South Bruny TAS01.04.04

Regional Setting

This compartment extends from Tasman Head to Hopwood Point.

The whole coastal section is directly exposed to south-westerly swells. Cloudy Bay is deeply embayed but wide, and Cloudy Bay Beach is directly exposed to south-westerly swells, although some attenuation of wave energy undoubtedly occurs within the bay. Micro tides also occur here.

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).

Justification of sensitivity

The sensitivity rating for beaches and soft lagoon shores is a 4, as these areas are possibly already responding to sea-level rise in parts, and likely to be early or medium term responders. The remainder of the compartment is composed of hard rocky shores which are resilient.

Beach barrier sands in Cloudy Bay are probably mainly derived from aeolian transport from the shelf during glacial low sea stands (the beaches are backed by extensive vegetated Pleistocene wind-blown sand sheets) and additional reworking onshore during post-glacial marine transgressions. There is no present-day fluvial sand input, and modelling suggests only minor potential for continuing onshore sand transport from the shelf today (Harris & Heap 2014). However, Cloudy Bay is very

deeply embayed between rocky headlands and there is unlikely to be significant alongshore loss of sand.

A large foredune erosion scarp is present at East Cloudy Bay Beach, although the history of twentieth century to recent shoreline behaviour at this site has not been determined. High wave energy exposure and limited onshore sand supply suggest this beach may be an early to medium term responder to sea-level rise. A rising bedrock surface behind the beach is masked by old (stabilised) transgressive dunes, and thus it is unclear how far to landwards shoreline recession might proceed before being halted by the rising bedrock surface.

West Cloudy Bay Beach is backed by a sandy barrier extending in depth below present sea-level, and is likely to translate landwards into the backing lagoon in response to sea-level rise. Extensive sections of the swell-sheltered, soft sandy and sandy-clay shores of Cloudy Bay Lagoon are currently exhibiting active shoreline recession, with large tree root-balls being undermined by shoreline erosion, and may be already responding to sea-level rise.

Other comments

The resilient hard rock cliffed sections of this coast are mostly uninhabited and within Bruny National Park. The main infrastructure at potential risk from sea-level rise in this area is several roads and residences on the stabilised (vegetated) transgressive dunes backing East Cloudy Bay Beach. The risk to these assets from shoreline recession is unknown, since they may be safely situated over underlying bedrock above sea-level, or the sand on which they sit may extend to below sea-level, placing them at medium to long-term risk.

Most of this compartment has moderately to steeply rising backshores and is not significantly at risk from inundation. However extensive low-lying areas around Cloudy Bay Lagoon are susceptible to inundation.

Existing and projected future shoreline erosion and inundation around Cloudy Bay Lagoon may place extensive saltmarsh communities at risk from coastal squeeze, although some landwards migration pathways are available.

Figure 1: *Compartment TAS01.04.04 South Bruny.*

Confidence in sources

Moderate confidence: Preliminary field examinations only (Sharples & Donaldson 2014).

Additional information

Harris, PT & Heap, A 2014, 'Geomorphology and Holocene Sedimentology of the Tasmanian Continental Margin', in KD Corbett, PG Quilty & CR Calver (eds), *Geological Evolution of Tasmania*, Geological Society of Australia (Tasmania Division), pp. 530-539.

Sharples, C & Donaldson, P 2014, *A First Pass Coastal Hazard Assessment for Kingborough Local Government Area, Tasmania*, By: Blue Wren Group, School of Land & Food (Geography), University of Tasmania, DOI 10.13140/2.1.4677.9680.