



Broadwater NSW01.01.03

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 Richmond River to Evans Head.

Justification of sensitivity

Sensitivity rating is a 4, following Chapman et al. (1982), based on exposure of Pleistocene sediments.

Other comments

The Broadwater compartment contains a long beach (30 km from the southern training wall of the Richmond River to Evans Head). The beach fronts a mixed Pleistocene-Holocene sand barrier that separates the Richmond River from the sea (Figure 1). To the north is a narrow Holocene ridge, behind which are back barrier flats and a river flood plain that historically has been subject to overwash and dune instability, in places such as Patches Beach (Chapman et al., 1982). The Holocene barrier is anchored on a Pleistocene beach and dune ridge sequence that occurs at the southern end of the compartment. The Pleistocene sands are indurated with

prominent coffee-rock outcrops on the beach as the waves erode the backshore. Mining of the Pleistocene sands has occurred.

Patterson (2009, 2013; see also work by WBM Oceanics Australia 2003) notes that little information is available for shoreline behaviour immediately north of Evans Head; however, regional modelling indicates shoreline recession of up to 0.4m/yr in that area. The local model shows that the Richmond River training walls have led to some shoreline accretion, suggesting a degree of long term stability of the shoreline for about 10km to the south of the mouth.



Figure 1. Pleistocene dune exposed and experiencing erosion, Broadwater (Photo A. Short).



Confidence in sources

Medium confidence: The synthesis by Chapman et al. (1982) provides some useful historical information, but more recent modelling indicates the need for more work to be undertaken on erosion rates of the coffee rock, and the impact of the Richmond River training walls.

Additional information (links and references)

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.

Helman, P., 2007. Two hundred years of Coastline Change and Future Change, Fraser Island to Coffs Harbour, East Coast Australia. Unpublished PhD thesis, Southern Cross University.

Patterson, D.C. 2009. Modelling the shoreline impacts of the Richmond River training walls. 18th NSW Coastal Conference, Ballina, NSW.

Patterson, D.C., 2013. Modelling as an aid to understand the evolution of Australia's central east coast in response to late Pleistocene-Holocene and future sea-level change. Unpublished PhD thesis, University of Queensland.