2002). This pelagic species breeds every two years and feeds on squid, fish and crustaceans (Gales 1998) by seizing and plunging. It feeds near fishing vessels at times. Breeding occurs after nine years of age and this species has lived for at least 61 years in the wild (Robertson 1998).

Identified threats: Threats to this species include its incidental capture by longlining fishing activities in Commonwealth waters (Environment Australia 1998b), suffering from colliding with the cables and warps used on trawlers (Gales 1998) and harmful marine debris that it ingests or becomes entangled in (Threatened Species Scientific Committee 2003). When on their breeding islands in New Zealand, northern royal albatrosses are threatened by illegal chick harvesting, nesting habitat degradation and climatic changes which are either drying nests or damaging them through storms (Gales 1998).

Conservation status: NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Endangered; International (IUCN) – Endangered.

4.1.35. Black-browed albatross (Thalassarche melanophris)

Distribution: The black-browed albatross has a circumglobal distribution over the southern oceans. The species forages around its Antarctic and subantarctic breeding islands during its summer breeding season and moves further north when not breeding. In Australia, it occurs along the southern coast from Brisbane to Perth. The species regularly migrates to waters off the continental shelf from May to November and is regularly recorded off the coast of NSW during this time (NSW NPWS 1999b). Sub-adults are observed in Australian waters all year round (Environment Australia 2001b).

General comments: This generally pelagic species inhabits Antarctic, subantarctic and subtropical marine waters. Observations of black-browed albatrosses in the Tasman Sea found 6% were over the open ocean, 75% were over the continental slope and 18% were over the continental shelf (Reid et al. 2002). It breeds annually on Antarctic and subantarctic islands between September and December. It has been observed to reach depths of 2-4 m when taking offal. It feeds on fish, krill, crustaceans, cephalopods and offal, and often forages in flocks with other seabirds. Prey are usually seized from the surface or just below while swimming or landing, and also by submerging themselves by plunging from heights and by scavenging behind fishing vessels. Feeding usually occurs during the day, and occasionally at night. It regularly scavenges behind fishing vessels. The largest flocks of the species occur over eastern boundary currents, continental shelves and slopes. It is usually associated with mixed flocks of other seabirds.

Identified threats: Fishing activities, particularly long-lining, is one of the processes threatening the species, along with disturbance to nesting colonies by introduced predators, and pollution.

Conservation status: NSW (TSC Act) – Vulnerable; Commonwealth (EPBC Act) – Vulnerable; International (IUCN) – Vulnerable.

4.1.36. Campbell albatross (Thalassarche impavida)

Distribution: This species only breeds on Campbell Island, New Zealand. It can be found foraging around New Zealand when breeding and over the temperate shelf waters of New Zealand, southern Australia and the central and western Pacific Islands when not breeding (Gales 1998, Environment Australia 2001b). In Australia, it occurs from the NSW/Qld border in the east to Ceduna South Australia in the west (Environment Australia 1998b).

General comments: This annual breeder returns to its breeding colony in August and successful breeders and chicks depart in April-May (Gales 1998). It feeds pelagically on squid, fish and crustaceans and also follows boats to retrieve offal (Garnett and Crowley 2000).
Identified threats: Threats to this species include its incidental capture in longline fishing operations in Commonwealth waters (Environment Australia 1998b), suffering from colliding with the cables and warps used on fishing trawlers and predation from other seabirds on the breeding islands (Gales 1998).

Conservation status: NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Vulnerable; International (IUCN) – Vulnerable.

4.1.37. Buller’s albatross (Thalassarche bulleri)

Distribution: The Buller’s albatross generally occurs near its breeding sites on Snares and Solander Islands, New Zealand. It may cross the Tasman Sea, even when breeding and also regularly visits Chile and Peru during the non-breeding season. This pelagic species is found off southeastern Australia, between Coffs Harbour and Eyre Peninsula (Gales 1998). In this area the species was formerly regarded as rare but there have been more frequent sightings recently.

General comments: In Australia, this species occurs over inshore, offshore and pelagic waters. Observations of Buller’s albatrosses in the Tasman Sea found 13% were over the open ocean, 69% were over the continental slope and 18% were over the continental shelf (Reid et al. 2002). Adult birds arrive at the breeding colony in December and chicks fledge the colony during late August (Gales 1998). The species mostly feeds on squid and some fish, krill and tunicates and takes its food from or just below the water’s surface by seizing, diving and plunging. The species has been observed in association with fishing boats in New Zealand.

Identified threats: This species is incidentally caught by longline operations in Commonwealth waters (Environment Australia 1998b) and may also suffer from colliding with the cables and warps used on fishing trawlers (Gales 1998).

Conservation status: NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Vulnerable; International (IUCN) – Vulnerable.

4.1.38. Shy albatross (Thalassarche cauta)

Distribution: The shy albatross is endemic to Australia (Environment Australia 2001b). Information on its at-sea distribution is confounded by its recent separation from other closely related taxa. It appears to occur in Australian waters below 25°S from southwest Western Australia to Queensland, mostly around Tasmania and southeastern Australia, where it can be found year round (Environment Australia 2001b). Although uncommon north of Sydney, the species is commonly recorded off southeast NSW, particularly between July and November. Some juvenile and immature individuals can be found in most sub-Antarctic to subtropical waters and have also been recorded in the Northern Hemisphere (Environment Australia 2001b).

General comments: Found mainly in subantarctic and subtropical waters, this species feeds over continental shelf waters, including in bays and harbours. Observations of shy albatrosses in the Tasman Sea found 2% were over the open ocean, 71% were over the continental slope and 27% were over the continental shelf (Reid et al. 2002). Adults seldom venture more than 600 km from their breeding colonies (Environment Australia 2001b). It breeds annually between September and December. Australian breeding locations include Albatross Island, Bass Strait, and Mewstone and Pedra Branca, off southern Tasmania. It feeds on fish, squid, crustaceans and offal using a variety of techniques, including seizing prey from the surface, diving and scavenging behind fishing vessels.

Identified threats: This species is incidentally caught by longline fishing operations in Commonwealth waters (Environment Australia 1998b). This species is shot off Tasmania to reduce bait stealing and for bait and food in South African waters (Garnett and Crowley 2000). Trawl fisheries could also threaten the species if it collides with cables or gets trapped in nets (Garnett and Crowley 2000). Disturbance by introduced predators at breeding colonies, pollution from
plastics, oils and chemicals and avian pox virus also threaten the species (NSW NPWS 1999c, Garnett and Crowley 2000). Commercial overexploitation of food reserves near breeding colonies in Bass Strait could threaten this species in the future (Gales 1998).

**Conservation status:** NSW (*TSC Act*) – Vulnerable; Commonwealth (*EPBC Act*) – Vulnerable; International (IUCN) – Lower risk, near threatened.

### 4.1.39. White-capped albatross (*Thalassarche steadi*)

**Distribution:** The white-capped albatross breeds on five islands in the Auckland and Antipodes Island groups off New Zealand and it generally forages in nearby waters (Gales 1998). Adults are found in New Zealand and southeast Australian waters throughout the year whilst immatures commonly occur off southeast Australia and South Africa (Environment Australia 2001b). In Australia, the species is especially found in waters around Tasmania (Environment Australia 1998b). There is little information on the occurrence of this species in waters off NSW.

**General comments:** The species breeds annually, egg laying starts mid November and young fledglings leave their nests in mid August (Gales 1998). Off Australia, it is found in offshore pelagic waters (Garnett and Crowley 2000). The diet of this species has never been studied, but it is probably composed of squid and fish (Garnett and Crowley 2000).

**Identified threats:** Threats to this species include its incidental capture by longline fishing operations in Commonwealth waters (Environment Australia 1998b), suffering from colliding with the cables and warps used on fishing trawlers (Gales 1998) and the predation of chicks by pigs on one of its breeding islands (Croxall and Gales 1998).

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Vulnerable; International (IUCN) – Not in database.

### 4.1.40. Salvin’s albatross (*Thalassarche salvini*)

**Distribution:** This species breeds on three islands south of New Zealand and one island in the Indian Ocean (Garnett and Crowley 2000). It forages over most of the southern Pacific Ocean, especially off South America, in the Indian Ocean (in small numbers) and sometimes in the South Atlantic Ocean (Garnett and Crowley 2000). It is abundant throughout the year on all continental shelf areas around New Zealand and roams widely in winter (Environment Australia 2001b). Small numbers of non-breeding adults regularly fly across to southeast Australian waters (Environment Australia 2001b).

**General comments:** This species breeds annually, eggs are laid in October and chicks fledge in March-April (Environment Australia 2001b). Breeding adults forage over shelf waters around colonies (Environment Australia 2001b). They probably feed on fish and squid and commonly follow fishing boats (Garnett and Crowley 2000).

**Identified threats:** This species is incidentally caught by longline fishing operations in Commonwealth waters (Environment Australia 1998b) and may also suffer from colliding with the cables and warps used on fishing trawlers (Gales 1998).

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Vulnerable; International (IUCN) – Vulnerable.

### 4.1.41. Indian yellow-nosed albatross (*Thalassarche carteri*)

**Distribution:** This species occurs over both pelagic and inshore waters between 15°S and 50°S (Environment Australia 2001b). It breeds on five islands in the Indian Ocean and is mostly found in the southern Indian Ocean where it is particularly abundant off Western Australia (Garnett and Crowley 2000). It is the most common albatross in the Great Australian Bight and central Bass
Strait and also occurs east off Tasmania and along the east coast of the mainland as far north as Coffs Harbour (Environment Australia 2001b). It is found off NSW between April–November.

**General comments:** Observations of yellow-nosed albatrosses in the Tasman Sea found 32% were over the continental shelf, 65% over the continental slope and 3% over the open ocean (Reid *et al.* 2002). This species breeds annually over eight months, beginning in mid-August (Environment Australia 2001b). Pairs travel to distant, subtropical feeding sites while rearing chicks (Environment Australia 2001b). It feeds on fish and squid, by seizing, diving, plunging and pursuing. It attends fishing vessels (Garnett and Crowley 2000).

**Identified threats:** This species is incidentally caught by longline fishing operations in Commonwealth waters (Environment Australia 1998b). It may also suffer from colliding with the cables and warps used on fishing trawlers (Garnett and Crowley 2000).

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Vulnerable; International (IUCN) – Vulnerable.

### 4.1.42. Sooty albatross (*Phoebetria fusca*)

**Distribution:** This species breeds on islands in the southern Indian and Atlantic Oceans and forages south of 30°S, between southern NSW and Argentina. The species has not been recorded in the Pacific Ocean. In Australian waters the sooty albatross occurs off the south coast from Tasmania to Western Australia. Occasionally, the species is recorded off the NSW coast, north to Grafton (NSW NPWS 1999d). Individuals are generally recorded in Australian waters in winter (NSW NPWS 1999d).

**General comments:** This pelagic species inhabits subantarctic and subtropical marine waters, and is occasionally observed over inshore waters. Observations of sooty albatrosses in the Tasman Sea found 22% were over the open ocean, 75% were over the continental slope or the relatively shallow waters of the Tasman Rise and 3% were over the continental shelf (Reid *et al.* 2002). It breeds every two years on small, isolated, subantarctic islands between August and December. The species feeds on fish, crustaceans, offal and squid by seizing prey from the surface while swimming or by landing on top of prey. It possibly feeds at night and may follow fishing vessels for short periods.

**Identified threats:** This species is incidentally caught by longline fishing operations in Commonwealth waters (Environment Australia 1998b). This species may also suffer from colliding with the warps and cables used on fishing trawlers (Garnett and Crowley 2000). Disturbance on breeding islands from frequent fires and predation by rats and pollution from plastics, oils and chemicals also threaten the species (NSW NPWS 1999d).

**Conservation status:** NSW (*TSC Act*) – Vulnerable; Commonwealth (*EPBC Act*) – Vulnerable; International (IUCN) – Vulnerable.
4.1.43. Wilson’s storm-petrel (*Oceanites oceanicus*)

**Distribution:** In summer, the Wilson’s storm petrel has a circumpolar distribution and is mostly restricted to the Southern Ocean, the south western parts of the Indian and Atlantic Oceans and to 30°S off the western coast of South America. The species migrates north in autumn, crossing the equator in all oceans to 77°N in the Atlantic Ocean, the Persian Gulf in the Indian Ocean and Japan and Washington in the Pacific Ocean. The species is occasionally found in the Southern Ocean over winter. In Australia, the species is mostly found on the edge of the continental shelf from all coasts during autumn. Off the NSW coast, the species is mostly seen on its migration between April-June and September-November.

**General comments:** The Wilson’s storm-petrel is a marine species that breeds between November-May on the Antarctic Continent and surrounding islands and subantarctic islands. It migrates to tropical and subtropical waters in the Northern Hemisphere during the non-breeding season and is found close to breeding islands during the summer breeding season. When migrating, the species is pelagic and in Australia, it mostly occurs on the edge of the continental shelf, however it can occasionally occur inshore. Observations of Wilson’s storm-petrels in the Tasman Sea found 46% over the open ocean, 34% over the continental slope and 20% over the continental shelf (Reid et al. 2002). It largely feeds on pelagic crustaceans, fish and some cephalopods, polychaetes, gastropods and carrion, from the sea-surface or in depths shallower than 10-15 cm by pattering, dipping, seizing, plunging and rarely diving. The species almost never actually alights on water. It congregates with other seabirds around krill, and fishing boats.

**Identified threats:** Rats and cats could possibly predate upon this species on some breeding islands, pesticides and heavy metals are also potential threats to this species.

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Protected; International (IUCN) – Not in database.

4.1.44. White-faced storm-petrel (*Pelagodroma marina*)

**Distribution:** The white-faced storm-petrel largely occurs in the temperate and subtropical regions of the Atlantic, Indian and south Pacific Oceans. In Australia, the species largely occurs around the southern half of the continent and occasionally on the outer Great Barrier Reef. In NSW, it has been recorded along its southern coast, from near Coffs Harbour to Victoria.

**General comments:** The white-faced storm-petrel is a marine pelagic species. It breeds between 30-50°S on islands that are mostly offshore around New Zealand, southern Australia and in the Atlantic Ocean. In NSW, they breed on nine islands, south of Broughton Island near Port Stephens, with most of the population breeding on the tollgate islands off Batemans Bay. They may move to the tropical waters of the Indian and Pacific Ocean in the non-breeding season. Adult birds return to their breeding colonies from mid-August to early October. Observations of white-faced storm-petrels in the Tasman Sea found 7% over the open ocean, 37% over the continental slope and 56% over the continental shelf (Reid et al. 2002). They feed mostly at night from or just below the surface on pelagic crustaceans, small fish and other small surface plankton. They generally do not follow ships. They form large flocks near breeding islands before laying their eggs.

**Identified threats:** They are threatened by predation by feral animals on breeding islands, trampling of burrows by grazing animals, disturbance by tourists and habitat destruction.

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Protected; International (IUCN) – Not in database.
4.1.45. **White-bellied storm-petrel** (*Fregata grallaria*)

**Distribution:** The distribution of the white-bellied storm petrel is poorly understood. The species is found in the subtropical and highly saline tropical Pacific, Atlantic and Indian Oceans, to 42°S. In Australia, the species is thought to occur in the Tasman and Coral Seas between May-October. The continental margin of north and central NSW may be a favoured feeding area of Lord Howe Island breeding birds. In NSW, the species has been recorded on continental shelf waters between Wolli and Nambucca Heads, off Coffs Harbour and off Wollongong.

**General comments:** The white-bellied storm petrel is a marine, pelagic species found in subtropical and tropical waters. The species has also been recorded infrequently in sub-Antarctic waters. It breeds from December to February, on islands and stacks close to the Subtropical Convergence in the southern Atlantic and Pacific Oceans, including the Lord Howe Island group. This is the only area where the species breeds around Australia. In the non-breeding season, it migrates to the tropics. In Australia, the species is recorded in the non-breeding season near the edge of the continental shelf 10 km to 25 km offshore. It feeds on cephalopods and crustaceans from or just below the surface, by dipping and pattering in association with other seabirds.

**Identified threats:** Predation by cats on breeding islands threatens this species. It is also vulnerable to the accidental introduction of rats to their breeding colonies (Garnett and Crowley 2000).

**Conservation status:** NSW (*TSC Act*) – Vulnerable; Commonwealth (*EPBC Act*) – Vulnerable; International (IUCN) - Not in database.

4.1.46. **Red-tailed tropicbird** (*Phaethon rubricauda*)

**Distribution:** The red-tailed tropicbird occurs in the tropical parts of the Indian and Pacific Oceans between 40°N and 40°S. In Australia, the species is found between November-March along the western and northern coasts and in the Coral Sea area, with scattered records along the east and south coasts to around Yorke Peninsula (SA). In NSW, the species has been recorded along the whole coast as far south as Montague Island and occasionally inland.

**General comments:** This pelagic, tropical and subtropical species breeds on islands throughout its range, including Norfolk and Lord Howe Islands, between October and April. When foraging it ventures hundreds of kilometres away from breeding sites. It mostly feeds on fish and cephalopods by deep plunging vertically into the water from a height of 6-10 m. When diving, they remain underwater for an average of 26.6 seconds. They follow ships from the air at an average height of around 40 m. Individuals are generally solitary, but they may flock around breeding sites.

**Identified threats:** Threats include predation by introduced animals and other birds at breeding islands, human interference (including harvesting activity outside of the Australian Territory), urban development and mining activity on breeding islands and poor food supply following El Nino Southern Oscillation events. On Christmas Island the yellow crazy ant also threatens this species.

**Conservation status:** NSW (*TSC Act*) – Vulnerable; Commonwealth (*EPBC Act*) – Protected; International (IUCN) – Not in database.
4.1.47. **Australasian gannet (Morus serrator)**

**Distribution:** The Australasian gannet occurs along the eastern and southern coasts of Australia, across the Tasman Sea, around New Zealand and at Lord Howe and Norfolk Islands. In Australia, the species has a continuous distribution from north of Rockhampton (Qld), around Tasmania, to Steep Point (WA). In NSW, the species is regularly recorded up to 5 km offshore.

**General comments:** The Australasian gannet is a marine species occurring mostly over subtropical and subantarctic waters mostly within the limit of the continental shelf. They can be found close inshore, in bays, harbours and estuaries, around coastal islands, off rocky coasts or shallow beaches. Breeding occurs between July to February mostly on offshore islands, and also on the mainland in New Zealand. Breeding in Australia occurs off Victoria and Tasmania. They largely feed on small fish and occasionally cephalopods by deep- and surface-plunging. They feed during the day, alone or in flocks, mostly in inshore waters both in the shallow and deep parts. They occasionally follow fishing boats for food. They can form groups when feeding or breeding, but are solitary at other times.

**Identified threats:** Threats include disturbance by humans at breeding grounds, fishermen using the birds as bait, and oil spills. Drowning in longline fishing gear, competition with the fishing industry and predation by introduced animals at breeding colonies also threaten this species (Garnett and Crowley 2000).

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Protected; International (IUCN) – Not in database.

4.1.48. **Darter (Anhinga melanogaster)**

**Distribution:** The darter occurs in Africa (south of the Sahara), Madagascar, Iraq, Pakistan, India, Southeast Asia, Indonesia, New Guinea, Australia, and as a vagrant in New Zealand. In Australia, the species is widespread east of a line from Adelaide to Tennant Creek and then Broome. It also occurs around the Port Headland area in northwest WA, and in southwest WA. Darters are widespread in NSW.

**General comments:** Darters are found on terrestrial wetlands and in sheltered coastal waters, mostly in the tropics and subtropics. They are most common on permanent waterbodies with large areas of open water at least 0.5 m deep and something to perch on. They inhabit lakes, reservoirs, rivers, swamps and estuaries, and may occasionally be seen at sea near shore in calm conditions. Breeding occurs widely in the eastern part of its Australian range. They feed mostly on fish, some insects and other aquatic animals such as tortoises, and occasionally vegetable matter, by diving underwater in depths greater than 60 cm. Their dives can last 30-60 seconds. They are usually solitary, but can form groups around food.

**Identified threats:** Habitat modification through clearing, grazing, frequent burning, groundwater extraction and increased salinity.

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Not protected under this Act; International (IUCN) – Lower risk, near threatened.
4.1.49. **Little pied cormorant (Phalacrocorax melanoleucos)**

**Distribution:** The little pied cormorant occurs in Australia, New Zealand, New Guinea, Indonesia and the south west Pacific. The species is widespread across Australia’s inland and coastal waters. The species occurs throughout NSW.

**General comments:** The little pied cormorant can be found in terrestrial wetlands and sheltered coastal waters. The species requires open areas of water to feed with adjacent perching sites, and is able to use smaller areas of open water than other cormorant species. The favoured habitats of this species are the inland freshwater lakes, swamps, rivers, pools, reservoirs and dams. Along the coast, the species tends to remain within sight of land and prefers deep lagoons, sheltered estuaries, bays and harbours. In the coastal zone, they can also use saltmarshes, dune and mangrove swamps and shallow lagoons. They are uncommon on exposed coasts, but occasionally feed close to shore from rock platforms. In Australia, they breed throughout their range mainly in freshwater wetlands and occasionally on offshore islands. They mostly feed on freshwater crayfish, other crustaceans and small numbers of fish, by diving. They usually feed alone, however they can feed in association with other cormorants. They are solitary, but form groups when nesting and sometimes when roosting and feeding.

**Identified threats:** Destruction of habitat is a threat to this species.

**Conservation status:** NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Not protected under this Act; International (IUCN) – Not in database.

4.1.50. **Pied cormorant (Phalacrocorax varius)**

**Distribution:** The pied cormorant is endemic to Australia and New Zealand. In Australia, the species is widespread on the coastal, subcoastal and inland waters of the country, except in the driest desert areas of central Australia. The species is found throughout NSW. On estuaries in northeast NSW, it is most common from July to December and during summer.

**General comments:** The pied cormorant is mainly a marine species and in eastern Australia inhabits coastal waters and terrestrial wetlands. It is associated with large areas of open water, especially permanent waterbodies, that have adjacent perching sites, including trees and bushes, islands, offshore rocks, beaches and sandspits. Along coasts, it is abundant in estuaries, and also occurs in saltfields, mangrove swamps, lagoons, on beaches and rock platforms and over inshore waters along unindented coasts. In Australia, they breed south of 19°S, mostly in coastal and subcoastal areas from Melbourne (Vic) to Eucla (WA) and from Perth to Carnarvon on the west coast. They breed at Avoca Beach, Toukley, Blayney, Lake Menindee and Wyangala Reservoir in NSW. Breeding generally occurs in bays, estuaries, tidal creeks, rocky or sandy offshore islands, and inland areas. They mostly feed on fish and a few crustaceans by pursuit-diving. They sometimes steal fish from nets. They typically feed singly, and roost and breed in colonies.

**Identified threats:** Humans taking eggs for food.

**Conservation status:** NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Not protected under this Act; International (IUCN) – Not in database.
4.1.51. **Little black cormorant (*Phalacrocorax sulcirostris*)**

**Distribution**: The little black cormorant occurs in Australia, New Zealand, Indonesia, New Guinea, and is a vagrant in New Caledonia. In Australia, the species is widespread in coastal and inland waters. The species occurs throughout NSW.

**General comments**: The little black cormorant is found in wetlands and coastal waters. The species is commonly found in larger water bodies that have open areas of water greater than 1 m deep with adjacent perching sites. On mainland Australia, the species is most common on inland waters. Along the coast, it is most abundant in estuaries and deep coastal lagoons, and is also found on shallow coastal lagoons, salt pans and mangrove swamps. It is uncommon in exposed inshore waters, and only occasionally feeds from rock platforms or flies along the coast. It mainly breeds in freshwater vegetated swamps and lakes. It feeds during the day mostly on fish and smaller numbers of freshwater crayfish and other crustaceans by pursuit-diving. It can feed individually or in cooperative flocks.

**Identified threats**: Habitat modification through clearing, grazing, frequent burning, groundwater extraction and increased salinity threatens this species.

**Conservation status**: NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Not protected under this Act; International (IUCN) – Not in database.

4.1.52. **Great cormorant (*Phalacrocorax carbo*)**

**Distribution**: The great cormorant has an almost cosmopolitan distribution, being located in Australia, New Zealand, Eurasia, Iceland, Africa, the northeast coast of North America, Greenland and New Guinea. In Australia, the species is found mainly east of a line from Adelaide to Darwin and southwest Western Australia. It is widespread throughout NSW.

**General comments**: The great cormorant is widespread, occurring in terrestrial wetlands and coastal waters. They are associated with large areas of open water, that have adjacent perching sites, including trees and bushes, offshore rocks, beaches, cliffs, and artificial structures. Along the coast, they are abundant in estuaries and deep coastal lagoons, and also occur in salt pans, mangrove swamps and on rock platforms, beaches and inshore waters on exposed coasts. In Australia, breeding occurs south of 20°S, mainly in the Murray-Darling Basin, on the east coast from Melbourne to Bundaberg and the west coast around Perth. They nest in lakes, swamps, rivers, temporary floodwaters, and also coastal cliffs and offshore islands. They usually feed during the day predominantly on fish in most habitats, in freshwater they occasionally take crustaceans and insects. They feed usually during the day by pursuit-diving and are known to wade in the shallows for food. They are usually solitary, but can flock over food.

**Identified threats**: No threats to this species have been identified.

**Conservation status**: NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Not protected under this Act; International (IUCN) – Not in database.

4.1.53. **Australian pelican (*Pelecanus conspicillatus*)**

**Distribution**: The Australian pelican occurs across Australia, Papua New Guinea, Indonesia, Fiji, and accidentally in New Zealand. In Australia, the species is widespread across coastal and inland waters. The species occurs throughout NSW and is generally not found in desert areas when there is no water.

**General comments**: The Australian pelican can be found in terrestrial wetlands, reservoirs and rivers, estuaries, marine habitats and arid zones after flooding. They are mainly found on open waterbodies, which are free of dense aquatic vegetation and have stretches of open shorelines. The
Description of wildlife species that commonly occur in marine & estuarine waters in NSW

4.1.54. **Least frigatebird (Fregata ariel)**

**Distribution:** The least frigatebird is found in the tropical waters of the Indian, western and central Pacific Oceans, with an isolated population occurring in the Atlantic Ocean, off Brazil. In Australia, the species occurs between 21°N in Western Australia, across the northern half of the coastline to Byron Bay (NSW). Vagrants reaching as far south as Mornington Peninsula (Vic) are often reported after high winds.

**General comments:** The least frigatebird is a marine, pelagic, aerial and tropical species. It is found in the open ocean, close to the continental coast, in inshore waters and occasionally inland flying up to 16 km from sea. It breeds on isolated oceanic islands, sand cays and atolls in tropical zones. It does not breed off the NSW coast. It flies high in the sky, and does not walk or swim. It feeds mostly on fish and some cephalopods, while flying above the surface or dipping just below. It forms groups around food, sometimes in association with other seabirds. It obtains food from other seabirds through aerial piracy.

**Identified threats:** Threats include introduced predators on breeding islands, human disturbance during the nesting period, use of eggs and birds as food by humans and poor food supply following El Nino Southern Oscillation events.

**Conservation status:** NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

4.1.55. **White-faced heron (Egretta novaehollandiae)**

**Distribution:** The white-faced heron occurs throughout Australia, New Zealand the southwest Pacific Ocean, parts of New Guinea and Indonesia and Christmas Island. The species is widespread throughout Australia, excluding the drier desert regions. It is found throughout all of NSW.

**General comments:** The white-faced heron is a tropical and temperate species found in littoral and estuarine habitats and inland wetlands and grasslands. Along the coast they have been found on mudflats, seagrass beds, saltmarshes, mangrove swamps, rocky reefs, beaches and rocky shores. In southern Australia, the species tends to use coastal wetlands as summer-autumn refuges, moving to freshwater habitats at other times of the year. They generally breed in the southwest and southeast of the continent in fresh or saline wetlands with fringing trees. They feed on a wide range of aquatic invertebrates and vertebrates, including crustaceans and fish, by foraging in the shallow...
waters or exposed surfaces of their habitats, by gleaning. They are generally solitary when feeding, but may occasionally flock.

**Identified threats:** No threats to this species have been identified.

**Conservation status:** NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Not protected under this Act; International (IUCN) – Not in database.

### 4.1.56. Little egret (*Egretta garzetta*)

**Distribution:** The little egret occurs in Africa, Europe to Japan and New Guinea, Australia and accidentally in New Zealand. In Australia, the species is widespread through the peripheral parts of the continent from the north west along the northern and eastern coast to Spencer Gulf (SA). The species is found throughout most of NSW.

**General comments:** The little egret can be found in terrestrial wetlands and estuarine and littoral habitats. In Australia, the species regularly uses coastal areas, preferably intertidal mudflats, mangrove-lined estuaries, tidal reaches of watercourses, salt pans and saltmarsh. They also use shallow coastal lagoons, salt lakes and beaches. They breed in fresh, brackish or saline wetlands vegetated with trees. On the coast breeding regularly occurs in mangrove forests. Breeding localities in Australia are scattered throughout its range, and in NSW they breed in the Lismore district, Shortland - Newcastle district, Macquarie Marshes, Chittaway Point and Tuggerah Lakes. They feed on aquatic animals, mostly fish but also frogs and insects, sometimes in association with cormorants, spoonbills and white ibis. They mainly forage in shallow water, and also on shores or exposed flats or banks. They occasionally feed in deeper water by plunging from the air. They can feed singly or in groups of up to 30.

**Identified threats:** Reclamation of tidal land may affect local breeding populations in mangroves.

**Conservation status:** NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

### 4.1.57. Eastern reef egret (*Egretta sacra*)

**Distribution:** The eastern reef egret occurs from east Asia to Australia, New Zealand and south east Polynesia. In Australia, the species has an almost continuous distribution around the mainland coast and islands. The species is found along the whole coast of NSW.

**General comments:** The eastern reef egret is found on marine littoral, and estuarine habitats, islands and atolls. Within its coastal zone, the species prefers the rocky shorelines and reefs of the mainland and is also found on intertidal areas of estuarine mudflats, mangrove-lined shores, tidal reaches of rivers and creeks, beaches of gravel and mud and sandy beaches in sheltered harbours and exposed coasts broken by rocky promontories. The species is assumed to breed throughout its range on islands, rocky islets and coral cays that are near suitable intertidal feeding habitat. They feed mainly on fish, some crustaceans and molluscs in the shallow parts of littoral and estuarine habitats by stalking and stabbing. Feeding mainly occurs at low tide in pools and channels in rock platforms, mudflats and riverbeds. They mostly roost at high tide on dead or living trees, sand spits, banks, rocks and artificial structures. The species can occur singly, in pairs or small groups.

**Identified threats:** Threats include the reclamation of tidal land, deepening of channels and disturbance by power-boats.

**Conservation status:** NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.
4.1.58. **Great egret (Ardea alba)**

**Distribution:** The great egret occurs in Australia, New Zealand, the Americas, Africa, southern Europe, Asia, Indonesia to New Guinea and the Solomon Islands. It is widespread across Australia, excluding the desert regions of the western interior. The species is found throughout NSW.

**General comments:** The great egret occurs in terrestrial wetlands, estuarine and littoral habitats, and moist grasslands. On the coast, the species regularly uses estuarine mudflats as summer-autumn or drought refuges, mangrove swamps, tidal reaches of watercourses, saltmarsh and offshore reefs. They breed in wetlands fringed with vegetation, including mangrove forests on the coast. On the NSW coast they breed near Shortlands Wetland Centre at Newcastle between November to May. They feed on aquatic animals, mostly fish but also frogs, insects and small birds. They forage by wading in open shallow water by scratching and sometimes by plunging from a perch into deep steep-sided waterbodies. They roost in trees in or near wetlands. They are often seen singly, or in small parties or flocks.

**Identified threats:** Destruction of breeding habitat.

**Conservation status:** NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

4.1.59. **Striated heron (Butorides striatus)**

**Distribution:** The striated heron is essentially pantropical. In Australia, it occurs along the northern coast from Shark Bay (WA) to Mallacoota (Vic), including the whole NSW coastline.

**General comments:** This primarily coastal species is found in littoral and estuarine habitats and occasionally nearby terrestrial wetlands. The species is mostly found in mangroves, estuaries, the tidal reaches of rivers, and at low tide, the intertidal flats to forage. It sometimes occurs in other habitats including swamp forest, fringing wetlands, sandy or rocky shores, reefs, saltmarsh, creeks and rivers above tidal influence and coastal floodplains. The species breeds mainly in mangroves throughout most of its range, including along the NSW coast probably between September - December. The species feeds on fish, crabs and other aquatic invertebrates, by foraging in the shallow waters of rivers and lagoons and off steep coastlines. The species usually forages alone.

**Identified threats:** Threats include reclamation of tidal land, and the destruction of mangrove and swamp forest.

**Conservation status:** NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Not protected under this Act; International (IUCN) – Not in database.

4.1.60. **Nankeen night heron (Nycticorax caledonicus)**

**Distribution:** The nankeen night heron is found throughout parts of Indonesia, Micronesia, Philippines, New Caledonia, Australia and New Zealand. It is widespread throughout north, east and southwest Australia. It is found throughout NSW, mostly in the Murray-Darling Basin and coastal and near coastal areas, but is scarce in southeast NSW.

**General comments:** The nankeen night heron is found in littoral and estuarine habitats and terrestrial wetlands and grasslands. It is more commonly an inland species, but is regularly found on mangrove-lined coasts, estuaries and tidal reaches of watercourses. It also occurs on saltmarsh, dunes, coral or rocky reefs, and atolls. Breeding in Australia, occurs in spring and summer mainly throughout the eastern part of its range in the densely vegetated areas of saline or freshwater wetlands, including mangroves, and also on treeless offshore islands. It feeds mostly on aquatic animals, mainly fish but also frogs, freshwater crayfish and insects. However, the species is an opportunist and can take any suitable prey when available including newly hatched sea-turtles,
nestlings, house mice and human refuse. It forages in wetlands or swampy vegetation in still or slow-moving shallow water on exposed shores, banks and flats. The species can also forage in deep water. It occurs in groups from a few to several hundred individuals, but solitary birds may disperse hundreds of kilometres.

**Identified threats:** Destruction of nesting habitats in freshwater wetlands by drainage, clearing, burning, grazing, increased salinity, groundwater extraction and flood-mitigation schemes threatens this species.

**Conservation status:** NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

### 4.1.61. Black bittern (*Ixobrychus flavicollis*)

**Distribution:** The black bittern occurs from Pakistan to south China and south to the Solomon Islands and Australia. In Australia, the species occurs around the coastal and near-coastal areas from about Exmouth Gulf (WA) around northern Australia to Green Cape (NSW) and in southwest WA from Perth to Hopetoun. In NSW the species occurs along the coast, rarely so south of Sydney.

**General comments:** The black bittern occurs in terrestrial wetlands and estuarine and littoral habitats. On the coast, it uses estuaries and the tidal reaches of creeks and rivers. In coastal NSW and Qld it is recorded more often during summer than in winter. It is rarely recorded in the open and is mostly found in the fringing vegetation of waterbodies where it breeds in secluded places. Breeding sites in NSW include the Clarence and Richmond Rivers. It probably feeds mostly on fish and freshwater crayfish at the end of running or still water, usually in permanent wetlands fringed by dense vegetation. The species is usually solitary and forms pairs during the breeding season.

**Identified threats:** Habitat clearing for agriculture, salinisation of rivers, destruction of waterside vegetation and the siltation of wetlands threaten this species.

**Conservation status:** NSW (NPW Act) – Vulnerable; Commonwealth (EPBC Act) – Not protected under this Act; International (IUCN) – Not in database.

### 4.1.62. Australian white ibis (*Threskiornis molucca*)

**Distribution:** The Australian white ibis occurs in Australia, New Zealand, New Guinea, the Moluccas and Solomon Islands. It is widespread along the eastern, northern and southwestern parts of Australia. The species is widespread throughout NSW except in the central west region.

**General comments:** The Australian white ibis occurs in terrestrial wetlands, sheltered marine habitats and grasslands. In coastal areas the species regularly uses estuaries (mainly intertidal mudflats), mangrove swamps, saltpans, saltmarsh, coastal lagoons and beaches. Breeding occurs in all Australian states, except Tasmania, in small to large colonies on fresh, brackish or saline wetlands. Major breeding colonies are located in southern NSW. They feed on small, usually aquatic animals including fish, frogs, freshwater crayfish, crickets, beetles, earthworms, carrion and occasionally snakes. In wetlands they feed in shallow water over soft substrate or on muddy flats and shores by probing and pecking. They can form flocks in terrestrial or aquatic habitats or be solitary in intertidal zones.

**Identified threats:** No threats to this species have been identified.

**Conservation status:** NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.
4.1.63. Royal spoonbill (*Platalea regia*)

**Distribution:** The royal spoonbill can be found in Australia and New Zealand and occurs as a straggler in Indonesia, New Guinea and some Pacific Islands. In Australia, the species mostly occurs throughout the eastern mainland and north of 20°S. It is found through NSW and is more common near the coast than inland.

**General comments:** The royal spoonbill occurs in terrestrial wetlands, sheltered marine habitats and wet grasslands, preferring large areas of water. Along the coast, the species prefers estuaries and inlets and is less common in lagoons, salt pans and saline swamps. They breed throughout their main range, often in freshwater wetlands but also in brackish or saline habitats. Burrill Lake, on the NSW coast, is a known breeding locality for this species. They feed on crustaceans, aquatic insects and fish in water shallower than 0.4 m deep and in coastal areas this includes intertidal mudflats covered with seagrass by dragging, probing, and sweeping. They occur singly or in groups of up to 50, often in association with other birds.

**Identified threats:** Threats include the modification or destruction of wetlands by clearing, grazing, burning, increased salinity, groundwater extraction and invasion by introduced plants, development and recreational activities and disturbance when breeding.

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Not protected under this Act; International (IUCN) – Not in database.

4.1.64. Black-necked stork (*Ephippiorhynchus asiaticus*)

**Distribution:** The black-necked stork occurs in Pakistan, India and Sri Lanka across to Vietnam and the Malaysian Peninsula, New Guinea and Australia. In Australia, the species is widespread mostly near the coast from near Onslow (WA) across northern Australia to northeast NSW. In NSW, the species is more common north of Walgett and Kempsey, with records near the coast being recorded as far south as Nowra.

**General comments:** The black-necked stork occurs in tropical and warm-temperate terrestrial wetlands, estuarine and littoral habitats, and occasionally grassland and wooded lands. It mainly occurs on freshwater wetlands and is less common in coastal areas. In coastal areas, the species can be found on intertidal waters, littoral and estuarine mudflats, bare or saltmarsh-covered flats with fringing mangroves, tidal reaches of creeks and rivers, and beaches and sandbanks along the coast. They are assumed to breed throughout their range north of 30°S, including northeast NSW. Their diet probably consists of fish, crustaceans, and some insects as well as snakes. They forage in fresh or saline waters up to 0.5 m deep by probing and stalking. They occur singly or in pairs.

**Identified threats:** Wetland destruction through drainage, saltwater intrusion, siltation, development and disturbance threaten this species.

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Not protected under this Act; International (IUCN) – Lower risk, near threatened.

4.1.65. Osprey (*Pandion haliaetus*)

**Distribution:** The osprey has a cosmopolitan distribution around the world. Around the Australian coastline its distribution is disjunct, occurring in the north from Broome in WA to the south coast of NSW, in the south from Kangaroo Island to the Great Australian Bight, and from Esperance to Cape Keraudren in the west. In NSW, the osprey occurs primarily along the coast, south to about Wonboyn Lake and is found in greater numbers in the north of the State.

**General comments:** Ospreys are found in littoral habitats, offshore islands, terrestrial wetlands and coastal lands of tropical and temperate Australia. They are predominantly coastal using bays,
estuaries, mangroves, beaches, dunes, cliffs, inshore waters, and coral and rocky reefs. They are not usually observed far from shore at sea. They require extensive areas of clear, open water for fishing, often ranging up into freshwaters of larger rivers. Breeding occurs mainly on the coast or islands. They nest in prominent positions near the ocean or large waterbodies, on rocky headlands, stacks, cliffs, palm trees, in tall dead trees, and on artificial platforms. They feed mostly on fish, clutching them from the surface of the water or diving to less than 1 m, and are able to eat toxic (Diodontidae, Tetraodontidae) and spiny fishes (Balistidae and Acanthuridae). They usually scavenge fish from ashore or take them from the shallows nearby. Offshore fishing is unusual. They also feed on terrestrial vertebrates, seabirds and crustaceans. They are generally seen singly or in pairs, and occasionally in family groups. Osprey are tolerant of human activity, often nesting within or adjacent to urban areas.

**Identified threats:** Over clearing and degradation of water quality are likely to have an adverse impact on the nesting and feeding habitat of ospreys. The species can also be disturbed by tourism activities and become entangled in synthetic fishing nets.

**Conservation status:** NSW (TSC Act) - Vulnerable; Commonwealth (EPBC Act) - Protected; International (IUCN) – Not in database.

### 4.1.66. Brahminy kite *(Haliastur indus)*

**Distribution:** The brahminy kite has a widespread distribution from the Indian peninsula across to southern China, through southeast Asia to New Guinea, the Solomon Islands and Australia. In Australia it is found along the northern coast and offshore islands from Carnarvon (WA) to Myall Lakes (NSW). The species is generally common throughout its Australian range, but is scarce in NSW south of 30°S.

**General comments:** The brahminy kite occurs over marine and estuarine habitats, and in the terrestrial wetlands of tropical and warm-temperate Australia. It is typically found on the coast at inshore ocean waters, islands, coral reefs, beaches, rock platforms, sea-cliffs, estuaries, tidal reaches of rivers, mangroves, saltmarsh and shrubby coastal dunes. There appears to be no major seasonal movement of this species. The species breeds throughout its range, from Barrow Island (WA) to Coffs Harbour (NSW). Nesting mainly occurs along the coast in trees near water. They are scavengers that feed on carrion and live prey, including insects and fish. They have been seen taking fish from beached nets. They mainly occur singly or in pairs.

**Identified threats:** Baits laid to kill wild dogs have sometimes poisoned this species.

**Conservation status:** NSW (NPW Act) - Protected; Commonwealth (EPBC Act) - Protected; International (IUCN) – Not in database.

### 4.1.67. Whistling kite *(Haliastur sphenurus)*

**Distribution:** The whistling kite occurs throughout Australia, the Solomon Islands, New Caledonia and parts of New Guinea. It is widespread throughout mainland Australia, including NSW, but is absent from waterless deserts.

**General comments:** The whistling kite occurs over wooded lands, open country and terrestrial and marine wetlands in tropical and temperate Australia. The species regularly occurs over the open coast, large bays, estuaries, mangroves, sand dunes, beaches, rocky platforms and offshore islands. They sometimes fly over the sea, usually within 50 m offshore. Breeding occurs in the species Australian range, including NSW. They feed mainly on carrion during the non-breeding season and hunt live prey in the breeding season, including small mammals, birds, fish and insects. On the water, they take prey from the surface, without submerging. They are usually seen singly or in pairs, but can also gather into small groups. Populations in southeast and southwest Australia are possibly declining.
Identified threats: The species is susceptible to poisoning during scavenging activity. The destruction and alteration of wetland habitats from clearing, drainage and salinity also threaten the species.

Conservation status: NSW (NPW Act) - Protected; Commonwealth (EPBC Act) - Protected; International (IUCN) – Not in database.

4.1.68. White-bellied sea-eagle (Haliaeetus leucogaster)

Distribution: The white-bellied sea-eagle occurs from India, across to southern China, and south through southeast Asia to New Guinea and Australia. The species occurs around most of the Australian coastline and occasionally well inland along rivers. In NSW, the species occurs along the coast mainly east of 150°E. In the southern half of the state it also occurs across the Great Dividing Range to the Riverina and southwest regions. It can occasionally occur along the Darling River and Macquarie Marshes.

General comments: The white-bellied sea-eagle is found in the marine habitats, terrestrial wetlands and coastal lands of tropical and temperate Australia. It breeds in tall trees near water, but also on cliffs, rock pinnacles and escarpments, on the coast, offshore islands and inland beside large rivers, lakes and swamps. This opportunistic carnivore hunts over large open tracts of water, particularly inshore waters, islands, coral reefs, bays, inlets, estuaries, mangroves and beaches. It feeds on birds, reptiles, fish, mammals, crustaceans and carrion from on or near surface of water, plunging to at least 40 cm depth. It also feeds on fishing offal and beach refuse. They are generally seen singly or in pairs and can congregate where food is abundant. They have been observed feeding on offal discarded from a factory ship.

Identified threats: There are some local extinctions and decline of this species in NSW and Vic, which have largely resulted from the clearing of coastal forest and optimal breeding habitat. The species is also threatened by disturbance when nesting, illegal shooting and poisoning and entanglement in fishing nets.

Conservation status: NSW (NPW Act) - Protected; Commonwealth (EPBC Act) - Protected; International (IUCN) – Not in database.

4.1.69. Peregrine falcon (Falco peregrinus)

Distribution: The peregrine falcon has a cosmopolitan distribution. It is found throughout most of Australia, except its driest parts. The species is widespread in NSW.

General comments: The peregrine falcon occurs over a variety of habitats including wooded and forested lands, open country, terrestrial wetlands, ocean shores, estuaries, mangrove forests and offshore islands. The species rarely occurs over the open ocean, but has been seen returning to land with prey from far out to sea. Breeding occurs throughout its range in Australia. This highly aerial species mainly takes its prey in the air, but also feed on the ground from vegetation or water. The species diet varies with habitat it mainly feeds on birds and occasionally takes rabbits and large insects. The species is usually seen singly or in pairs.

Identified threats: Threats to the species include habitat destruction, removal of nest sites, human disturbance near nest sites, shooting, chemical contamination, and collision with human objects such as cars, fences, wires and windmills.

Conservation status: NSW (NPW Act) - Protected; Commonwealth (EPBC Act) - Protected; International (IUCN) – Not in database.
4.1.70. **Buff-banded rail (Gallirallus philippensis)**

**Distribution:** The buff-banded rail is widespread in southeast Asia, New Guinea, Australia, New Zealand and the South Pacific Islands. In Australia, the species occurs in coastal, subcoastal and riverine regions, and is generally not found far inland. The species is recorded from all regions in NSW, except the upper west of the state.

**General comments:** The buff-banded rail is found on fresh and saline, terrestrial, estuarine and littoral wetlands. In coastal areas the species also occurs on beaches, reef flats, sand banks, saltmarsh and tidal mudflats. Foraging areas include the vegetated margins of wetlands and reef flats. They mostly feed on crustaceans, molluscs, worms, insects and sometimes young plants, seeds and other vegetable matter, fruits, frogs, eggs, carrion and refuse by probing, pecking and stabbing. They are generally found singly, in pairs or family groups.

**Identified threats:** The species is threatened by habitat loss, including that associated with wetland reclamation, introduced animals and being struck by vehicles.

**Conservation status:** NSW (NPW Act) - Protected; Commonwealth (EPBC Act) - Protected; International (IUCN) – Not in database.

4.1.71. **Lewin’s rail (Rallus pectoralis)**

**Distribution:** Lewin’s rail occurs in Indonesia, New Guinea and eastern and southern Australia. It occurs in the coastal regions of NSW from Murwillumbah to the south coast. It is also found in the southern tablelands, south west slopes and riverina regions of NSW.

**General comments:** Lewin’s rails are found in densely vegetated fresh, brackish or saline wetlands. Coastal habitats include tidal creeks and streams, saltmarshes, coastal lagoons and estuaries. They mainly forage close to fringing vegetation in soft mud or shallow water (<5 cm) at the edges of wetlands. Breeding is scattered throughout their range, and occurs in swamps and marshes with low dense concealing vegetation in Victoria and Tasmania. They feed on molluscs, earthworms, arthropods, especially insects and crustaceans, and occasionally frogs and birds eggs by probing, pecking and drilling. They are usually seen singly, in pairs or family groups. They are apparently uncommon in mainland Australia.

**Identified threats:** Threats to the species include habitat destruction, predation from introduced animals, and accidental killing by cars, animal traps and lawn mowers.

**Conservation status:** NSW (NPW Act) - Protected; Commonwealth (EPBC Act) – Not protected under this Act; International (IUCN) – Not in database.

4.1.72. **Australian crake (Porzana fluminea)**

**Distribution:** The Australian crake is endemic to Australia, found only in its southeast and southwest. It is widespread in the coastal and sub-coastal regions of NSW and is also found in the upper and lower western regions, and the Murrumbidgee-Murray basin.

**General comments:** This species is often found in the well-vegetated margins of terrestrial and maritime wetlands. On the coast it can be found in estuaries and tidal creeks. The species forages in the margins of wetlands in shallow (<5 cm) water or in mud or peat amongst fringing vegetation. It feeds on seeds, molluscs, insects, crustaceans and spiders by gleaning, probing and lunging. It occurs alone, in pairs or family groups.

**Identified threats:** Habitat destruction through wetland drainage.

**Conservation status:** NSW (NPW Act) - Protected; Commonwealth (EPBC Act) - Protected; International (IUCN) – Not in database.
4.1.73. **Spotless crake (Porzana tabuensis)**

**Distribution:** The spotless crake can be found in the Philippines, Indonesia, New Guinea, Australia, New Zealand and the South Pacific Islands. The species known distribution in Australia can be described as patchy, except for the southeast and southwest of the country where its distribution appears to be more continuous. The species is found in all districts of NSW, mainly south of 33ºS, records north of this are mostly from the coast and the Darling River Basin.

**General comments:** The spotless crake occurs on terrestrial and littoral wetlands, including tidal creeks and lagoons, usually with continuous blocks of tall emergent reeds, rushes, sedges or other vegetation. The species can be found in saline, brackish or freshwater wetlands. It probably breeds throughout its range in southern Australia. The species forages on mud or in shallow water and feeds on seeds, fruits, shoots of grasses, aquatic plants, insects, molluscs, crustaceans, spiders and carrion by gleaning. The species has been observed alone, in pairs, or in family groups.

**Identified threats:** Threats to the species include habitat destruction, disturbance of nesting sites, predation by introduced animals and death by motor vehicle strike.

**Conservation status:** NSW (NPW Act) - Protected; Commonwealth (EPBC Act) - Protected; International (IUCN) – Not in database.

4.1.74. **Black-tailed godwit (Limosa limosa)**

**Distribution:** The black-tailed godwit can be found in Europe, where it breeds, parts of Asia, Africa, the Middle East, New Guinea, Australia and New Zealand. In Australia, the species is most common between Darwin and Weipa, but is also found in small numbers along much of the Queensland coast south of Cairns, south of Derby in Western Australia, the southeast of South Australia, and mainly around Port Phillip Bay in Victoria. In NSW, there are scattered records of the species along the coast south to Bermagui and in the state’s inland. The Hunter River estuary in NSW is a significant site for the species.

**General comments:** In Australia, the species mainly occurs on the coast in sheltered bays, estuaries and lagoons with large intertidal sandy or muddy shores, and occasionally on rocky coasts. The few inland records of the species have mostly been around shallow freshwater and saline wetlands. This migratory wading bird, that breeds in the Northern Hemisphere, visits Australia in summer, arriving in August and leaving in mid-April. The species forages on intertidal shores by probing in soft mud or shallow water where it feeds on invertebrates, occasionally seeds, and also worms, crustaceans, spiders, fish eggs and tadpoles. The species can occur singly or in small to large groups.

**Identified threats:** Threats to the species include hydrological changes to inland lakes and tourism or agricultural developments reducing coastal and inland habitat areas. Habitat destruction and alteration, destruction of nest sites, disturbance, pollution, introduced predators and hunting have been identified as threats to shorebirds (Priest *et al.* 2002).

**Conservation status:** NSW (TSC Act) – Vulnerable; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.
4.1.75. Bar-tailed godwit (*Limosa lapponica*)

**Distribution:** The bar-tailed godwit breeds in northern Europe and northwest Alaska and can also be found in other parts of Europe, Africa, the Middle East, Asia, Australia, New Zealand and the southwest Pacific Islands. In Australia, the species can be found on most of the coastline and offshore islands and in a few scattered inland locations. The species is widespread along the NSW coast and occurs in a few locations in the state’s inland. The Hunter River estuary and the north coast of NSW are significant sites for this species in NSW.

**General comments:** In Australia, the species is mainly coastal occurring on large intertidal sandflats, spits and banks and less often on mudflats, estuaries, lagoons and bays. It often occurs around seagrass beds, sometimes occurs on saltmarsh and also occurs on sandy ocean beaches and rock platforms. It is rarely found on inland wetlands. This migratory species, which breeds in the Northern Hemisphere, begins to arrive in northern Australia in August and southwest Australia in late August. Individuals on Australia’s east coast depart for their northern breeding grounds from February to mid-April. The species usually forages near the waters edge or in the shallows, although not at high tide and feeds on worms, molluscs, crustaceans, insects, some plant material and also fruit, fish and tadpoles by probing and gleaning. The species can occur in pairs, small groups or large flocks.

**Identified threats:** Habitat destruction and alteration, destruction of nest sites, disturbance, pollution, introduced predators and hunting have been identified as threats to shorebirds (Priest et al. 2002).

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Protected; International (*IUCN*) – Not in database.

4.1.76. Little curlew (*Numenuis minutus*)

**Distribution:** The little curlew breeds in Siberia, occurs as a transient species through Mongolia, China, Japan, Indonesia and New Guinea, and winters mostly in Australia. In Australia, the species is widespread north of 20-21ºS, elsewhere, there are scattered records of the species inland and widespread but scattered records of the species along the east coast. In NSW, the species is mostly found east of the Great Dividing Range from Casino to Greenwell Point. The species was recorded further south once in the Bermagui River.

**General comments:** The little curlew occurs on short dry grasslands and sedgelands which have scattered freshwater pools, occasionally in open woodland and saltmarshes and also in coastal swamps and on the sheltered mudflats or sandflats of estuaries or beaches. This migratory species, which breeds in Siberia, winters in Australia from mid-September to mid-April. The species forages mostly in grasslands, including those around tidal channels, and feeds on insects, seeds and berries.

**Identified threats:** Habitat destruction and alteration, destruction of nest sites, disturbance, pollution, introduced predators and hunting have been identified as threats to shorebirds (Priest et al. 2002).

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Protected; International (*IUCN*) – Not in database.
4.1.77. **Whimberel (Numenius phaeopus)**

**Distribution:** The whimberel breeds in Alaska and northern Europe and Asia. In the non-breeding season it can be found on the coast of the Americas, Africa, the Middle East, India, southeast Asia, New Guinea, west Pacific Islands, Australia and New Zealand. The species is a regular visitor to most of the Australian coastline, more commonly occurring in the north. It can be found along the whole eastern Australian coastline to southern NSW, and has been sighted in inland locations on the odd occasion.

**General comments:** The whimberel mainly occurs on the intertidal mudflats of sheltered coastal areas, lagoons and estuaries. It occasionally occurs on sandy beaches and has sometimes been recorded on rocky platforms and reefs that have been exposed by low tide. This migratory wading bird flies to Australia for the summer (August - April) from its breeding grounds in eastern Siberia. The species feeds from the habitats where it can be found, mainly on worms and crustaceans, and rarely on fish and birds.

**Identified threats:** Habitat destruction and alteration, destruction of nest sites, disturbance, pollution, introduced predators and hunting have been identified as threats to shorebirds (Priest et al. 2002).

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Protected; International (IUCN) – Not in database.

4.1.78. **Eastern curlew (Numenius madagascariensis)**

**Distribution:** The eastern curlew can be found in its breeding grounds in Russia and northeast China. On its migration to Australia and New Zealand it can be found passing through Japan, Korea, southeast Asia and New Guinea. In Australia, the species is widespread along the northern, eastern and southern coastlines. It can be found along the whole NSW coast, and Port Stephens and the Hunter River estuary are internationally important sites for this species.

**General comments:** The eastern curlew occurs on the sheltered coastlines of Australia, especially in estuaries, harbours and lagoons with large intertidal sand- and mudflats and often with seagrass beds. The species occasionally occurs on ocean beaches near estuaries and may also occur on rock platforms and islets. The migratory wading bird spends summer in Australia, before returning to its breeding grounds in Russia and northeast China. The species arrives in Australia from July to the end of August and leaves its shores mostly during March. The species forages on soft sheltered unvegetated intertidal sandflats or mudflats, in saltmarsh, rockpools, and the tideline on ocean beaches by probing. Its diet consists of crabs, small molluscs and insects. It can be found singly, in small groups or occasionally in large flocks.

**Identified threats:** The species is threatened by habitat loss and disturbance and pollution that reduces food availability. Destruction of nest sites, introduced predators and hunting are additional threats identified for shorebirds (Priest et al. 2002).

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Protected; International (IUCN) – Lower risk, near threatened.
4.1.79. Marsh sandpiper (*Tringa stagnatilis*)

**Distribution:** The marsh sandpiper breeds from eastern Europe to eastern Siberia. In the non-breeding season, the species can be found in Africa, the Middle East, India, southeast Asia, New Guinea, Australia and New Zealand. In Australia, the species is distributed throughout the inland and coastal parts of eastern Australia and is also scattered along the western coastline of Australia. Along the NSW coast, the species is sparsely distributed in the north and is more widespread on the central and southern coasts, with the Hunter River estuary being a significant site for the species. It is also widespread throughout parts of inland NSW.

**General comments:** The marsh sandpiper can be found in terrestrial and coastal wetlands of varying salinity, including swamps, lagoons, saltmarshes, estuaries and intertidal mudflats in coastal regions. This migratory wading bird spends summer in Australia (September - April) before returning to its breeding grounds in Europe. The species forages in shallow water, on mudflats or among marshy vegetation at the edge of wetlands by probing and gleaning. Their diet includes insects and molluscs.

**Identified threats:** Habitat destruction and alteration, destruction of nest sites, disturbance, pollution, introduced predators and hunting have been identified as threats to shorebirds (Priest et al. 2002).

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Protected; International (IUCN) – Not in database.

4.1.80. Common greenshank (*Tringa nebularia*)

**Distribution:** The common greenshank breeds in northern Europe and northern Asia. In the non-breeding season, the species can be found in Europe, Africa, Asia, Melanesia, New Guinea, Australia and New Zealand. The species is widespread throughout Australia, except in its driest deserts. It occurs in most coastal regions of NSW, especially the Hunter River which is of significance for the species, and is widespread in western NSW.

**General comments:** The common greenshank occurs in inland wetlands and sheltered coastal habitats of varying salinity. In coastal regions they occur in bays, estuaries and lagoons with large mudflats, saltmarsh, mangroves or seagrass, and less often around tidal pools, rock platforms and sandy beaches. This migratory wading bird spends summer in Australia (August-April) before returning to its breeding grounds in Eurasia. The species forages in soft mudflats, the shallows or fringing vegetation at the edge of wetlands and occasionally on exposed seagrass beds by gleaning and lunging. Their diet includes molluscs, crustaceans, insects and fish and frogs on occasion.

**Identified threats:** Habitat destruction and alteration, destruction of nest sites, disturbance, pollution, introduced predators and hunting have been identified as threats to shorebirds (Priest et al. 2002).

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Protected; International (IUCN) – Not in database.
4.1.81. **Terek sandpiper (Xenus cinereus)**

**Distribution:** The Terek sandpiper breeds across northern Europe and northern Asia. When not breeding, the species can be found in the coastal regions of Africa, the Middle East, India, southeast Asia, New Guinea, Australia and New Zealand. The species occurs around the Australian coastline, mostly along the northern and eastern coastline. In NSW, the species has been recorded from the Northern Rivers region south to Lake Wollumbboola. The north coast of NSW and the Hunter River estuary are significant sites for the species in NSW, the latter being internationally important.

**General comments:** This coastal species prefers intertidal mudflats in sheltered estuaries, bays and lagoons, islets, sandspits and is often seen around mangroves. It also occurs less often on beaches, rocky reefs or platforms. This migratory wading bird spends summer in Australia (August–April / May) before returning to its breeding grounds in the Northern Hemisphere. The species mostly forages on soft wet intertidal mudflats and occasionally on sandy beaches and rock platforms by pecking and lunging. Its diet includes crustaceans, insects, worms and small shellfish.

**Identified threats:** Threats to the species include hydrological changes to estuaries that may modify or remove habitat, tourism or agricultural developments reducing coastal and inland habitat areas, urban and industrial development and disturbance by recreational activities (NSW NPWS 1999e). Additional identified threats for shorebirds are pollution, hunting and introduced predators (Priest et al. 2002).

**Conservation status:** NSW (TSC Act) – Vulnerable; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

4.1.82. **Common sandpiper (Actitis hypoleucos)**

**Distribution:** The common sandpiper breeds in Europe and Asia. The species spends its non-breeding season in Africa, Asia, New Guinea, Australia and New Zealand. In Australia, the species mostly occurs in the north and west. In NSW, the species is widespread east of the Great Dividing Range, and is widely scattered in the western regions of the state.

**General comments:** The common sandpiper occurs in wetlands of varying salinity, both on the coast and inland. It mostly occurs on narrow or steep muddy margins or rocky shores of wetlands, including estuaries. It can also occur on rocky shores, inshore reefs, breakwaters and occasionally ocean beaches. This migratory wading bird spends summer in Australia (July–April) before returning to its breeding grounds in the Northern Hemisphere. The species forages in shallow water and bare soft mud at the edge of wetlands by pecking and gleaning and feeds mostly on molluscs, crustaceans and insects and sometimes on algae, seeds, worms, spiders, fish, frogs and tadpoles.

**Identified threats:** Habitat destruction and alteration, destruction of nest sites, disturbance, pollution, introduced predators and hunting have been identified as threats to shorebirds (Priest et al. 2002).

**Conservation status:** NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.
4.1.83. Grey-tailed tattler (*Heteroscelus brevipes*)

**Distribution:** The grey-tailed tattler breeds in Siberia and spends its non-breeding season in southeast Asia, New Guinea, some Pacific Islands, Australia and New Zealand. The species is recorded along most of the Australian coastline. In NSW, it is more common on the coast north of Sydney, but also occurs as far south as Tilba Lake. The north coast of NSW and the Hunter River estuary are significant sites for this species.

**General comments:** The grey-tailed tattler occurs on sheltered coasts, including bays, estuaries and lagoons, with reefs, rock platforms or intertidal mudflats. The species occurs less often on open sandy beaches or sandbanks. This migratory wading bird spends summer in Australia (late August to mid-June) before moving onto its breeding grounds in Siberia. The species usually forages in shallow water on rocky reefs and platforms and on intertidal mudflats and occasionally on intertidal sandflats by probing. It feeds on polychaete worms, molluscs, crustaceans, insects and occasionally fish.

**Identified threats:** Habitat destruction and alteration, destruction of nest sites, disturbance, pollution, introduced predators and hunting have been identified as threats to shorebirds (Priest et al. 2002).

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Protected; International (IUCN) – Not in database.

4.1.84. Ruddy turnstone (* Arenaria interpres*)

**Distribution:** The ruddy turnstone generally breeds north of 60°S on the coasts of Europe, Asia and North America. During its non-breeding season, the species is found throughout many parts of the world, including Australia where it is widespread around most of the mainland coast and offshore islands. The species is found along the whole NSW coast, including the Hunter River estuary which is a significant site for this species, and occasionally in the state’s inland.

**General comments:** The ruddy turnstone occurs on the exposed rocky reefs, platforms and beaches, sandy beaches and occasionally in the estuaries, bays and lagoons of coastal Australia. The species prefers rockier habitats in southern Australia. This migratory wading bird spends summer in Australia (September-April) before returning to its breeding grounds in the Northern Hemisphere. The species mainly forages in the tidal area of shorelines and feeds on insects, worms, crustaceans, molluscs and occasionally eggs and carrion by digging and probing.

**Identified threats:** Habitat destruction and alteration, destruction of nest sites, disturbance, pollution, introduced predators and hunting have been identified as threats to shorebirds (Priest et al. 2002).

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Protected; International (IUCN) – Not in database.

4.1.85. Great knot (*Calidris tenuirostris*)

**Distribution:** The great knot breeds in Siberia and passes through China, Japan and southeast Asia on its migration to Australia where most of this species spends its non-breeding season. The species occurs throughout most of the Australian coastline and is most common in the north and uncommon to rare further south. The species is sparse on the NSW coast, occurring as far south as Narooma, and is found in the inland of the state on rare occasions.

**General comments:** In Australia, this species occurs within sheltered coastal habitats containing large intertidal sand- and mudflats, including inlets, harbours, estuaries and lagoons. It has also been recorded on ocean beaches, exposed reefs or rock platforms and rarely on inland wetlands.
This migratory wading bird spends summer in Australia (late August–April) before returning to its breeding grounds in Siberia. The species forages on sandy or muddy intertidal flats, usually in shallow water, and occasionally on ocean beaches by jabbing, gleaning, pecking and probing. Its diet includes bivalve molluscs, gastropods, polychaete worms and crustaceans.

Identified threats: Threats to the species include tourism or agricultural developments reducing coastal and inland habitat areas (NSW NPWS 1999f). Other general identified threats to shorebirds include destruction of nest sites, disturbance, pollution, introduced predators and hunting (Priest et al. 2002).

Conservation status: NSW (TSC Act) – Vulnerable; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

4.1.86. Red knot (Calidris canutus)

Distribution: The red knot breeds in parts of northern Europe, northern Asia and northern North America. During its non-breeding season, the species visits most continents, including Australia. The species is mostly found in eastern and southeastern Australia, and is scattered around the other parts of the Australian coastline. The species is widespread along the NSW coast, but there are only few records of the species from Bermagui to the Victorian border. There are also few records of the species from inland NSW.

General comments: In Australia, this species mostly occurs within sheltered coastal habitats containing intertidal mudflats, sandflats and sandy beaches, including estuaries, bays, inlets and lagoons. It also occurs occasionally on sandy ocean beaches and rock platforms. This migratory wading bird spends summer in Australia (August-April) before returning to its breeding grounds in the Northern Hemisphere. The species mostly forages on soft sandy or muddy intertidal flats at low tide, near the waters edge by probing and gleaning. Its diet includes worms, bivalves, gastropods, crustaceans and echinoderms.

Identified threats: Habitat destruction and alteration, destruction of nest sites, disturbance, pollution, introduced predators and hunting have been identified as threats to shorebirds (Priest et al. 2002).

Conservation status: NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

4.1.87. Sanderling (Calidris alba)

Distribution: The sanderling breeds at scattered localities from northern North America to northern Russia. During its non-breeding season, the species almost has a cosmopolitan distribution and can be found in Australia at this time. The species is widespread around coastal Australia. In NSW, the species can be found along the whole coast, however it is more common north of Shoalhaven Heads and Comerong Island. Important sites for the species in NSW include Harrington Inlet and Old Bar at the mouth of the Manning River.

General comments: During their non-breeding season, the sanderling prefers open sandy beaches exposed to open sea-swell, exposed sand bars and spits, and are also found in coastal areas on low beaches of firm sand, near reefs, estuaries and inlets. This migratory wading bird spends summer in Australia (September-April) before returning to its breeding grounds in the Northern Hemisphere. The species forages by probing in the wave-wash zone on sandy beaches, sometimes amongst rotting kelp, as well as at the edges of shallow pools on sandspits and nearby mudflats. Its diet consists of plants, seeds, worms, crustaceans, spiders, insects, jellyfish, fish, larger molluscs and crustaceans.

Identified threats: Threats to the species include hydrological changes to estuaries and similar waterbodies that may modify or remove habitat, and tourism or agricultural developments reducing
coastal and inland habitat areas (NSW NPWS 1999g). Other general identified threats to shorebirds include disturbance, pollution, introduced predators and hunting (Priest et al. 2002).

**Conservation status:** NSW (*TSC Act*) – Vulnerable; Commonwealth (*EPBC Act*) – Protected; International (IUCN) – Not in database.

### 4.1.88. Red-necked stint (*Calidris ruficollis*)

**Distribution:** The red-necked stint breeds in Siberia and Alaska and passes through Japan, Korea, China and southeast Asia when it migrates mostly to Australia for the non-breeding season. In Australia, the species is widespread along most of the coastline, including the whole NSW coast, with sporadic records from the inland regions of all states.

**General comments:** In Australia, the red-necked stint occurs on the intertidal mudflats of sheltered coastal habitats such as bays, lagoons and estuaries. The species is also occasionally found on exposed beaches and sometimes found on rocky shores or reefs. This migratory wading bird spends summer in Australia (August to mid-April) before returning to its breeding grounds in the Northern Hemisphere. This species forages on bare wet intertidal sand and mudflats close to the waters edge, sometimes in very shallow water and amongst kelp on sandy beaches by probing and gleaning. Its diet includes molluscs, gastropods, crustaceans, amphipods, polychaete worms, insects and plants.

**Identified threats:** Habitat destruction and alteration, destruction of nest sites, disturbance, pollution, introduced predators and hunting have been identified as threats to shorebirds (Priest et al. 2002).

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Protected; International (IUCN) – Not in database.

### 4.1.89. Pectoral sandpiper (*Calidris melanotos*)

**Distribution:** The pectoral sandpiper breeds in northern Russia and North America and passes through Central America and the Caribbean when migrating to non-breeding areas in South America. The species can also be found in the tropical Pacific and small numbers regularly visit Australia. The records of the species in NSW are widespread and scattered, on the coast it has been found as far south as Ulladulla.

**General comments:** In Australia, this species occurs on fresh to saline wetlands, mostly on the coast, but occasionally further inland. Coastal habitats include lagoons, estuaries, bays, swamps and saltmarsh. Although South America is the main non-breeding area for this species, small numbers also spend the season in Australia (September–March) before returning to its breeding grounds in the Northern Hemisphere. The species forages on shallow water or soft mud at the edge of wetlands by probing. Its diet consists of algae, seeds, crustaceans, arachnids and insects.

**Identified threats:** Habitat destruction and alteration, destruction of nest sites, disturbance, pollution, introduced predators and hunting have been identified as threats to shorebirds (Priest et al. 2002).

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Protected; International (IUCN) – Not in database.
4.1.90. Curlew sandpiper (*Calidris ferruginea*)

**Distribution:** The curlew sandpiper mostly breeds in northern Siberia. During its non-breeding season it can mostly be found throughout Africa, in Asia, New Guinea, Australia and New Zealand. In NSW, the species is widespread east of the Great Dividing Range, and in the southern inland regions is occasionally recorded in the tablelands and is scattered elsewhere. The Hunter River estuary (NSW) is a significant site for the species.

**General comments:** In Australia, this species mostly occurs on the intertidal mudflats of sheltered coastal areas, including estuaries, bays, inlets and lagoons and is recorded around inland wetlands less often. This migratory wading bird spends summer in Australia (August-April) before returning to its breeding grounds in Siberia. The species mostly forages on mudflats and nearby shallow water and can also forage on exposed reefs and beachcast seagrass or seaweed by probing and gleaning. Its diet consists of worms, molluscs, crustaceans, insects and seeds.

**Identified threats:** Habitat destruction and alteration, destruction of nest sites, disturbance, pollution, introduced predators and hunting have been identified as threats to shorebirds (Priest *et al.* 2002).

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Protected; International (IUCN) – Not in database.

4.1.91. Broad-billed sandpiper (*Limicola falcinellus*)

**Distribution:** The broad-billed sandpiper breeds in scattered locations in northern Europe. During the non-breeding season the species occurs in Africa and Asia and is a rare but regular visitor to New Guinea. It also occurs in Australia during this time, most commonly in the north and northwest coasts and regularly at scattered locations in the south. Small numbers of the species regularly visit the NSW coast between Ballina and Shoalhaven Heads, and the Hunter River estuary is a site of both national and international importance for the species.

**General comments:** In Australia, this species occurs on sheltered coastlines, such as estuaries, harbours, bays and lagoons, with large soft intertidal mudflats. It also occasionally occurs on reefs or rock platforms. This migratory wading bird can spend summer in Australia (August–May) before returning to its breeding grounds in northern Europe. The species forages on exposed mudflats by gleaning and probing, its diet consists of worms, molluscs, crustaceans, insects, seeds and occasionally roots and other vegetation.

**Identified threats:** Habitat destruction and alteration, destruction of nest sites, disturbance, pollution, introduced predators and hunting have been identified as threats to shorebirds (Priest *et al.* 2002).

**Conservation status:** NSW (*NPW Act*) – Vulnerable; Commonwealth (*EPBC Act*) – Protected; International (IUCN) – Not in database.

4.1.92. Beach stone-curlew (*Esacus magnirostris*)

**Distribution:** The beach stone-curlew occurs from the Malay Peninsula, through Indonesia to New Guinea, the Solomon Islands and northern and eastern Australia. They have been recorded around the north coast of Australia and associated islands from Onslow in Western Australia to the Nambucca River in NSW, and rarely southwards to Forster.

**General comments:** This exclusively coastal species occurs on marine littoral habitats, including all types of beaches and offshore islands. Often on beaches around mouths of rivers, beaches associated with mangroves, offshore sand bars, coral atolls, reefs and rock platforms and occasionally in muddy tidal creeks, around coastal lagoons, and sand dunes. Breeding occurs
throughout their Australian range, at the back of sandy beaches, or occasionally on sand banks, islands or the open coast. The breeding season in temperate Australia is from September to November. They forage on large intertidal mudflats, sandflats, sandbanks, and sandspits at low tide. They feed on crabs and other marine invertebrates. They are solitary or occur in pairs or groups of three to four.

General comments: Threats to the species include loss of habitat due to residential and industrial development, human disturbance through beach-combing, boating and 4WD vehicles, predation by raptors, cats and dogs, nest destruction by pigs or high tides, and nest desertion.

Conservation status: NSW (NPW Act) - Endangered; Commonwealth (EPBC Act) - Protected; International (IUCN) – Lower risk, near threatened.

4.1.93. Pied oystercatcher (Haematopus longirostris)

Distribution: The pied oystercatcher is distributed along the entire Australian coastline and offshore islands, and some parts of New Guinea and Indonesia. Most key sites for the species are located in southeast Australia, including The Coorong (SA), Derwent River (Tas) and Corner Inlet (Vic).

General comments: This coastal species can be found on sandy beaches, mudflats, rocky shores and occasionally mangroves. It is rarely recorded away from the shoreline. The species mainly nests on areas of sand, shell-grit or shingle immediately above the high water mark on beaches, sand-bars and margins of estuaries and lagoons. Breeding probably occurs throughout the species range, however there are no breeding records between NE Cape York and Rockhampton. In southern Australia, breeding occurs between September to December. The species feeds on molluscs (including pipis), worms, crabs and small fish. It forages by probing the soft substrates on intertidal mudflats, beaches, saltmarsh, reefs and rocks, mostly at low tide. The species occurs in groups, and nests as a single pair. In November 1987, 58 individual pied oystercatchers were counted along a 76 km stretch of coastline in East Gippsland and southeastern NSW.

Identified threats: Threats to the species include alteration of habitat, human disturbance, destruction of nests and predation by introduced animals.

Conservation status: NSW (TSC Act) - Vulnerable; Commonwealth (EPBC Act) – Not protected under this Act; International (IUCN) – Not in database.

4.1.94. Sooty oystercatcher (Haematopus fuliginosus)

Distribution: Sooty oystercatchers are endemic to Australia and are widespread along the east, west and south coasts, with scattered records from northern Australia. There are thought to be only small numbers of birds in NSW distributed evenly along the coast, although the coastline between Lake Conjola and Lake Tabourie is thought to support more than 1% of the Australian population (Carter 1995).

General comments: They are a strictly marine coastal species, preferring rocky intertidal shorelines with a minimal cover of foliose algae, coral reefs or sandy beaches near intertidal mudflats. They also occasionally forage on oyster leases, but are more common on intertidal rock platforms where they feed on molluscs, crustaceans, ascidians, echinoderms and small fish. When feeding on beaches, they take worms, larvae of seaweed flies and sandhoppers. They nest on offshore islands and rock stacks, often close to rocky coasts, and sometimes on remote headlands, promontories or steep beaches.

Identified threats: No threats have been identified for this species.

Conservation status: NSW (TSC Act) - Vulnerable; Commonwealth (EPBC Act) – Not protected under this Act; International (IUCN) – Not in database.
4.1.95. Pacific golden plover (*Pluvialis fulva*)

**Distribution:** The Pacific golden plover occurs in Alaska, northern Siberia, the Kamchatka Peninsula, northeast Africa, most of Asia, New Guinea, Australia, New Zealand, the Pacific Islands and southern California. In Australia the species mostly occurs along sections of the coastline and is occasionally recorded in more inland regions. The species is widespread along the NSW coast and sporadically occurs in the western parts of the state.

**General comments:** In Australia, the Pacific golden plover is usually found in coastal areas including beaches, mudflats, sandflats, rocky shelves, estuaries, lagoons, saltmarsh, mangroves, seagrass beds, reefs and offshore islands. The species rarely occurs in inland areas. The species is migratory, breeding in the Arctic during the northern summer before moving to more southern Pacific coastlines. When the species arrives on Australia’s east coast it generally moves south and does so from August to November. The species departs Australia to return to the Arctic from mid-February to May. The species mostly feeds on molluscs, worms, insects, crustaceans, spiders and occasionally seeds, leaves, lizards, birds eggs and small fish by gleaning and probing. It can feed alone or in flocks of 100 or more.

**Identified threats:** The destruction of roosting and feeding sites by residential development threatens the species.

**Conservation status:** NSW (*NPW Act*) - Protected; Commonwealth (*EPBC Act*) - Protected; International (IUCN) – Not in database.

4.1.96. Red-capped plover (*Charadrius ruficapillus*)

**Distribution:** The red-capped plover is widespread in Australia, mostly in its southern half. The species has been recorded in all districts in NSW, but is least common on the Tablelands and Western Slopes.

**General comments:** The red-capped plover prefers saline and brackish waters and can be found in littoral, estuarine and terrestrial wetlands. The greatest numbers of the species occurs in arid areas where saltlakes are common. In coastal areas, the species prefers saline wetlands, including saltmarsh, is also found in bays, estuaries, river deltas and lagoons, and is found less often on wide flat sandy ocean beaches. In tidal areas, the species forages near the edge of the water, feeding on annelids, molluscs, small crustaceans and some vegetation. The species possibly breeds throughout its range, mostly on the coast. The movements of this species are poorly known, but it is known to move between the coast and inland wetlands and also between inland wetlands in response to the availability of suitable wetlands and food. The species usually occurs alone or in pairs, but is also found in flocks.

**Identified threats:** Threats to the species include disturbance to breeding birds and habitat destruction from coastal development. A death from the collision with overhead powerlines is known.

**Conservation status:** NSW (*NPW Act*) - Protected; Commonwealth (*EPBC Act*) - Protected; International (IUCN) – Not in database.
4.1.97. **Double-banded plover (Charadrius bicinctus)**

**Distribution:** The double-banded plover is widespread throughout New Zealand and mostly occurs in Australia between the Tropic of Capricorn and the western Eyre Peninsula and occasionally in north Queensland and Western Australia. The species is a regular visitor to Norfolk and Lord Howe Islands and occurs as a vagrant in Fiji, Vanuatu and New Caledonia. The species is widespread along the coastal regions of NSW and has occasionally been recorded in more inland parts of the state.

**General comments:** The double-banded plover can be found in littoral, estuarine and terrestrial wetlands, grassland and pasture. In coastal areas, the species can be found on muddy, sandy and sometimes rocky beaches, coastal sand-dunes, bays, lagoons, shallow estuaries, swamps, saltmarsh, seagrass beds, rock platforms and exposed reefs. The species breeds throughout New Zealand and migrates within New Zealand or to Australia. The species departs New Zealand for Australia in March where it stays until it returns to New Zealand in August and early September. The species feeds on molluscs, insects, crustaceans, spiders and sometimes seeds and fruits. The species in Australia generally occurs in flocks.

**Identified threats:** None of the threats identified for this species occur in Australia.

**Conservation status:** NSW (NPW Act) - Protected; Commonwealth (EPBC Act) - Protected; International (IUCN) – Not in database.

4.1.98. **Lesser sand-plover (Charadrius mongolus)**

**Distribution:** The lesser sand-plover occurs in scattered parts of central and northeast Asia when breeding and when not breeding in southeast Siberia, Japan, China, southeast Asia, New Guinea, Australia, southwest Pacific islands, and on the coastline around the Indian Ocean. The species occurs around the entire coastline of Australia but is most abundant in the Gulf of Carpentaria and along the east coast of Queensland and northern NSW. In NSW, important sites for the species include Port Stephens, Harrington Inlet and the Clarence and Richmond Rivers. The species is rare on the south coast of NSW.

**General comments:** The lesser sand-plover is a migratory wading bird that breeds in eastern Siberia, southern Mongolia, western China and the Himalayas in the Northern Hemisphere during its summer and migrates south to the coasts of eastern and southern Africa, the Middle East, India, Southeast Asia and Australia during the northern winter. The species arrives in Australia from August to October, with maximum numbers occurring at most sites during December, and departs for its breeding grounds from March to May. Some birds are known to remain in northern Australia during its breeding season. The lesser sand-plover is usually a coastal species occurring in such littoral and estuarine environments as sheltered bays, harbours and beaches with large intertidal sandflats or mudflats, sandy open beaches, rock platforms, saltmarsh and mangroves. On rare occasions the species can also be found inland around terrestrial wetlands. The species mostly forages on freshly exposed intertidal sandflats, mudflats and beaches where it mostly feeds on molluscs, polychaete worms, crustaceans and insects by pecking.

**Identified threats:** Threats to the species include hydrological changes to the Clarence and Richmond Rivers and tourism or agricultural developments reducing coastal and inland habitat areas (NSW NPWS 1999h).

**Conservation status:** NSW (TSC Act) - Vulnerable; Commonwealth (EPBC Act) - Protected; International (IUCN) – Not in database.
4.1.99. **Greater sand-plover (Charadrius leschenaultii)**

**Distribution:** The greater sand-plover is a migratory wading bird that occurs in central Asia where it breeds and in the coastal areas in eastern and southern Africa, the Middle East, India, Southeast Asia, New Guinea, the Solomon Islands, Australia and New Zealand in the non-breeding season. In Australia, the species occurs in scattered locations along the coast, more commonly on the western and northern coasts. In NSW, the species has been recorded in coastal areas from the northern rivers region south to Shoalhaven Heads, with the majority of birds recorded in the Clarence and Richmond Rivers.

**General comments:** The greater sand-plover is almost an entirely coastal species occurring mainly on sheltered sandy, shelly or muddy beaches with large intertidal mudflats or sandflats, sandy estuarine lagoons where it feeds and occasionally on inshore reefs, rock platforms, small rocky islands and sand cays. The species can be found on Australia’s shores throughout the year, however more so during summer. When migrating it arrives on the east coast from September to November and most birds have generally left Australia by the end of April. The species diet includes molluscs, worms, crustaceans and insects, by pecking, gleaning and probing.

**Identified threats:** Threats to the species include hydrological changes to the Clarence and Richmond Rivers and tourism or agricultural developments reducing coastal and inland habitat areas (NSW NPWS 1999i).

**Conservation status:** NSW (TSC Act) - Vulnerable; Commonwealth (EPBC Act) - Protected; International (IUCN) – Not in database.

4.1.100. **Hooded plover (Thinornis rubricollis)**

**Distribution:** The hooded plover is endemic to southern Australia and is found along the coast from Jervis Bay to the western Eyre Peninsula in South Australia, along the coast of Tasmania, the Bass Strait Islands and from 30°S on the Western Australian coast to the western edge of the Great Australian Bight. Occasional strays are recorded as far north as Sydney, but the most important sites for the species in NSW are on the south coast. Sussex Inlet, particularly on Bhaveerre and Cudmirrah Beaches, is though to support the highest density of hooded plovers, followed by the coastline between Lake Conjola and Lake Tabourie (Carter 1995).

**General comments:** The hooded plover occurs on sandy beaches, especially broad flat ones backed by sparsely vegetated sand dunes, and inland salt lakes. The species is occasionally found on tidal bays and estuaries, rock platforms, exposed reefs near sandy beaches, and small beaches among cliffs. The species forages in the wave wash zone or among seaweed at high-tide. Its diet includes polychaete worms, molluscs, crustaceans, insects, waterplants and seeds. It feeds by gleaning and probing. Breeding occurs throughout its range, eggs are laid in a depression in the sand. The species occurs singly, in pairs, family groups or small groups.

**Identified threats:** Threats to the species include artificially high populations of silver gulls around human settlements leading to increased predation by foxes and raptors, loss of habitat due to development for housing and recreation, human disturbance during the summer breeding season, particularly four-wheel driving along sand dunes and beaches, and destruction of nests by stock (NSW NPWS 1999j).

**Conservation status:** NSW (TSC Act) – Endangered; Commonwealth (EPBC Act) - Protected; International (IUCN) – Lower risk, near threatened.
4.1.101. Masked lapwing (*Vanellus miles*)

**Distribution:** The masked lapwing occurs in New Guinea, Australia, New Zealand, locations in Indonesia and as a vagrant in the Solomon Islands. The species is widespread throughout northern and eastern Australia and occurs throughout NSW.

**General comments:** The masked lapwing can be found in a wide range of natural and modified open habitats that are usually near water, preferring short-grassed areas. The species can also be found in intertidal mudflats, estuaries, coastal lagoons, sheltered embayments, beaches and occasionally rock platforms. The species is not migratory, but does move in response to the availability of wetlands. Breeding occurs from June to December in southern Australia, including the eastern and southern parts of NSW. Nests are formed on the ground in short grass or bare, stony or sealed ground, often near water. The species feeds on molluscs, worms, insects, crustaceans and occasionally seeds, leaves and frogs by probing, pecking and gleaning.

**Identified threats:** The species is threatened when its nests and eggs are destroyed by stock and lawn mowers, and introduced animals and road works disturb nesting birds. Collision with motor vehicles and aircraft also threaten the species.

**Conservation status:** NSW (NPW Act) - Protected; Commonwealth (EPBC Act) - Protected; International (IUCN) – Not in database.

4.1.102. Brown skua (*Catharacta lonnbergi*)

**Distribution:** The great skua has a circum polar breeding distribution in the Southern Hemisphere, mostly on subantarctic islands. During the non-breeding season (winter) only a few individuals stay on their breeding islands, and the species has been recorded off southern Africa, Australia, New Zealand and South America. The species regularly visits Australia, and on the east coast has been recorded as far north as Sandy Cape in Queensland. The species is widespread in the western Tasman Sea. Off NSW, the species is most widespread off Seal Rocks to Eden, however there are also a few records from between Ballina and Coffs Harbour.

**General comments:** The great skua mostly breeds on subantarctic islands. While some birds stay on these islands during the non-breeding season, others occupy neritic or pelagic zones and less often inshore waters. Off central NSW, 65% of the sightings of this species were in offshore waters. The species has been recorded off Wollongong from April to September. The species is an opportunistic scavenger and predator and feeds on eggs, young adult birds, crustaceans, molluscs, fish, small mammals, carrion and offal. When following ships, the species flies 10-15 m above the water, seizes the food in the air and lands on the water well away from the ship to eat.

**Identified threats:** No threats to this species have been identified.

**Conservation status:** NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

4.1.103. South polar skua (*Catharacta maccormicki*)

**Distribution:** The south polar skua can be found around Antarctica, where it breeds. The non-breeding distribution of this species is not well known, however it does cross the equator during this time, reaching the northern parts of the Indian, Pacific and Atlantic Oceans. There are only few adequately described records of the species in waters off Australia. It appears to be distributed around the southern half of Australia, and the species has been recorded between Ballina and Eden off the NSW coast.

**General comments:** The south polar skua breeds mainly on the Antarctic coast. Outside Antarctic waters the species is generally offshore or pelagic and is occasionally recorded inshore. Off
southern Australia, the species has been recorded over waters 92 m and 166 m deep. This trans-equatorial migrant moves north during the austral summer, passing through Australian waters in autumn and spring. The species often forages in the open sea, plunging from heights of 3-6 m to take food from just below or on the surface of the water. Its diet includes eggs, young and adult birds, fish, molluscs and krill.

**Identified threats:** No threats to this species have been identified.

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Protected; International (IUCN) – Not in database.

### 4.1.104. Pomarine jaeger (*Stercorarius pomarinus*)

**Distribution:** The pomarine jaeger breeds in North America and Russia. The species has a wide non-breeding distribution over the Atlantic, Indian and Pacific Oceans. In the Pacific Ocean, the species is recorded off the coast of the Americas, around Hawaii, in the southwest Pacific, southeast Asia, New Guinea, Australia and New Zealand. Around Australia, the species is mostly found off the southeast. It is the most abundant skua in waters off NSW, and is widespread off most of the coast, especially from Coffs Harbour to Green Cape. It has also been recorded in the southwest Tasman Sea, between Eden and Gascoyne seamount.

**General comments:** The pomarine jaeger occurs in tropical and subtropical seas during the non-breeding season. Off Australia, the species is most common in offshore waters along the edge of the continental slope and is uncommon inshore. It is sometimes recorded in sheltered bays and off major estuaries on the coast. The species occurs off eastern Australia when the East Australian Current is strongest and the water temperature has risen. It occurs off NSW between October to May. The species that commonly feeds while sitting on the surface of the water, can also feed in the air by stealing food from other birds, and readily feeds from trawlers and refuse thrown overboard from ships. On its non-breeding grounds, this opportunistic predator and scavenger mainly feeds on fish.

**Identified threats:** No threats to this species have been identified.

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Protected; International (IUCN) – Not in database.

### 4.1.105. Arctic jaeger (*Stercorarius parasiticus*)

**Distribution:** The Arctic jaeger has a circumpolar breeding distribution in the Northern Hemisphere. During the non-breeding season, the species can be found off the Pacific and Atlantic coasts of South America, off the west coast of Africa, in Australasian waters and uncommonly off the coast of the Middle East. The species can be mostly found off southeast Australia, and smaller numbers regularly occur in the southwest. Off NSW, the species is widespread along much of the coast, and has mostly been recorded off Sydney.

**General comments:** Most sightings of the species off southeast Australia are over the continental shelf, mostly in inshore waters. Although generally uncommon in the open sea, the species has also been recorded over the continental slope in southeast Australia. It also occasionally occurs around estuaries, particularly bays and harbours, however it rarely occurs on intertidal sand- or mudflats. The occurrence of this migratory species coincides with the strongest flow of the East Australian Current and the associated warmer water. The species arrives in waters off NSW in October-November and departs these waters to return to its breeding grounds in May. The species almost exclusively feeds in the air by stealing food from other birds, can also feed from the surface of the water and often follows ships to feed from refuse. The species is a scavenger and opportunistic predator and mainly feeds on fish, carrion, young birds, eggs, plant material, molluscs, crustaceans, insects and small mammals.
Identified threats: No threats to this species have been identified.

Conservation status: NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

4.1.106. Long-tailed jaeger (*Stercorarius longicauda*)

Distribution: The long-tailed jaeger has a circumpolar breeding distribution in the Northern Hemisphere. During its non-breeding season, the species is mostly found in the South Atlantic, although some individuals may spend this period in the South Pacific Ocean off South America, the central Pacific and Australasia. Small numbers of the species regularly visit the waters off southeast Australia, especially the Tasman Sea, during summer. Off NSW, the species is regularly recorded off Ballina, Sydney and Wollongong and it has also been observed off Coffs Harbour and Merimbula.

General comments: During the non-breeding season, this marine species is rarely found inshore and mostly occurs in offshore and pelagic waters. Off southeast Australia, the species has mostly been recorded over the continental slope. This migratory species occurs off eastern Australia from September to May before it moves onto its breeding grounds in the Northern Hemisphere. At sea, the species probably feeds from the surface of the water or in the air when it steals food from other birds. When inshore it can feed along the tideline. There is little information on the species diet in the Australian region, it has been recorded taking fish at sea. On its breeding grounds it feeds on rodents, plant material, worms, molluscs, crustaceans, spiders, insects, fish, young birds, eggs and carrion.

Identified threats: No threats to this species have been identified.

Conservation status: NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

4.1.107. Pacific gull (*Larus pacificus*)

Distribution: The Pacific gull is endemic to southern Australia and is mostly found along the southern and western coasts and infrequently on the east coast. In NSW, the species is recorded along the coast from Sydney south. It was once common near Sydney in the 1920s, however it is now considered rare in the region.

General comments: The Pacific gull occurs on sandy and less often on rocky coasts and often occurs on offshore islands. The species usually occurs close inshore and rarely far offshore. In eastern Australia, it prefers protected areas such as bays, inlets, estuaries and lagoons. The species sometimes also occurs on mudflats and inland regions. It breeds on offshore islets and stacks, sometimes on rocky shores and less often on sandy islets or sandflats. The species usually forages between the high-water mark and shallow water (<20 cm) on sandy beaches, exposed mudflats, rocky platforms and reefs. It sometimes feeds in inshore waters where it follows ships and fishing boats, and also on the shore where fish are cleaned. This predator and scavenger feeds on molluscs, echinoids, fish, birds and other marine animals, carrion and tide-line wrack. The species is usually seen singly or in pairs and rarely in large groups.

Identified threats: The species is easily disturbed by human activity near its breeding sites and occasionally becomes entangled in fishing line.

Conservation status: NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.
4.1.108. Kelp gull (*Larus dominicanus*)

**Distribution:** The kelp gull can be found south of the Antarctic convergence, on most subantarctic islands, off the southern parts of South America and Africa, in New Zealand and on the Australian coastline, mainly on the southern and south eastern coasts. Most records in NSW are from the Illawarra region, south to Shoalhaven Heads and also along the South Coast as far south as Congo. The species is occasionally recorded in northeast NSW from Ballina to Myall Lakes and is found more often on the central coast. There is also one record of this species at sea, around 12 km from Eden.

**General comments:** The kelp gull occurs in Antarctic to subtropical zones. In Australia, the species is almost always found on the coast, mostly in sheltered harbours, bays, inlets, estuaries, sandy or rocky beaches, mudflats and banks and rock platforms. It also often occurs on offshore islands. The species generally stays within sight of land and rarely ventures >10 km offshore, unless it follows a boat beyond the continental shelf. It breeds on the coast and breeding sites in NSW include Flinders, Bass and Martin Islands. The species forages on land or in water, in either inshore waters or the intertidal zone, and can pick food from a depth of 0.7 m. It also feeds around trawlers and other ships, mostly in inshore waters. This opportunistic predator and scavenger feeds on molluscs, fish and crustaceans.

**Identified threats:** This species occasionally becomes entangled in fishing line and is shot illegally.

**Conservation status:** NSW (*NPW Act*) – Protected; Commonwealth (*EPBC Act*) – Protected; International (IUCN) – Not in database.

4.1.109. Silver gull (*Larus novaehollandiae*)

**Distribution:** The silver gull is mostly found in Australia and New Zealand and most of its outlying islands. The species is widespread through most of Australia. It is found throughout NSW and its offshore islands, mainly on the coast but also throughout the inland of the state.

**General comments:** In Australia, the species occurs on sandy and rocky coastal beaches, rocky reefs, rock platforms, mudflats, banks and shoals, in sheltered bays, harbours, inlets and estuaries, in urban and developed areas, lakes, terrestrial wetlands and agricultural regions and also at some sites in the highlands and arid interior. The silver gull usually occurs on inshore waters at sea and occasionally in the neritic zone. Off Wollongong (NSW), during winter, the species may occur well beyond the continental shelf, but from September to April it generally occurs <10 km from the shore. The species breeds on the coast, including offshore islands, headlands and beaches, and in terrestrial wetlands. Main breeding sites for the species along the NSW coast are at Big, Montague, Moon, Bass and Martin Islands. The species obtains much of its food from human sources, scavenging wherever scraps, offal or refuse is available, and it has increased its range and numbers where the human population has increased, especially around urban centres. The species follows fishing boats and parties and feeds on their discards. When feeding on intertidal beaches, the species forages on sand, in clumps of beachcast seaweed and sometimes in water <5 cm deep. When foraging at sea, the species generally stays close inshore around the breakers, although it can also forage further out to sea, especially if following boats. It can take food from, or a few centimetres below the surface of the water, either while swimming or flying close to the water. It can rarely dive to depths of approximately 30 cm. This species is an opportunistic scavenger and feeds on many things including human domestic and industrial organic waste, insects, small birds, worms, carrion, fish, crustaceans, eggs, placental remains of fur-seals, spiders and reptiles. It can also be a pelagic planktivore. The species most commonly occurs in groups.

**Identified threats:** Predation of eggs by introduced animals and human disturbance around breeding colonies threaten this species.
Conservation status: NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

4.1.110. Gull-billed tern (Sterna nilotica)

Distribution: The gull-billed tern occurs in North and South America, Europe, Africa, Asia and Australia and breeds at scattered sites on all these continents. It is widespread in Australia. In NSW, it is common east of the Great Dividing Range as far south as the Shoalhaven River and is also found in the western regions of the state.

General comments: The gull-billed tern prefers shallow terrestrial wetlands and also occurs in sheltered coastal bays, estuaries, tidal sand or mud flats or beaches. It usually breeds on large inland lakes. No breeding colonies are known on coastal NSW.

The species takes food from the water’s surface or exposed sand or mud flats near the edge of the water by hawking and dipping. This carnivorous species feeds on insects, fish, small vertebrates and occasionally young waterbirds. It is usually observed singly or in small parties.

Identified threats: No threats to this species have been identified.

Conservation status: NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

4.1.111. Caspian tern (Sterna caspia)

Distribution: The Caspian tern breeds at widely scattered sites in North America, Europe, Africa, Asia, Australia and New Zealand. The species is widespread around the Australian coastline and the inland parts of eastern Australia. In NSW, the species is widespread east of the Great Dividing Range, mainly in coastal regions, and is also widespread throughout parts of the western regions of the state.

General comments: The Caspian tern mostly occurs in sheltered coastal habitats, including lagoons, inlets, bays and estuaries, usually those with sandy or muddy margins. At sea, it usually occurs in sheltered areas, especially near islands. The species can also occur on terrestrial fresh or saline wetlands. The species usually forages in open wetlands, preferring the sheltered shallow waters, and in open coastal waters. Its diet almost entirely consists of fish and it feeds by shallow-plunging. It breeds on low islands, spits, banks, beaches and less often on terrestrial wetlands. It occurs singly, in pairs or small parties and sometimes in flocks.

Identified threats: Destruction of nest sites, predation of chicks by introduced animals, entanglement in fishing nets and illegal shooting threaten this species.

Conservation status: NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

4.1.112. Crested tern (Sterna bergii)

Distribution: The crested tern is widespread around the coasts of the Indian Ocean and the western central Pacific Ocean. It occurs around the whole Australian coastline, including the whole NSW coast, and is rarely recorded up to 150 km inland.

General comments: The crested tern mostly occurs on coastal regions on exposed ocean beaches, offshore islands, and in sheltered bays, harbours, inlets, estuaries and lagoons. It also regularly occurs in pelagic waters. It forages from the surface of the sea to 1m deep, mainly in inshore waters and often close to beaches and island shores. Occasionally it can forage well out to sea and may feed from boats beyond the continental shelf. It also forages in estuaries and sheltered inlets, sometimes over seagrass beds. Its diet mainly consists of fish and occasionally prawns and squid.
and it feeds by plunging. It has been observed feeding from fishing nets and prawn trawl bycatch. It breeds on islands, banks of sand or rocks. North Solitary Island and Montague Island are the larger breeding colonies of this species in NSW. The species is generally seen singly, in pairs or small groups and occasionally in larger groups.

Identified threats: The species can be disturbed by human activity near breeding colonies, and is killed from predation by cats and dogs and occasionally from collisions with wires or light-towers.

Conservation status: NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

4.1.113. White-fronted tern (*Sterna striata*)

Distribution: The white-fronted tern is found around the New Zealand coast and southeast Australia. In Australia, the species is only found off the southeast coast and is widespread along much of the NSW coast, from Kingscliff to Green Cape and less often on the north coast.

General comments: The white-fronted tern occurs on coastal seas, exposed rocky coasts often with islands or stacks, and the sandy beaches of sheltered bays, estuaries and lagoons. Off Wollongong (NSW), the species has been mostly recorded on offshore and pelagic seas than on inshore waters. In Australia, the species only breeds in Tasmania. It forages from or just below the water’s surface by plunging, in coastal seas <3 km from the shore, mainly in or just beyond the surf-zone and also close to shore near reefs and rocks. It will also forage >15 km from the shore, from behind boats. Its diet mostly consists of fish. The species usually breeds, feeds, and rests in flocks and is often seen singly or in small groups.

Identified threats: Disruption to breeding habitat, predation by introduced animals and occasional capture on fishing lines threaten the species.

Conservation status: NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

4.1.114. Common tern (*Sterna hirundo*)

Distribution: The common tern breeds in North America, Europe and Asia. During the non-breeding season this species almost has a cosmopolitan distribution. In Australia, the species mainly occurs along the east coast. It is found along the entire NSW coast, although it occurs less often on the coast south of Port Hacking. Localities where large numbers of the species have been recorded in NSW include Nambucca Heads, Botany Bay, Long Reef, Boat Harbour and Sydney Harbour. Numbers in NSW are thought to be increasing.

General comments: This marine species is pelagic and coastal. It is often recorded near the coast, on ocean beaches and in sheltered waters such as bays and estuaries. It also occasionally occurs in other coastal and near-coastal wetlands. Off Wollongong (NSW) the species has generally been observed in all marine zones, but mostly in the offshore and pelagic regions. This migratory species usually spends summer in Australia (September-April) before returning to its breeding grounds in the Northern Hemisphere. It forages close to the coast, in the surf-zone and further out to sea, and in sheltered estuaries and near-coastal terrestrial wetlands. It feeds by plunging and gleaning. It was once observed foraging from behind a trawler and has been recorded taking fish from nets. It mainly feeds on fish and occasionally on insects and crustaceans.

Identified threats: No threats to this species have been identified.

Conservation status: NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.
4.1.115. Little tern (*Sterna albifrons*)

**Distribution**: The little tern breeds in Europe, Asia and Australasia. During the non-breeding season it is found on the coasts of the Baltic and Mediterranean Seas, eastern Atlantic Ocean, western Indian Ocean, southeast Asia, New Guinea, northern and eastern Australia, New Zealand and islands in the tropical western Pacific Ocean. In Australia, the species occurs from Shark Bay (WA), around northern and eastern Australia, to the east coast of Tasmania and around to the Gulf of St Vincent in South Australia. In NSW, a second population of the subspecies *sinensis* predominantly occurs, which is migratory, breeding in the spring and summer along the entire east coast from Tasmania to northern Queensland. The other population of the subspecies breeds in Asia and migrates to Australia in summer, masking the size of the threatened, eastern Australian population.

**General comments**: The little tern occurs on ocean beaches and in sheltered coastal environments especially those with exposed sandbanks of sandspits, including lagoons, estuaries, lakes, bays and inlets. It rarely occurs on rocky or muddy shores. Little terns are migratory or partly migratory seabirds. Most of its nesting sites are sand-spits, sand islands or beaches within or adjacent to the mouths of rivers, creeks and coastal lakes. Nesting also occurs at some sites on ocean beaches well away from estuaries, but often with a large coastal lake nearby. Little terns have been recorded nesting at 70 sites along the NSW coast, but at only 31 since 1987 and 11 in 1998/99. Since 1995, the largest, most successful colonies have been at Sawtell, Harrington, Botany Bay, Lake Wollumboola and more recently Farquhar Inlet (formerly known as Old Bar) (NSW NPWS 2000c). The species forages in the shallow waters inside or at the mouth of estuaries and up to 50 m offshore. Little terns in NSW feed predominantly, perhaps exclusively, on fish less than 10 cm long often generally referred to as whitebait. These include perchlets (*Ambassis* spp.), surfsardines (*Isthrothophilus*), and sprats (*Clupeidae*), but may also include juvenile mullet, gudgeons, tailor and whiting.

**Identified threats**: There are numerous threats to the species, and human disturbance has been identified as a major, and often the most important factor leading to poor breeding success and abandonment of nest sites. Human disturbance can range from the extreme of 4WD and trail-bike use through to walking or simply sitting or fishing on the beach, all of which may keep the terns off nests. Other threats include adverse weather conditions, nesting at locations prone to flooding, predation by foxes, dogs, cats, rats and a variety of birds, coastal development, availability of food, damage to estuarine habitats and pollution (NSW NPWS 2000c).

**Conservation status**: NSW (*TSC Act*) – Endangered; Commonwealth (*EPBC Act*) – Protected; International (*IUCN*) – Not in database.

4.1.116. Sooty tern (*Sterna fuscata*)

**Distribution**: The sooty tern is found within the tropical and subtropical waters and islands of the Indian, Pacific and Atlantic Oceans. In Australia, individuals are widespread in the tropics and occasional sightings occur along the west and east coasts, from Perth in Western Australia to Bermagui on the south coast of NSW, although in NSW they are more common off the north coast.

**General comments**: The sooty tern occurs in offshore and pelagic zones and is almost never found inshore. The species nests on coral cays, offshore islands, sandbanks and rock stacks. Up to 1,000,000 breeding pairs have been recorded on Lord Howe Island. The species feeds from just below the surface of the water and occasionally dives through the crests of waves. Foraging methods include dipping and plunging. Its diet includes cephalopods, hydrozoans, crustaceans and fish.

**Identified threats**: Threats to the species include disturbance of breeding colonies, egg collecting, ticks and predation of eggs and chicks by cats, rats and other birds.
Conservation status: NSW (TSC Act) – Vulnerable; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

4.1.117.  **White-winged black tern (Chlidonias leucopterus)**

**Distribution:** The white-winged black tern breeds in eastern Europe, Russia and China. When not breeding the species can be found in Africa, Asia, New Guinea and Australia. In Australia, the species mainly occurs on the northern coastline and is scattered elsewhere. In NSW, the species is widespread east of the Great Dividing Range, mainly occurring from Ballina to Wollongong and rarely further south to Wallaga Lake, and is scattered in the state’s western regions. Main sites for the species in NSW are at Kooragang Island and Grahamstown Reservoir in Newcastle and Lake Wollumboola.

**General comments:** The white-winged black tern mostly occurs on coastal or subcoastal, fresh or saline wetlands, including bays, estuaries, lagoons and their associated flats. The species is sometimes recorded at sea, especially when on migration. This migratory bird spends summer in Australia (August-May) before moving onto its breeding grounds in the Northern Hemisphere. The species forages low in air over water, muddy or sandy wetland edges and adjacent land and very rarely dives into water. Its diet mostly consists of insects, spiders and fish.

**Identified threats:** No threats have been identified for this species.

Conservation status: NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

4.1.118.  **Common noddy (Anous stolidus)**

**Distribution:** The common noddy is widespread in the tropical and subtropical waters of the Indian, Atlantic and Pacific Oceans. In Australia, the species is generally found along the northern half of the coastline and is mostly found off Queensland and the northern half of Western Australia. In NSW, the species is mainly recorded in the north between Kingscliff and Coff's Harbour and around Sydney. It has occasionally been recorded on the mid-north and Hunter coasts, infrequently in the south to Gerroa, and once as far south as Eden.

**General comments:** When not breeding, the common noddy most often occurs in the pelagic zone. The species breeds on isolated or offshore islands such as Lord Howe and Norfolk Islands situated off NSW. The species forages on or just below the surface of the sea, in inshore waters around islands and in the pelagic zone at sea. It feeds mostly on fish and also squid, pelagic molluscs, medusae, insects and Pandanus fruit. Foraging methods include dipping, seizing and plunging. The species can occur in groups and flocks.

**Identified threats:** Predation by introduced animals threatens this species.

Conservation status: NSW (NPW Act) – Protected; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

4.1.119.  **Grey ternlet (Procelsterna albivittata)**

**Distribution:** The grey ternlet occurs through much of the tropical Pacific Ocean from Australia east to Hawaii and San Felix and San Ambrosio Islands off the east coast of Chile. In Australia, the species occurs off the east coast between the Tropic of Capricorn and Bass Strait and is occasionally beachcast during stormy weather. Individuals are usually recorded off the east coast soon after the breeding season between December and March, and it is thought that some individuals may disperse to the east coast of Australia from breeding grounds on Lord Howe and Norfolk Islands.
General comments: The grey ternlet mainly occurs on isolated tropical or subtropical islands and their surrounding nearshore waters. They also occasionally occur in the pelagic zone. They usually forage from the surface of the sea and feed on small crustaceans, fish and squid. The species generally occurs in small groups or large flocks.

Identified threats: Threats to the species include intensive fishing operations in feeding grounds, cyclonic weather and urban development in Lord Howe and Norfolk Islands.

Conservation status: NSW (TSC Act) – Vulnerable; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

4.1.120. White tern (Gygis alba)

Distribution: The white tern occurs transglobally throughout tropical and sub-tropical oceans and islands. Individuals may occasionally visit the east coast of Australia between Cape York Peninsula and Sydney and generally only come ashore as a result of stormy weather. Within NSW, they are regularly recorded off the coast at Ballina and occasionally off Sydney and Wollongong. They are present on Lord Howe Island for breeding from September to June, dispersing when the winter gale arrives (NSW NPWS 1999k). They also breed on Norfolk Island (NSW NPWS 1999k).

General comments: The white tern is found on isolated tropical islands and their nearshore waters. They are also recorded in the pelagic zone, especially off Australia. The species feeds both inshore and offshore from the surface of the water on fish, squid and less frequently crustaceans and insects. Dawn and dusk are probably important feeding times for the species. The species is usually seen singly or in pairs at sea.

Identified threats: Threats to the species include stochastic events impacting upon small colonies, strong winds dislodging eggs from branches, predation by cats, kestrels, owls and currawongs, and the introduced black ant.

Conservation status: NSW (TSC Act) – Vulnerable; Commonwealth (EPBC Act) – Protected; International (IUCN) – Not in database.

4.1.121. Azure kingfisher (Ceyx azurea)

Distribution: The azure kingfisher occurs in Indonesia, New Guinea and is widespread in northern and eastern Australia. In NSW it is widespread east of the Great Dividing Range from the Queensland to Victorian border, with some records on the western slopes and plains.

General comments: Found amongst the vegetation at the edges of wetlands, this species occurs in freshwater or tidal rivers and creeks, freshwater wetlands, estuaries, inlets, embayments and harbours (especially along gutters in mangrove forests), and rarely on bare mudflats or sandy beaches. Most breeding occurs during spring-summer on the eastern shores of the Gulf of Carpentaria and along the east coast as far south as Gippsland. They forage by plunging from perches to a few centimetres below the water’s surface. They mainly feed on small fish, crustaceans, aquatic insects and occasionally amphibians and aquatic invertebrates. They sometimes forage on bait or lures on fishing lines.

Identified threats: Removal of waterside vegetation, flooding of nests, increased water turbidity, injuries by cats and collisions with windows are a problem for this species.

Conservation status: NSW (TSC Act) – Protected; Commonwealth (EPBC Act) – Not protected under this Act; International (IUCN) – Not in database.
4.1.122. Sacred kingfisher (*Todiramphus sanctus*)

**Distribution:** The sacred kingfisher occurs in Australia, New Zealand, Lord Howe and Norfolk Islands and islands in the South Pacific, where it breeds. It also occurs as a non-breeding migrant in Indonesia, New Guinea and other pacific islands. It is widespread throughout much of Australia, except its interior. It is widespread throughout NSW, but sparsely distributed in the west.

**General comments:** The sacred kingfisher inhabits a wide variety of wooded and open habitats and is often found in sheltered harbours and estuaries with intertidal flats, often amongst mangroves. It is sometimes found on low vegetated cays and rarely on unvegetated banks or reefs. This species sometimes lands on ships out at sea. Breeding occurs in a wide variety of habitats, including those near the coast, mostly from September to February. The species forages from the ground, on exposed intertidal shores, rock pools and reefs and by surface-plunging into the shallow water of wetlands. It mainly feeds on insects, but also earthworms, freshwater crayfish, crabs, spiders, fish, frogs, lizards and small rodents.

**Identified threats:** Loss of suitable breeding habitat, predation by cats and foxes and collisions with vehicles, windows, lighthouses, ships and powerlines are a problem for this species.

**Conservation status:** NSW (TSC Act) – Protected; Commonwealth (EPBC Act) - Protected; International (IUCN) – Not in database.
5. REFERENCES


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6. APPENDICES

6.1. APPENDIX 1: DEFINITIONS OF THE CATEGORIES OF THREATENED / PROTECTED SPECIES

Definitions of the status of threatened / protected species listed under the relevant NSW (TSC Act 1995; NPW Act 1974), Commonwealth (EPBC Act 1999) and International (IUCN Redlist 2004) threatened and protected species legislation are provided in the following:

* Threatened Species Conservation (TSC) Act 1995
  * **Endangered** The species is likely to become extinct in nature if threats continue, or its numbers are reduced to a critical level, or its habitat is reduced.
  * **Endangered population** The population has been reduced to such a critical level, or its habitat has been so drastically reduced, that it is in immediate danger of extinction. It will be geographically isolated and near the limit of the species' natural range, or will be genetically distinct, or will have some other conservation significance.
  * **Vulnerable** The species is likely to become endangered if threats continue.

National Parks and Wildlife (NPW) Act 1974
  * **Protected** All native birds, reptiles, amphibians and mammals, except the dingo, are protected in NSW from harm under this legislation.

* Environment Protection and Biodiversity Conservation (EPBC) Act 1999
  * **Endangered** A native species is eligible to be included in this category at a particular time if, at that time, it is not critically endangered and it is facing a very high risk of extinction in the near future, as determined in accordance with the prescribed criteria.
  * **Vulnerable** A native species is eligible to be included in this category at a particular time if, at that time, it is not critically endangered or endangered and it is facing a high risk of extinction in the medium-term future, as determined in accordance with the prescribed criteria.
  * **Protected** All listed migratory species, listed marine species and cetaceans in Commonwealth waters and outside Australian waters are protected from harm under this legislation.

* 2004 IUCN Redlist of Threatened Species
  * **Critically Endangered** A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see www.redlist.org), and it is therefore considered to be facing an extremely high risk of extinction in the wild.
  * **Endangered** A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see www.redlist.org), and it is therefore considered to be facing a very high risk of extinction in the wild.
  * **Vulnerable** A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see www.redlist.org), and it is therefore considered to be facing a high risk of extinction in the wild.
  * **Lower risk, near threatened** A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
  * **Data deficient** A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between Data Deficient and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.
  * **Not in database** The species was not listed in this database of threatened species.
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