



Bundjalung NSW01.01.04

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 Evans Head to Yamba Point.

Justification of sensitivity

Overall sensitivity rating of 4. A higher local rating of 5 is given to sections of coast at, and adjacent to, Woody Bay which are already experiencing erosion. Tertiary compartments to the south are rated 3. A lengthy section of the compartment, from the north of Woody Head and past Jerusalem Creek, is an eroded cliff cut into Pleistocene sands. Most of this area is in a National Park.

Other comments

South of Evans Head, the Bundjalung compartment consists of a crescentic beach (Ten Mile beach, 28.5 km long), fronting a broad plain of Pleistocene barrier deposits, containing former beach ridges and dunes (Chappell and Thom, 1978). The Holocene component is relatively narrow, forming either a perched beach on exposed coffee rock or a covering transgressive dune ridge over Pleistocene sands.



By contrast, partly as a result of a modest supply of sand from the Clarence River, there are extensive Holocene sediments forming a prograded beach-ridge plain between Woody Head and the mouth of the Clarence River, accumulated over the past 3000 years. This is an area of intensive study of shoreline evolution from mid Holocene times to changes since the early 1940s (Walsh and Roy, 1983; PWD, 1993; Moratti and Lord, 2000; Lord and Edwards, 2000; Goodwin et al. 2006; Patterson, 2013).

A low-lying area where the road comes close to the shore at the southern end near the Woody Bay camping area is vulnerable to erosion and inundation. Woody Bay itself is flanked by Triassic sandstone headlands; erosion has been experienced there with trees falling into the sea, with considerable retreat (~2m/yr) evident from comparison of aerial photographs from 1942 and 1990 (Goodwin et al., 2006).

A contemporary sand budget, as well as late Holocene budgets, is suggested by Goodwin et al. (2006, see Fig). Goodwin et al. (2006) suggest that erosive phases such as that seen at Woody Bay may result from a shift to more ESE mean wave direction, whereas progradation is associated with a more southerly modal wave direction. If correct, this implies that on this stretch of the northern coast of NSW there exist embayments that are sensitive to shifts in wave climate, and that may change under global warming and thus deserve close monitoring. Patterson (2013) notes some discrepancies in the modelling, perhaps related to the effects of the training walls, and offers a degree of caution in the interpretation of changes in shoreline condition. He notes that there may be limited shoreward supply of sand to the small tertiary compartments, such as that at Iluka (Patterson, 2013, Fig.8-3). However, Goodwin et al. (2006) show that to the south of Woody Bay, they are either stable at present or showing some signs of accretion related to sediment supplies off the ebb tide delta of the Clarence River (Figure 1).

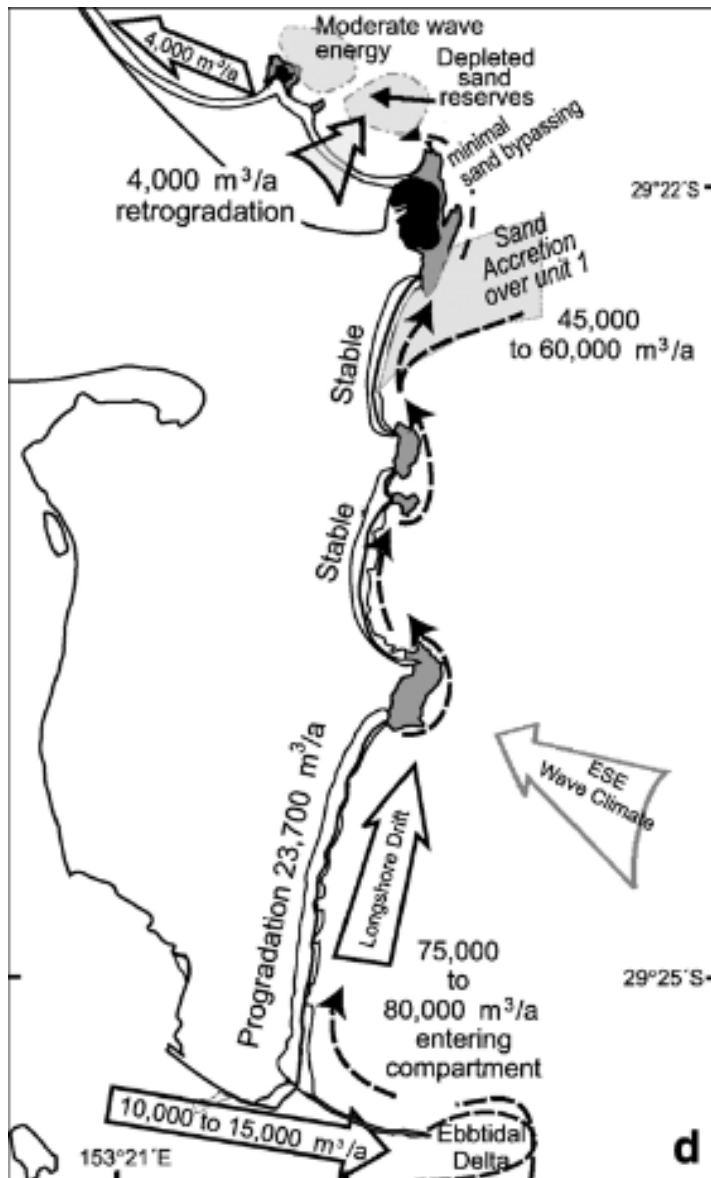


Figure 1. Iluka-Woody Bay sediment budget (Goodwin et al., 2006)



Confidence in sources

Medium to high confidence. The study by Goodwin et al. (2006) provides first indication of likely sediment budgets at the southern end of this compartment.

Additional information (links and references)

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