



Twofold Bay NSW02.06.08

Regional Setting

The dominant regional processes influencing coastal geomorphology in this region are the humid warm to cool temperate climate, micro-tides, south-easterly Tasman Sea swells, easterly seas, dominantly quartz (terrigenous) sediments with northerly longshore transport in the northern part, and the El Nino Southern Oscillation (driving beach erosion/accretion cycles, cyclone frequency).

Regional hazards or processes driving large scale rapid coastal changes include: East Coast Lows (extra-tropical cyclones), mid-latitude cyclones (depressions), and storm surges (<1m).

This compartment extends from Worang Point to Red Point.

Justification of sensitivity

Sensitivity rating is a 3 overall. However, local differences between tertiary compartments imply that several could respond rapidly and become a 4, or even a 5.

Other comments

Bounded by Worang Point to the north and Red Point to the south, Twofold Bay is a major embayment, divided into two sections by Lookout Point in Eden. Worang Point extends prominently to the south and limits sediment movement, implying little, if any sediment, is presently transported north from this compartment. Swath mapping has also shown that Red Point extends as a submerged rocky outcrop northwards, further enclosing the embayment. Waves refract into Twofold Bay; changes from offshore to inshore wave climate for the Bay are described by Webb (1983). Ballard (1981) has compiled historic maps of shorelines of the Bay.



Different barrier types are found around the Bay (Thom et al., 1986). Offshore sediments within the bay become coarser away from the shore (see Figure 1). The sediments constituting the barriers have been described as showing some textural and compositional variation, but are predominantly quartz with variable amounts of feldspar, lithics and heavy minerals. Progradation of barriers has been initiated from three sources: (1) by the supply of quartzose sediment from offshore, (2) the supply of angular feldspathic sediments from the Towamba River (forming a very coarse and steep beachface at Whale Beach), and (3) the supply of biogenic material (shell fragments) from a localised nearshore source (Fisheries Beach carbonate 70%).

Whale Beach is a very distinctive beach on the NSW coast, forming a narrow barrier that lies across the mouth of the Towamba River. It is unclear for how long the river will continue to feed sand to build the beach, noting there is limited accommodation space for further sediment accumulation and the river may breach the barrier, discharging more of these sands into the Bay to assist with accretion of Boydtown Beach. A substantial prograded barrier at Boydtown appears disproportionate to the small catchment of the Nullica River and has accreted as a result of onshore sand transport over the last 6000 years. It is uncertain how the beachface at Boydtown will respond; if there is limited sand supply from the bay, its low-lying topography facing east may respond quickly to further increases in sea level rise.

By contrast, Aslings Beach, facing directly into the south-easterly swell direction, comprises fine to medium, well sorted quartzose sands; and photogrammetric data shows little evidence of long-term trend (a typical stationary barrier blocking a coastal lagoon, Hails, 1969).

Confidence in sources

Medium confidence: There has been little specific research since Chapman et al. (1982).



Additional information (links and references)

Ballard, P., 1981. Twofold Bay: the interface of cartographic evidence with that of geomorphic nature: a case study. Monograph 9 Department of Geography, UNSW, Duntroon.

Chapman, D.M., Geary, M., Roy, P.S., Thom, B.G., 1982. Coastal Evolution and Coastal Erosion in New South Wales. Coastal Council of New South Wales, Sydney.

Hails, J.R., 1969. The nature and occurrence of heavy minerals in three coastal areas of New South Wales. Proceedings of the Royal Society of N.S.W. 102, 21-39.

Thom, B.G., Roy, P.S., Short, A.D., Hudson, J., Davis, R.A., 1986. Modern coastal and estuarine environments of deposition in southeastern Australia. Department of Geography, University of Sydney, 12th International Sedimentology Conference. Guide to Excursion 4A, p. 279.

Webb, A.T., 1983. Wave climate of the New South Wales coast, Proceedings of the 6th Australian Conference on Coastal and Ocean Engineering, Gold Coast, 245-251.

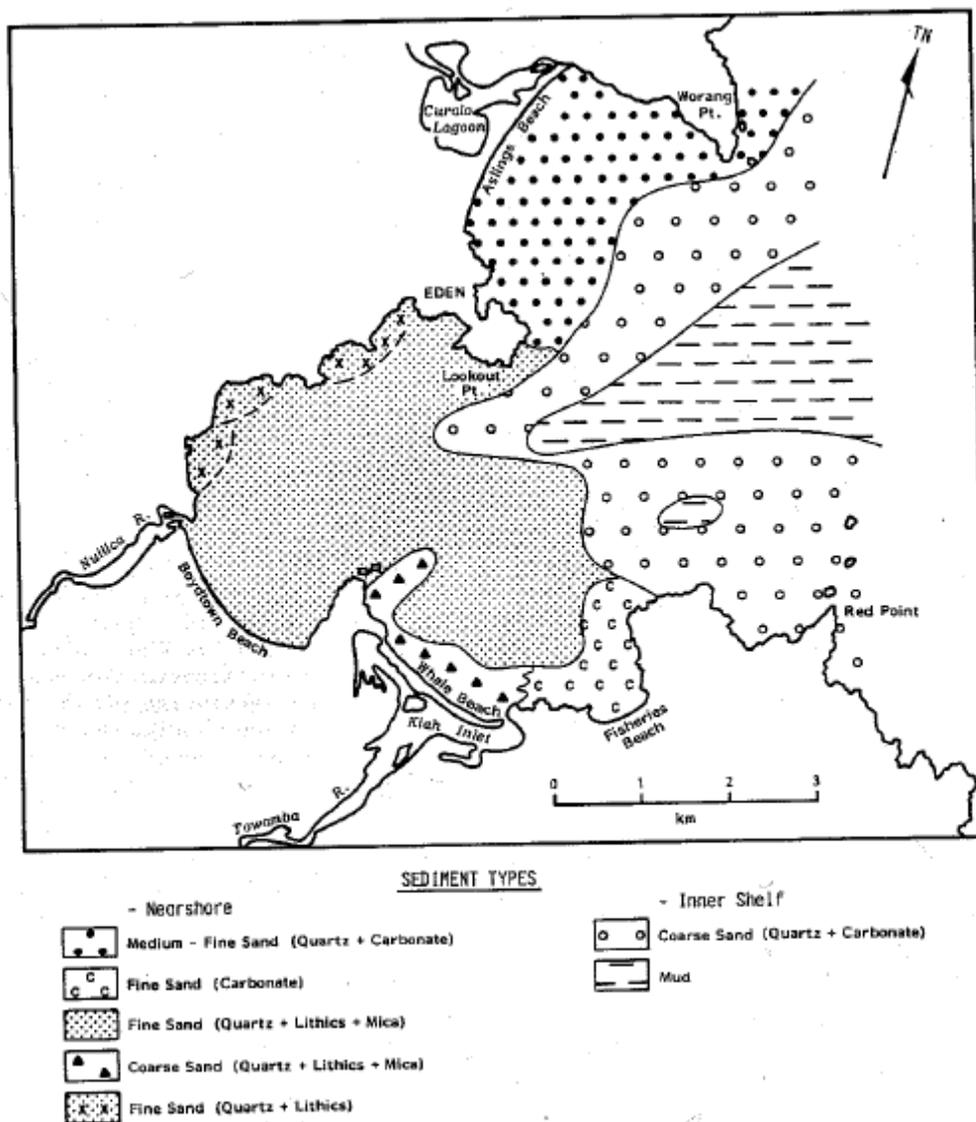


Figure 1. Offshore sediment distribution highlighting different sediment types within Twofold Bay (from Thom et al., 1986).