

Part 2 – Foreshore Information and Analysis

2.0 Physical Environment

The Port Stephens foreshore (as defined for this study) is more than 250 kilometres in length. The physical character and processes operating on the shoreline vary markedly around its length. The Inner Port (to the west of Soldiers Point) (see **Figure 1.2**) is dominated by fluvial processes (Thom, et al 1992:177). This section of the port is characterised by wide mud flats with mangrove and saltmarsh. Sediments consist of muddy lithic sands that originate from the Karuah River. Tidal currents are responsible for the dispersal of sediment. The Outer Port (to the east of Soldiers Point) (see **Figure 1.2**) is dominated by tidal and wave processes. The form and composition of the sands and mud in the Outer Port are predominantly tidal in origin (Thom, et al 1992:177).

The dynamic sedimentary nature of the estuary means that the foreshore is in a constant state of change. For example, variations in rainfall can affect the balance of freshwater and marine water in the estuary, and the load of nutrients, bacteria, acid and suspended sediment from the catchment. Additionally, storm events can cause substantial changes, particularly in the outer port. The associated wave action influences shoaling and erosion in particular sections of the port and its shoreline. The final destruction of Myall Point (which once extended from the northern foreshore to within approximately 100 metres of the southern foreshore) by one of several large storms in the late 1920s, and the subsequent impacts that this has had on the stability of Winda Woppa, Jimmys Beach and sections of the southern foreshore illustrates the changes that storm events can cause.

The diverse character of the foreshore means that there is a diverse range of values associated with it. There are many different natural values associated with the various ecological habitats found along the shoreline. There are also many different community values associated with the use, accessibility and visual amenity of different parts of the foreshore. The physical diversity of the foreshore also means that some sections are more prone to some threats than others. For example, a rocky shoreline will be less prone to wave erosion than one composed of sand, particularly in areas where riparian vegetation has been removed.

As discussed in **Section 1.1**, in order to facilitate clear definition of issues and options, the foreshore has been divided into Management Zones (see **Figure 1.2**). This division is mainly based on physical character, but also takes into consideration the nature of development and use, recreational preferences, and visual catchment. A physical description and a summary of the features, uses and issues in each Management Zone are provided in **Table 2.1**.

Table 2.1 – Description of Management Zones

Management Zone	Description	Features/Uses/Issues
Zone A – Southern shoreline of outer Port Stephens. Includes sub zones A1 to A3	Sandy beaches separated by rocky headlands.	The shoreline is of high aesthetic value. There is high recreational demand along all beaches, foreshore reserves, and nearshore waters in this zone, with uses including swimming, scuba diving, fishing, sailing, paddle boats, power boats and picnic activities.
A1 – Tomaree Headland to Nelson Bay	Tomaree Headland is a steep bedrock outcrop that provides 360° views of Port Stephens and the adjacent coastline. This gives way to a series of sandy bays and headlands between Shoal Bay and Nelson Bay.	Tomaree Headland is located within Tomaree National Park. The Shoal Bay shoreline is affected by erosion and requires careful management to maintain recreational value and to protect infrastructure. Zone includes the main commercial and tourist developments of Port Stephens. The zone also includes Nelson Bay Harbour and D’Albora Marina. This is the main fishing port of the estuary, and the main berthing facility for commercial cruising and charter vessels. There is also a small marina at Little Beach. Boat launching ramps are located at Shoal Bay, Little Beach. Overcrowding occurs at Little Beach during peak periods.
A2 – Nelson Bay to Corlette Point	Sandy bays and rocky headlands	Zone includes longstanding residential area and a substantial section of undeveloped foreshore at Bagnalls Beach. There is a marina at Corlette (The Anchorage).
A3 – Corlette Point to Soldiers Point	Sandy beaches separated by rocky headlands.	The Salamander Bay area is the major urban growth area within the immediate catchment of Port Stephens. The Salamander Bay foreshore is backed by Mambo Wetland (SEPP14). There is a single boat ramp and jetty, and numerous moorings in Salamander Bay. Foreshore erosion is an issue in some areas. There are numerous seawalls and other foreshore structures in this Management Zone.

Table 2.1 – Description of Management Zones (cont)

Management Zone	Description	Features/Uses/Issues
Zone B – Cromartys Bay and Tilligerry Creek (Inner Port). Includes sub zones B1 to B3	The Soldiers Point ridgeline separates the open estuary bay of the outer port from the confined estuary waters of the inner port.	Flushing times increase from less than one day in the outer port to 10-12 days in the inner port. Water quality in the sheltered bays of the inner port is significantly affected by catchment runoff, and is also often turbid because of a combination of catchment inputs after rain, and the resuspension of fine sediments by wind waves and tidal currents. On-site sewerage systems affect water quality. Contains large areas of koala habitat.
B1 – Cromartys Bay	Very low gradient shoreline of muddy sand. Seagrass beds extend across most of the bay. The western shoreline of the bay is mangrove wetland which is periodically inundated.	Zone includes extensive active oyster leases and oyster processing facility. Major boat ramp facility and marina at Soldiers Point. Some urban development along the western shoreline but majority of shoreline is in natural condition.
B2 – Tilligerry Creek	A long narrow channel occupying a depression between the Pleistocene and Holocene sandy barriers of Newcastle Bight. The creek has very restricted water circulation. Foreshore characterised by muddy tidal flats.	Foreshore area has been modified through the construction of drains and embankments. Surrounding area has high potential for acid sulphate soils. Area used for rural residential settlement and small scale agricultural enterprises, with on-site wastewater management systems. These have affected local water quality. Oyster leases and processing/packing facilities on the foreshore. Foreshore erosion and protection structures an issue in the lower part of the creek.
B3 – Lemon Tree Passage	Mouth of Tilligerry Creek. Channel between mainland (Tilligerry Peninsula) and Bulls Island. Muddy tidal flats along Bulls Island shoreline. Foreshore area along mainland foreshore highly modified through reclamation and seawalls.	Boat ramp facilities and marina. Major facilities for western part of Port Stephens. Numerous moorings in channel. Long established small urban area.

Table 2.1 – Description of Management Zones (cont)

Management Zone	Description	Features/Uses/Issues
Zone C – Western part of the upper port. Comprises sub zones C1 to C2	Open and closed embayments on the southern shore of the inner port. Primarily within low lying alluvial/wetland terrain.	The water of the inner port is frequently turbid, reflecting both the resuspension of fine sediments by wind waves and the effects of discharges from the Karuah River catchment in wet weather. The flushing time of 10-12 days is considered long enough to permit algal blooms to occur and affect water quality in terms of recreational use. Tourist development is relatively restricted. Long established small urban area.
C1 – Mallabula and Tanilba Bay	Steep embankments and seawalls drop to gently sloping sandy mud/muddy sand.	This southern shoreline faces a long fetch and is subject to relatively high energy wind waves. Wave attack has affected shoreline stability and is threatening koala habitat and littoral vegetation. Large areas of seagrass in Tanilba Bay. Local stormwater drains affect shoreline stability and cause water quality concerns. Extensive foreshore reserve. Many boat moorings. Zone contains two of the largest oyster processing operations in Port Stephens.
C2 – Big Swan Bay, Twelve Mile Creek, Little Swan Bay and Reedy Creek	Tidal flats of sandy mud. Seawalls common.	Large areas of seagrass in Big Swan Bay but not Little Swan Bay. SEPP14 wetlands in Twelve Mile Creek and Reedy Creek. Numerous operational and derelict oyster leases. Large marina and slipway.
Zone D – Karuah River upstream of Karuah Bridge	Tidal flats with muddy sand, low embankments to shallow sandy mud beaches, bedrock/rockplatform.	Floodplain is underlain by acid sulphate soils and gravel deposits. Small upstream settlements are unsewered. Significant sections of intact riparian vegetation. Intensive chicken production is a major agricultural land use.

Table 2.1 – Description of Management Zones (cont)

Management Zone	Description	Features/Uses/Issues
Zone E – Northern Shoreline of Inner Port Stephens	Relatively steep and rocky foreshore. Moderate slopes to muddy sand tidal flats and rockplatforms in North Arm Cove/Fame Point area. The Pindimar area is characterised by sandy, mangrove lined shoreline, backed by flood prone land at the base of steep slopes.	Majority of shoreline is in private ownership. All villages in this area are unsewered. Public boat ramps are rare but there are numerous private boat ramps, jetties and seawalls. Erosion of the sandy shoreline at Pindimar is causing concern. Concern regarding sediment/erosion associated with development sites at North Arm Cove. Derelict oyster leases. Heavy boat usage in summer months.
Zone F – Northern Shoreline of Outer Port Stephens	Dynamic sedimentary environments.	
F1 – Corrie Island and Corrie Channel. Comprises sub zones F1 to F3	Tidal flats	Corrie Island is a Nature Reserve that is managed by NPWS. Both the eastern and western channels around Corrie Island are extensively shoaled, making navigation into the Myall River hazardous. Cost of channel maintenance is an issue.
F2 – Jimmys Beach and Yacaaba Headland	Steep beach face. Marine sand.	Severe erosion at Jimmys Beach. Beach nourishment programs over the past 10 years have failed to stabilise the beach. Threats to residences and beach amenity. Investigation of more effective long term solution is ongoing (this issue is therefore not addressed in detail in the current document).
F3 – Lower Myall River	Tidal flats, low embankment to gently sloping sandy beach, large sections completely modified by development.	Pressure for further urban development. SEPP14 wetlands. Regional boat ramp at Tea Gardens. Shoaling in channel causes boat access difficulties.