Tuncurry NSW01.03.04

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 Black Head to Cape Hawke.

Justification of sensitivity

Sensitivity rating is a 1, based on the progradational history of beach ridges over the past 7000 years and modelled evidence that shelf is likely to continue to supply sand, as well as a component of alongshore sand transport (Figure 1).

Other comments

The Forster-Tuncurry embayment comprises a broad beach ridge–plain, the landward portion of which is Pleistocene in age, fronted, east of the Tawamba River, by a Holocene beach-ridge plain comprising about 40 ridges that appear to have accumulated at a relatively constant rate over the past 7000 years. The geomorphology has been described in detail by Roy et al. (1997), and is summarised in Figures 1 and 3 in Kinsela et al. (2016, see below). These authors tested, using the BARSIM model, the effect of forced regression due to Late Holocene sea-level fall, time-varying longshore sediment supply, and shoreface sediment supply due to

disequilibrium morphology, to suggest the latter was the most likely source for ongoing onshore sediment accumulation, but with an additional source of longshore sand supply after 3ka.

Sand was sequestered into the Wallis lake flood tide delta between 4000 and 2000 years ago, representing a sediment sink that needed filling before longshore transport supplied sand to the beach-ridge plain. However, recent training wall construction has changed the tidal regime, allowing additional sand to be transported from the entrance to the inner shelf (Gordon and Nielsen, xxxx). Whereas an initial disequilibrium morphology that was convex provided suitable sand volumes for the progradation of the plain, these would have been decreasing rates of lowering of shoreface through time, and hence of accumulation of ridges.

Confidence in sources

Medium confidence: The Quaternary history of this area is well studied, but only preliminary modelling is available to indicate likely future trends.

Additional information (links and references)

Kinsela, M.A., Daley, M.J.A., Cowell, P.J., 2016. Origins of Holocene coastal strandplains in southeast Australia: shoreface sand supply driven by disequilibrium morphology. Marine Geology. 374: 14-30.

Nielsen, A.F., Gordon, A.D., 1980. Tidal inlet behavioural analysis, Proceedings of the 17th International Conference on Coastal Engineering. ASCE, Sydney, pp. 2461-2480.

Roy, P.S., Zhuang, W.-Y., Birch, G.F., Cowell, P.J., Li, C., 1997. Quaternary geology of the Forster-Tuncurry coast and shelf, southeast Australia, NSW Geological Survey Report, GS 1992/201, p. 405.

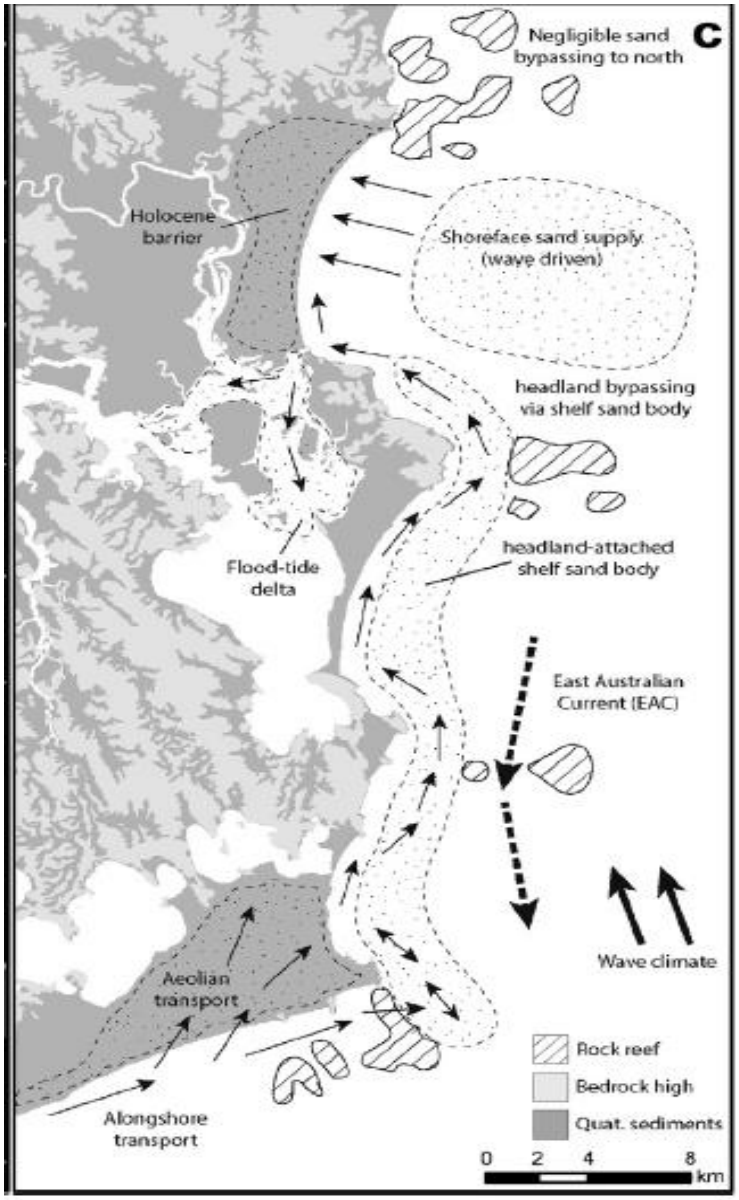

Figure 1. Sediment pathways from Kinsela et al. (2016)