

3.1. Sandy Beaches

Asset	Sandy Beaches
<i>Description</i>	Shorelines between low and high tide mark, composed of accumulated sediments of various particle sizes, weathered from bedrock, and also composed of calcium carbonate particles derived from the breakdown of shelly marine organisms. Beaches around the NY NRM region vary in length, width and depth, steepness, wave exposure, sediment size and composition, species composition and ecology.
<i>Examples of Main Species</i>	<p>Birds</p> <ul style="list-style-type: none"> • Pacific Gull and Silver Gull • Hooded Plover • Red-capped Plover • Pied Oystercatcher and Sooty Oystercatcher • Crested Tern, Caspian Tern and Fairy Tern • Migratory shorebirds listed under international treaties, such as Bar-tailed Godwit, Curlew Sandpiper and Sharp-tailed Sandpiper, Red-kneed Dotterel, Red-necked Stint, Grey Plover, Mongolian Plover, Pacific Golden Plover, Red Knot and Great Knot, Ruddy Turnstone, Grey-tailed Tattler, and Sanderling. • Double-banded Plover • Masked Plover <p>Invertebrates</p> <ul style="list-style-type: none"> • Surf Diatoms (various species) • Foraminifera (various species) • Small crustaceans, such as copepods, sand hopper amphipods , and scavenging isopods • Smooth Pebble Crab • Sand crab • Ghost shrimps, • South Australian Sand Shrimp • gastropod shells such as Fragile Air-breather, Sand-plough Snail and other Moon Snail species, Impoverished Whelk, Cominella shells, and Banded Kelp Shell • Looping Snails (minute gastropod shells) • bivalve shells such as Double-rayed Sunset Clam, Wedge Shells, Venerid and Venus shells and Cockles, Frilled Venus Shell, Surf Clams, Common Pipi • ‘Angas’ Bubbleshell and Botany Bay Bubble Shell • Polychaete worms • Nematode worms • Flatworms

Asset	Sandy Beaches
<i>Example Locations</i>	<p data-bbox="328 309 807 338"><u>Northern and North-eastern Gulf St Vincent</u></p> <ul data-bbox="376 344 810 439" style="list-style-type: none"> • Port Gawler • Sandy Point and Great Sandy Point • Port Prime <p data-bbox="328 479 592 508"><u>Eastern Yorke Peninsula</u></p> <ul data-bbox="376 515 1209 707" style="list-style-type: none"> • Port Clinton • Mac’s, Tiddy Widdy and Young’s Beach • Ardrossan, James Well, Rogues Point, Muloowurtie Point and Pine Point • Sheoak Flat and Port Vincent • Port Julia • Black Point <p data-bbox="328 748 663 777"><u>South-Eastern Yorke Peninsula</u></p> <ul data-bbox="376 784 927 976" style="list-style-type: none"> • Stansbury • Oyster Point • Wool Bay • Coobowie • Sheoak Beach, Sultana Point and Wattle Point • Troubridge Island <p data-bbox="328 1016 616 1046"><u>Southern Yorke Peninsula</u></p> <ul data-bbox="376 1052 783 1211" style="list-style-type: none"> • Kemp Bay • Sturt Bay • Foul Bay • Marion Bay and Willyama Bay • Butlers Beach and Salmon Beach <p data-bbox="328 1252 671 1281"><u>South-western Yorke Peninsula</u></p> <ul data-bbox="376 1288 1206 1413" style="list-style-type: none"> • Cable Bay, The Gap, Ethel Beach, West Cape Beach • Groper Bay, Pondalowie Bay. • Dolphin Beach, Shell Beach, Browns Beach and Gym Beach, Formby Bay • Gleeson’s Landing, Swincer’s Rock, and Berry Bay <p data-bbox="328 1453 632 1482"><u>South-eastern Spencer Gulf</u></p> <ul data-bbox="376 1489 783 1615" style="list-style-type: none"> • east of Corny Point, • Burners Beach and Levens Beach • Southern Hardwicke Bay • Parsons Beach and Bluff Beach <p data-bbox="328 1655 711 1684"><u>Northern and Eastern Spencer Gulf</u></p> <ul data-bbox="376 1691 836 1977" style="list-style-type: none"> • Wauraltee Beach, • Chinaman Wells and The Pines • Balgowan • The Bamboos and The Gap • Tiparra Bay, Moonta Bay Port Hughes • Wallaroo • Fisherman Bay • Port Davis • Port Germen

Description

By definition, a sandy beach is a shoreline between high and low water mark, composed of sediments in size classes which can be classified as 'sands'. Beaches around the NY NRM region vary in length, width and depth, steepness, wave exposure, sediment size and composition. They also vary considerably in the species composition and ecology of organisms which live on or in the beaches. The beaches of the NY NRM region are composed of grains of two main origins. The first is accumulated sediments of various particle sizes weathered from bedrock and other rocks exposed along the coast and nearshore area, and the second is calcium carbonate particles, derived from the breakdown of shelly marine organisms.

Examples of some marine organisms which contribute to beach sediments around Yorke Peninsula, particularly the exposed southern coast, include bivalve shells (e.g. species in the genera *Katelaysia*, *Cardium*, *Dosinia* and *Mactra*), gastropod snail shells, foraminifera (e.g. *Amphistegina*), sponge spicules, echinoderm plates (e.g. from feather stars and sea urchins), calcareous red algae (including rhodoliths), serpulid and spirorbid worm tubes, solitary coral skeletons, barnacle plates and bryozoans (Shepherd and Sprigg 1976; James and Bone 2011). Much of the shelly sediment which ends up on beaches in the Region is derived from beds of seagrass and seaweed (James and Bone 2011).

The wave- and swell-exposed southern Yorke Peninsula coast which faces Investigator Strait, as well as the south-western "toes" end of the peninsula, and the south-eastern "heel" end, all contain coarse sediment beaches between headlands and points. Sediments are finer on beaches along the less exposed mid coast of both gulfs, such as James Well and Stansbury in Gulf St Vincent, and Moonta / Port Hughes area in Spencer Gulf. Towards the northern ends of the gulfs, in depositional areas of even lower wave energy, the beaches become broad sand flats (see chapter on **Mudflats and Sandflats**). Tidal sand flats also occur along parts of eastern and south-eastern Yorke Peninsula (e.g. from Troubridge Point up to Giles Point), which are protected to the south from wave energy and swell due to the presence of rocky points and sand spits. In many parts of Yorke Peninsula, beaches grade landwards into sand dunes.

Ecological Significance of Sandy Beaches

Many beaches may look devoid of life, but there are considerable species numbers and many ecological processes occurring within the sands, and in the waters of the intertidal zone. For marine animals, the harsh conditions of beach life include physical disturbance from waves; exposure to air and light; and extreme changes in temperature, salinity and oxygen. This results in few large organisms living on the intertidal sand surface. Marine animals which live permanently on beaches are usually small, and often buried in the sand.

At the basis of beach food webs, tiny single-celled algae (phytoplankton) which comes ashore in the waves, plays an important role as primary producer (Edgar 2001). One of the main types is the diatoms, tiny photosynthetic plankton with hard cell walls made of silica. Broken up phytoplankton and the nutrients they release are a component of the white or brown "beach foam" which is seen at the shoreline of wave-exposed beaches. The tiny diatoms and dinoflagellates which form the plankton mass are brought to shore in the surf, and are important food sources for bivalve molluscs such as clams and wedge shells, as well as other filter-feeding invertebrates living in the sand, such as copepod crustaceans, nematode worms, flatworms and other worms. Bacteria and tiny single-celled animals (protozoa, such as amoebas) break down the phytoplankton which is buried in sediments, and also utilise the dissolved organic matter and particles released by plants and animals (Edgar 2001). The microbes and protozoans are in turn also consumed by larger sand-dwelling animals. Another major role of bacteria and protozoans in beach sand is making their waste product nutrients such as nitrates available for more phytoplankton such as diatoms to grow, and this process is driven by wave action (NIWA 2012). Similarly, the bivalve shells which eat diatoms release waste nutrients which enable the growth of more diatoms.

Seagrasses and seaweeds which are broken down and deposited on the beach as beachwrack are also important food sources. The beachwrack provides food for small crustaceans such as amphipod (sand hoppers) and isopod (pillbug) crustaceans, as well as fly larvae. Other dead animals washed up onto beaches includes fishes, jellyfish, ascidians (sea squirts), shells and other fauna from the subtidal, and these animals are consumed by scavenging animals in the intertidal zone, such as isopods, and small crabs.

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Beaches in the NY NRM region are also important feeding areas for numerous shore bird species, which feed on the worms, small crustaceans such as crabs and burrowing shrimp, various bivalve shells and snails which live in the intertidal sands, and the insects in beachwrack.

Sandy Beach Distribution in NY NRM Region

Within the NY NRM region, sandy beaches are found on all sides of the Yorke Peninsula, interspersed with other intertidal habitats such as platform reefs, and mangroves. Many of the smaller beaches occur between rocky headlands / points, and the larger ones form the majority of the broad bays along the southern and south-eastern coasts. There are more than 50 named sand beaches within the NY NRM region, and some of the main ones are discussed below. The following beach descriptions are adapted from information provided in the Beachsafe SA web site (Surf Lifesaving Australia 2014), supplemented by descriptions in Baker (2004), photographs, and personal observations of various beach locations by J. Baker, from 2002 to 2014.

At the north-eastern edge of the NY NRM Region, there are few coastal areas which could be classified as sandy beaches. Northern Gulf St Vincent is a low wave energy depositional environment, and mudflats are more common than sand beaches. Along north-eastern Gulf St Vincent is the Samphire Coast, which starts at Port Gawler at the southern edge of the NY NRM region, and continues north for 57 km to Sandy Point / Bald Hill (Purnell et al. 2012). Sandy beaches are very limited in extent at top of the north-eastern Gulf, where mudflats, mangroves, and saltmarsh dominate. However, there are a few low energy beach areas of note. At the south-eastern edge of the NY NRM region, in the **Port Gawler** area, the beach runs for around 4.5km, and is backed by tidal flats which have been developed as salt evaporation ponds. The high tide sand ridge is fronted by 3 km of tidal flats. Between **Sandy Point** and Parham, in the Prohibited Area used for weapons proofing, the coastal strip of intertidal bare sand is around 1km – 1.5km wide, backed by a thin band of vegetated beach ridges (degraded in places), behind which lies stranded samphire and bare flats, extending several km inland (DEH mapping data, in DTUP 2003). Further south, towards **Great Sandy Point**, above the sand and patchy seagrass in the intertidal, is samphire, saline patches, and a broad area of bare flats (DEH mapping data, in DTUP 2003). Between **Port Prime** and the northern end of the Light River delta, there are vegetated beach ridges, fronted by a sand beach, around 9km long southwards from Port Prime.

On the eastern side, there is also bare sand forming an intertidal strip along the coast between Mangrove Point and Port Clinton (DEH Saltmarsh Mapping, in DTUP 2003). The 1km wide sand flats are **Port Clinton** are backed by a 1.8 km low energy sandy shoreline, bounded by mangroves (**Figure 3.1.2**).



Figure 3.1.2: Beach at Port Clinton exposed to very low wave energy, behind intertidal sand flats and mangroves. Photo (c) J. Baker.

Further south, there is also a low energy beach called **Mac's**, behind the 300m wide sand flats, and this extends south to **Tiddy Widdy** and **Young's Beach** (north of Ardrossan). There is a narrow shelly beach at Mac's, but the majority of the intertidal area could be described as sand flats (see chapter on **Mudflats and Sandflats**). The beach at the town of **Ardrossan** is a narrow one (about 150m long, with the jetty in the middle), terminating at the low, fossil-rich cliffs of the northern end of Ardrossan. In front of the beach are 300m wide intertidal sand flats, covered by seagrass.

South of Ardrossan, similar low energy beaches fronted by sand flats exist at **James Well (Figure 3.1.3A)**, **Rogues Point**, **Muloowurtie Point** and **Pine Point**, and these strip beaches remain narrow along the coast, towards **Port Julia** (where there is a beach known as “The Dipper”), **Sheoak Flat** and **Port Vincent**. The 1km long beach at **Port Julia** is narrow, about 10m wide at high tide, and sand flats are visible at low tide. Just north of **Port Julia**, the beach is shorter (around half a kilometre long) but broader, and fronted by seagrass-covered sand flats at low tide. Further north of Port Julia is **Black Point**, and on the northern side of **Black Point (Figure 3.1.3B)**, the beach is broader, and the sand flats are narrower, with dense seagrass growing much closer to shore. In some areas of this coast (e.g. **Pine Point**) there are rock-studded sand flats stretching several hundred metres seaward of the narrow, shelly sand beach, into the gulf.



Figure 3.1.3: Examples of low energy sand beaches on the eastern side of Yorke Peninsula: (A) James Well and (B) Black Point. All images (c) Google Earth.

Along the mid eastern coast of Yorke Peninsula, **Port Vincent** has a 1.9 km long, low energy beach north of Surveyor Point, dissected by the marina. South of Surveyor Point, another low energy sand beach which runs south for 1.6km. This beach is fronted by sand flats, about 200m wide, and the sand area is more extensive to the south than the north of the Point (**Figure 3.1.3A**). Between Port Vincent and Stansbury, there are narrow strips of sandy beach along most of the coast, often at the base of low cliffs / bluffs. The sand beach widens towards **Stansbury**, where the main beach (1.2 km long) extends from the boat ramp wall to the tip of **Oyster Point**. To the south, the beach is fronted by broad intertidal sandflats with seagrass (about 300m wide), and also a large area of unvegetated sand flat (**Figure 3.1.3A**).

Other sand beaches in the eastern side include **Wool Bay** (sand beach about 700m long), **Coobowie (Figure 3.1.3B)**, and **Sheoak Beach** and **Sultana Point** south of Edithburgh. The narrow sand beach at **Coobowie** stretches for 3km, and is fronted by a broad, sand-covered calcareous reef platform which extends seaward for several hundred metres. This is discussed in the chapter on **Intertidal Reefs - Rock Platforms**. **Sultana Point** and **Wattle Point** are close to the “heel” of Yorke Peninsula, and between the points is a 2 km long southeast facing beach. There are also sand beaches around **Troubridge Island**, fronted by wide intertidal sand flats, known as **Troubridge Shoals** (see chapter on **Sand Islands**).

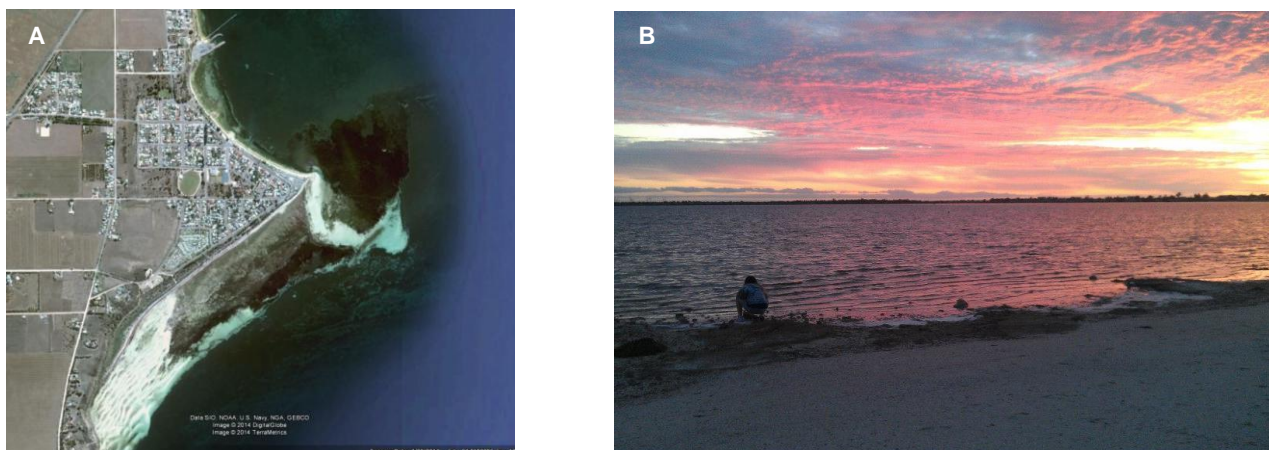


Figure 3.1.4: The low energy beach north of Oyster Point at Stansbury, and the broad intertidal sand flats, partly vegetated with seagrass, south of Oyster Point (A). Image (c) Google Earth. Coobowie Beach (B). Photo © J. Baker

Conditions are more exposed on the south coast of the Peninsula, facing into Investigator Strait. To the north-west of Troubridge Hill on the “heel” of Yorke Peninsula, the coast comprises steep cliffs, fronted in many areas by steeply sloping exposed sand beaches. Examples are shown in **Figure 3.1.5**. Narrow, steep beaches front cliffs along part of the coast, and in some of the bay areas, they are backed by extensive dune systems. **Kemp Bay** on the south-eastern coast is one example of a steep, high wave energy beach sand beach which faces Investigator Strait, and is backed by dunes.



Figure 3.1.5: Examples of high wave energy beaches on the south-eastern coast of Yorke Peninsula. Kemp Bay (A and B). Beach near Suicide Point (C). Photos © J. Baker

The broad bays of the mid south coast of Yorke Peninsula, such as **Sturt Bay, Foul Bay, Marion Bay** and **Willyama Bay**, support long but often narrow beaches, backed by dunes in some places, and fronted by calcareous shore platforms in others. Examples are shown in **Figure 3.1.6** below. Offshore reef and seagrass beds help to attenuate waves in the bays of the south coast, and sediments have built up on the beaches. In the lee of low headlands in some of the bay areas, broad intertidal sand flats have formed in lower energy areas. The abundant nearshore seagrass in Investigator Strait is often washed up into the bays after storms, and there are large deposits of beach wrack in most areas (e.g. Marion Bay and Foul Bay). Between Foul Bay and Marion Bay there is series of steeper and more wave-exposed sand beaches, all with offshore reef and seagrass, and breaking waves. Examples include **Butlers Beach** and **Salmon Beach** (around 1.4km long), the latter exposed to the south-west swell and winds. Large dunes have built up over time behind Salmon Beach.

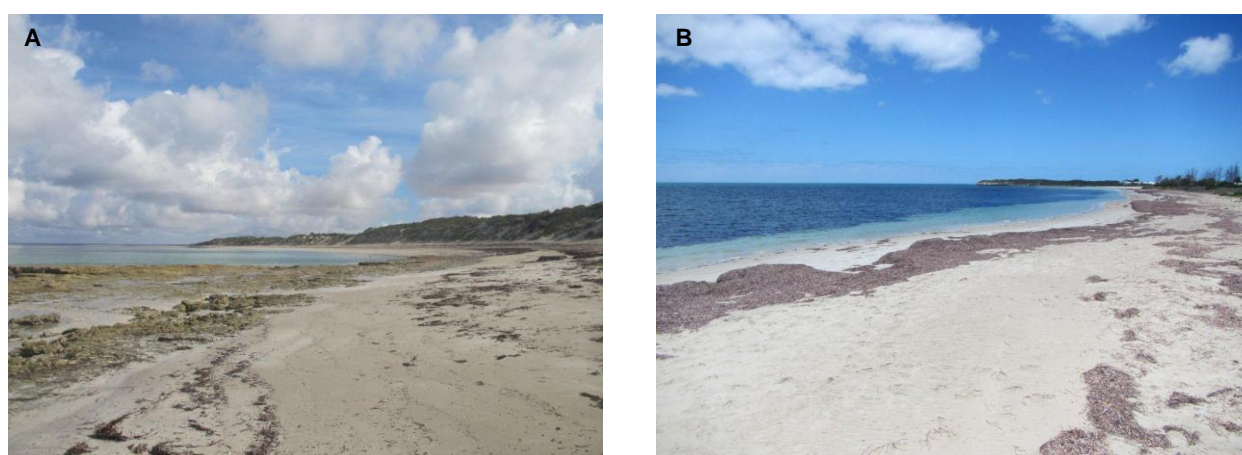


Figure 3.1.6: Examples of beaches in the broad bays of the southern Yorke Peninsula coast. Mozzie Flat (A), and Marion Bay (B). Photos © A. Futterer (A) and L. McLean (B).

Further west in Investigator Strait around the “toes” of south-western Yorke Peninsula (Innes National Park area), the bays are much smaller and are positioned between numerous, wave-exposed rocky headlands. In the small indentations between headlands, “pocket” beaches have developed in some areas, such as **Cable Bay** (several small beaches at the base of cliffs), **The Gap**, **Ethel Beach**, **West Cape Beach** and **Groper Bay**, at the southern end of **Pondalowie Bay** (**Figure 3.1.7A** and **B**). There is nearshore reef and seagrass in all of these areas.

On the northern side of West Cape, broader bays have developed, such as **Pondalowie Bay**. The beach in this area, composed of fine white sand, is around 4km long. Further to the northern end of the bay, the dune-backed surf beach at **Pondalowie** runs for around 900m, and is more exposed to the south-westerly waves than is the main beach to the south.



Figure 3.1.7: Examples of wave-exposed beaches between the headlands of south-eastern “toes” of Yorke Peninsula. West Cape Beach (A). Groper Bay, part of Pondalowie Bay (B). Photos © Diceman @ Wikimedia Commons (A); L. McLean (B).

Roysten Head is at the northern end of Pondalowie Bay, and past this point, facing west and south-west into southern Spencer Gulf is a series of swell- and wave-exposed sand beaches, such as **Dolphin Beach, Shell Beach, Browns Beach** and **Gym Beach**. There is also nearshore patch reef off the beaches in some of in these locations, such as **Brown’s Beach (Figure 3.1.8)**. These beaches form the southern end of the large **Formby Bay**, which runs for more than 6km along the middle of the Yorke Peninsula “toes”, up to Daly Head. The Formby Bay coastline has few crenulations, and the dune-backed high energy beaches are longer and straighter than those along the south-western end of the Peninsula.



Figure 3.1.8: Brown’s Beach, in one of the wave-exposed bays along the “toes” of Yorke Peninsula which face west. Photo © L. McLean.

North of Daly Head, there are several wave-exposed, west-facing bays smaller than Formby, separated by small rocky points (such as Point deBurg and Point Anne). Beaches in this area include **Gleeson's Landing** (about 1.8km long); the beach near **Swincer's Rock**; and **Berry Bay**, south of Corny Point.

At the southern end of Gleeson's Landing is a low wave energy beach fronted by and intertidal calcareous platform reef, about 250m wide, and protected to the south by the headland. North of the platform, towards Swincer's Rocks, the beaches become broader, longer and sandier, and are more exposed to the westerly waves and southwesterly swell.

In contrast to the wave- and swell-exposed beaches between Formby Bay and Corny Point in the west, beach areas at the top of the "toes" of Yorke Peninsula are more protected, and calmer. Wave energy progressively lessens towards Hardwicke Bay in south-eastern Spencer Gulf, west of Corny Point. Some of the lower energy beaches in this area include the dune-backed, 1km long beach **east of Corny Point**, fronted by sand flats; and also **Burners Beach** and **Levens Beach**, which together run for several kilometres. There sand flats of several hundred metres wide in front of some beaches in this area, and also calcareous shore platforms. Much of Hardwicke Bay is fringed by sandy beaches and sand flats, but there is platform reef at the southern end of the bay. **Burners Beach** is one example of a low, cobble-covered reef platform in the area, interspersed with sand, and backed by low dunes. Intertidal reef patches are also present at several other locations in the bay (see chapter on **Intertidal Reefs - Rock Platforms**). The most extensive area of sand beach in **Hardwicke Bay** occurs at the bottom of the bay, east and south-east of Point Turton (**Figure 3.1.9A**).



Figure 3.1.9: Aerial view of the long sand beach at the bottom of Hardwicke Bay (A), and the sand beaches in Tiparra Bay and Moonta Bay (B). Photos © Google Earth.

Named beaches north of Hardwicke Bay are narrow and low in sand cover (e.g. **Parsons Beach** and **Bluff Beach**), and consist mainly of intertidal platform reef, sand flats and cobble, and these are discussed in the chapters on **Intertidal Reefs - Rock Platforms** and **Mixed (Sand, Mud, Rock)** beaches. Further north towards Port Victoria, in mid eastern Spencer Gulf, there are long, narrow, fine sand beaches such as **Wauraltee Beach**, backed by low sand dunes. A similar long, low energy, white sand beach strip occurs north of Reef Point (on the peninsula above Port Victoria), and continues for more than 30km up to Cape Elizabeth, including areas such as **Chinaman Wells, The Pines, Balgowan, The Bamboos, and The Gap**.

Cape Elizabeth provides protection of the eastern Spencer Gulf coast from southerly and south-westerly sea conditions, and has enabled **Tiparra Bay** to develop, which includes **Moonta Bay** at the northern end. Halfway along the coast in Tiparra Bay is **Port Hughes**, and sandy beaches extend both north and south of Port Hughes, fanning out into broad sand flats at either end of the bay (**Figure 3.1.9B**).

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There are very few beach areas further north of **Tiparra Bay**, apart from a pocket beach at **Wallaroo**; and the beaches which back the broad, extensive sand flats between **Fisherman Bay** and **Port Davis** (which are more than 2km wide in places), and in the **Port German** area north of Port Pirie (see chapter on **Mudflats** and **Sandflats**).

In northern Spencer Gulf, there are few areas of sandy beach, as the low energy conditions and depositional environment result in extensive build up of mudflats (and associated mangroves and saltmarsh). Sand flats, the low energy, non-muddy areas in north-eastern Spencer Gulf are discussed in the chapter on **Mudflats** and **Sandflats**).

Invertebrates of Sandy Beaches

Many of the invertebrate species which live in sandy beach habitats in the NY NRM region are not obvious, due to their small size, or because they live buried in the sediment. Some of the invertebrate species which live on beaches migrate across the shore according to the position of the tide, or the weather, or time of day (Edgar 2001). Distribution of marine invertebrates on sandy beaches in the region also changes with season.




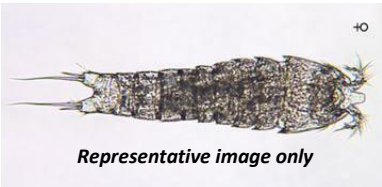




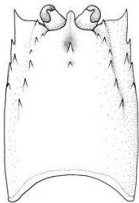

Gastropod (snail) shells and bivalve shells are conspicuous on some of the sandy beaches in the region, but many of the species observed as empty shells do not live in the harsh intertidal environment, but come from deeper waters. Their shells are periodically washed up on the beach, especially after storms. Examples of the shells which do thrive in intertidal sandy environments are shown in **Table 3.1.1** below. One of the most commonly seen is the Sand-plough Snail *Polinices conicus*, which moves through the wet intertidal sand, leaving distinctive curved trails. Bivalve shells such as wedge shells, venus shells and surf clams are also common.


Small isopod (pill bug) and amphipod (sand hopper) crustaceans also live in the intertidal zone of beaches. They help to break down the beach wrack (dead seagrass and seaweed) which is washed up onto the sand, so that the plant material can be recycled through the nearshore beach ecosystem. There are few larger crustaceans in sandy beach ecosystems, but two of the commonly observed ones are the Sand Crab *Ovalipes australiensis*, which lies buried in the lowest intertidal and shallow subtidal, and the Smooth Pebble Crab *Bellidilia laevis*, which is found in more protected bays with finer sand, and is most active when the tide is changing. Ghost shrimps, such as Ceramic Ghost Shrimp *Biffarius ceramicus* (*Notiax ceramica*) also live in beach areas of the NY NRM region, and make tubular, branching burrows in sand.











Many types of worms live in sand in NY NRM beach areas, including nematodes (which in some areas of Australia are reported to comprise up to 80% of the tiny animals in beach sediments - Nicholas 2006); polychaetes (e.g. segmented worms in families such as Spionidae, Oeonidae, Phyllodocidae, Opheliidae, and numerous others), flatworms and ribbon worms. Nematode worms which live in beach sand have many different feeding preferences, including diatoms, bacteria, protozoans and organic debris, and some are carnivorous, preying on other worms (Nicholas 2006). Worms are important in nutrient recycling, and are also a significant food source for carnivorous beach fauna.

Minor groups of tiny animals such as mites, tardigrades (water bears) and gastrotrichs (hairybacks) may also be present in beach sand (Nicholas 2006), but the particular species which may occur in the intertidal sands of NY NRM were not reviewed for this report.

Table 3.1.1: Examples of some invertebrate species which are associated with sandy beaches in NY NRM region (Womersley and Thomas 1976; Edgar 2001; J. Baker, pers. obs. 2002 - 2014; Museum Victoria 2014; maps in Atlas of Living Australia 2014)

Common Name and Latin Name	Representative Image	Common Name and Latin Name	Representative Image
Surf Diatoms (various species)	 <p>© W. Bettighofer @ Plankton Net http://planktonnet.awi.de/</p>	Foraminifera (various species)	 <p>© J. Baker</p>
gastrotrichs ("hairybacks")	<p><i>Representative image only</i></p>  <p>© R. Hochberg @ Lifedesks. CC Licence</p>	harpacticoid copepods	 <p><i>Representative image only</i></p> <p>© US Geological Survey</p>
Sand hopper amphipods in Talitridae family	 <p>© M. Marmach Museum Victoria</p>	Isopods, including scavenging isopods in Cirolanidae	 <p>© M. Marmach Museum Victoria</p>
Sand crab <i>Ovalipes australiensis</i>	 <p>© A. Pearson @ Flickr. CC Licence</p>	Smooth Pebble Crab <i>Bellidilia laevis</i>	 <p>© H. Crawford</p>
South Australian Sand Shrimp <i>Philocheras intermedius</i>	 <p>Dorsal carapace. © K. Nolan, Museum VIC. CC Licence</p>	Ghost shrimps, such as Ceramic Ghost Shrimp <i>Biffarius ceramicus</i> (<i>Notiax ceramica</i>) (NB the related south-eastern Australian species <i>B. limosus</i> is illustrated here)	 <p>© M. Marmach Museum Victoria CC Licence</p>

Common Name and Latin Name	Representative Image	Common Name and Latin Name	Representative Image
Fragile Air-breather sand snail <i>Salinator fragilis</i>	 © T. Alexander, ausmarinverts.net	Sand-plough Snail <i>Polinices conicus</i> and other Moon Snail species	 © National Library of Australia. Image by Dr. I. Bennett
Impoverished Whelk <i>Nassarius pauperatus</i>	 © T. Alexander, ausmarinverts.net	Cominella shells, such as <i>Cominella lineolata</i> and <i>C. eburnea</i>	 © M. Norman Museum Victoria CC Licence
Wentletrap shells (e.g. <i>Epitonium jukesianum</i> and <i>E. minorum</i>), which live subtidally with anemones but are occasionally recorded in the intertidal.	 © D. Beechey www.seashellsofnsw.org.au	Banded Kelp Shell <i>Bankivia fasciata</i>	 © D. Beechey www.seashellsofnsw.org.au
Double-rayed Sunset Clam <i>Soletellina biradiata</i>	 © D. Staples, Museum VIC. CC Licence	Wedge Shells, such as species in the genera <i>Paphies</i> and <i>Anapella</i>	 © D. Staples, Museum VIC. CC Licence
Venerid and Venus shells, such as Feathered Venerid / Chicken Venus <i>Tawera gallinula</i> , <i>Circe rivularis</i> , <i>Eumarcia fumigata</i> , and several other species in Veneridae	 © D. Staples, Museum VIC. CC Licence	common cockles (e.g. Peron's Venus <i>Katylsia peronii</i> , and Enigma Venus <i>K. scalarina</i>)	 © D. Staples, Museum VIC. CC Licence

Common Name and Latin Name	Representative Image	Common Name and Latin Name	Representative Image
Frilled Venus Shell <i>Bassina (Callanaitis) disjecta</i>	 <p>© D. Staples, Museum VIC. CC Licence</p>	Surf Clams (<i>Dosinia</i> species, such as <i>D. histrio</i> and <i>D. victoriae</i>)	 <p>© D. Staples, Museum VIC. CC Licence</p>
Common Pipi <i>Donax (Plebidonax) deltoides</i> and Choice Pipi <i>D. electilis</i>	 <p>© D. Staples, Museum VIC. CC Licence</p>	'Angas' Bubbleshell <i>Philine angasi</i>	 <p>© L. Altoff, MRG</p>
Botany Bay Bubble Shell <i>Bulla quoyii</i>	 <p>© G. Bould @ Wikimedia Commons</p>	minute gastropod shells, in the family Truncatellidae (looping snails)	 <p>J. Delsing @ Wikimedia Commons</p>
Polychaete worms - numerous species in Spionidae, Oeononidae, Phyllodocidae, Opheliidae, and other families.	 <p>Representative image only From: Read, G.B. (2004) <i>Guide to NZ Shore Polychaetes</i>. © NIWA</p>	Nematode worms	 <p>A. Smyth, Smithsonian TRI http://biogeodb.stri.si.edu/bioinformatics/</p>
Oligochaete worms	 <p>Representative image only © California Dept. Fish and Game</p>	Flatworms and micro-tubellarians	 <p>Representative species from intertidal rubble © J. Baker</p>





Coastal Bird Species on Sand Beaches in NY NRM Region









The sandy beaches of NY NRM region provide important habitat (especially feeding grounds) for various local and migratory shore bird species. A number of local species which utilise Yorke Peninsula beaches are listed under schedules of the *South Australian National Parks and Wildlife Act 1972*, including Pied Oystercatcher and Sooty Oystercatcher (both listed as *rare*), Hooded Plover (*vulnerable*) and Fairy Tern (*endangered*) (Cullen et al. 2008; Department of the Environment 2014). Migratory bird species of conservation significance, including species listed under JAMBA, CAMBA, ROKAMBA and/or Bonn Convention visit intertidal beaches in the Region (Birdlife Australia records, cited in ALA 2014). Shorebirds in the genera *Calidris* and *Charadrius* are very well represented on the Peninsula, with 6 and 4 species respectively. Reports by Purnell et al. (2012, 2013) provide shore bird counts for a number of south-eastern Yorke Peninsula locations, such as Black Point - Port Julia area, Stansbury, and Sheoak Beach. Birdlife Australia undertakes biennial counts of a number of threatened bird species around the peninsula, and Cullen et al. (2009) provided numbers of Hooded Plovers, and Pied and Sooty Oystercatchers sighted on Yorke Peninsula, during a survey period in November 2008. A national survey of Hooded Plovers was also conducted in 2012, and Mead et al. (2013) provided figures for Yorke Peninsula, a total of 212 adult Hooded Plovers, 15 juveniles, and 8 nests with eggs sighted over 67% of the available habitat that was surveyed around the Peninsula. Hooded Plovers pick invertebrates from the sand near the water line, and nest further up the beach, in shallow scrapes in the sand, often near dried seaweed and seagrass (beackwrack).









Many of the other bird species shown in **Table 3.1.2** forage in the intertidal, and some nest further up the beach like Hooded Plover. For example, Sanderling roost on or the behind the bare sand high on the beach; also in dunes, and in clumps of washed-up seaweed (Higgins and Davies 1996, cited by Department of the Environment 2014).





The chapters of this report on **Mudflats and Sandflats**, and **Sand Islands and Shoals** also provide information about many of the coastal bird species which utilise intertidal sand habitats in the NY NRM Region.

Table 3.1.2: Some examples of bird species which utilise sandy beaches in NY NRM Region. (From Baker 2004 and references therein; Cullen et al. 2008; Berkinshaw et al. 2013; Birdlife Australia records, cited in ALA 2014; J. Baker, pers. obs. 2002-2014).

Common Name and Latin Name	Common Name and Latin Name
<p>Pacific Gull <i>Larus (Larus) pacificus</i></p>  <p>© J.J. Harrison, CC Licence</p>	<p>Silver Gull <i>Chroicocephalus novaehollandiae</i></p>  <p>© D. Daniels, CC Licence</p>
<p>Sooty Oystercatcher <i>Haematopus fuliginosus</i> (Listed as Rare, under the NPW Act in SA)</p>  <p>© J.J. Harrison, CC Licence</p>	<p>Pied Oystercatcher <i>Haematopus longirostris</i> (Listed as Rare, under the NPW Act in SA)</p>  <p>© J.J. Harrison, CC Licence</p>

Common Name and Latin Name	Common Name and Latin Name
<p>Greater Sand Plover <i>Charadrius leschenaultii</i> (Listed under Bonn, CAMBA, JAMBA, ROKAMBA)</p>  <p>© C. Lam, CC Licence</p>	<p>Fairy Tern <i>Sterna nereis</i> / <i>Sternula nereis nereis</i> (Listed as <i>Endangered</i>, under the NPW Act in SA)</p>  <p>© J.J. Harrison, CC Licence</p>
<p>Crested Tern <i>Thalasseus bergii</i> (Listed under JAMBA)</p>  <p>© G. Fergus, CC Licence</p>	<p>Caspian Tern <i>Hydroprogne caspia</i> (= <i>Sterna caspia</i>) (Listed under JAMBA and CAMBA)</p>  <p>© Mdf at Wikimedia Commons. CC Licence</p>
<p>Red-capped Plover <i>Charadrius ruficapillus</i></p>  <p>© J.J. Harrison, CC Licence</p>	<p>Hooded Plover <i>Thinornis rubricollis</i> (Listed as <i>Vulnerable</i>, under the NPW Act in SA)</p>  <p>© J.J. Harrison, CC Licence</p>
<p>Grey Plover <i>Pluvialis squatarola</i> (Listed under Bonn, CAMBA, JAMBA, ROKAMBA)</p>  <p>© G. Buissart, CC Licence</p>	<p>Bar-tailed Godwit <i>Limosa lapponica</i> (Listed under Bonn, CAMBA, JAMBA, ROKAMBA)</p>  <p>© U.S. Fish and Wildlife Service, CC Licence</p>

Common Name and Latin Name	Common Name and Latin Name
<p>Ruddy Turnstone <i>Arenaria interpres</i> (Listed under Bonn, CAMBA, JAMBA, ROKAMBA)</p>  <p>© A. Trepte, CC Licence</p>	<p>Mongolian / Lesser Sand Plover <i>Charadrius mongolus</i> (Listed under Bonn, CAMBA, JAMBA, ROKAMBA)</p>  <p>© J.J. Harrison, CC Licence</p>
<p>Pacific Golden Plover <i>Pluvialis fulva</i> (Listed under Bonn, CAMBA, JAMBA, ROKAMBA)</p>  <p>© J.J. Harrison, CC Licence</p>	<p>Double-banded Plover <i>Charadrius bicinctus</i> (Listed under Bonn)</p>  <p>© J.J. Harrison, CC Licence</p>
<p>Red Knot <i>Calidris canutus</i> (Listed under Bonn, CAMBA, JAMBA, ROKAMBA)</p>  <p>© H. Hillewaert, CC Licence</p>	<p>Red-necked Stint <i>Calidris ruficollis</i> (Listed under Bonn Convention, CAMBA, JAMBA ,and ROKAMBA)</p>  <p>© J.J. Harrison, CC Licence</p>
<p>Curlew Sandpiper <i>Calidris ferruginea</i> (Listed under Bonn, CAMBA, JAMBA, ROKAMBA)</p>  <p>© J.J. Harrison, CC Licence</p>	<p>Sharp-tailed Sandpiper <i>Calidris acuminata</i> (Listed under Bonn, CAMBA, JAMBA, ROKAMBA)</p>  <p>© Alnus, CC Licence</p>

Common Name and Latin Name	Common Name and Latin Name
<p>Masked Lapwing <i>Vanellus miles</i></p>  <p>© J.J. Harrison, GNU Free Documentation Licence</p>	<p>Great Knot <i>Calidris tenuirostris</i> (Listed under Bonn, CAMBA, JAMBA, ROKAMBA)</p>  <p>© M. Nishimura, CC Licence</p>
<p>Sanderling <i>Calidris alba</i> (Listed under Bonn, CAMBA, JAMBA, ROKAMBA) (Listed as Rare, under the <i>NPW Act</i> in SA)</p>  <p>© I. Sévi @ Wikimedia Commons</p>	<p>Grey-tailed Tattler <i>Tringa brevipes</i> (Listed under Bonn, CAMBA, JAMBA, ROKAMBA)</p>  <p>© J.J. Harrison, CC Licence</p>