East Tasman TAS01.03.04

Regional Setting

This compartment extends from Cape Frederick Henry to Tasman Island.

This is an open coast which experiences micro tides, and is exposed to Tasman Sea swells and refracted south-westerly swells.

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

Sensitivity rating for beaches is a 3. Erodible sandy beaches are deeply embayed, with little loss or gain of sand, and will probably be relatively late responders to sea-level rise. The remainder of the compartment (hard rocky coast) is mostly resilient, although slumps do occur.

Most of this coast comprises cliffed, hard rock shorelines in dolerite, siltstones, sandstones and granite (*Figure 3*). These shores are mostly resilient and stable; however, rock-falls and slumps may occur sporadically, and are likely to become more frequent with ongoing sea-level rise (Trenhaile 2011). A large active slump exists in sandstone cliffs at High Yellow Bluff (*Figure 2*).

The only soft (easily erodible) shores present in this compartment are three deeply embayed, sandy barrier beaches at Lagoon Bay, Pirates Bay, and Fortescue Bay. In each case, the sand forming these beaches was probably reworked from sand distributed across the continental shelf by rivers and wind action during glacial low sea stands, then reworked shore-wards by wave action during post-glacial marine transgressions. Within each embayment, there is probably episodic cross-shore and alongshore sand transport in response to erosion during storm events, followed by swell-driven recovery. However, there is unlikely to be significant alongshore leakage of sand into or out of these deep embayments, nor is there currently any landwards loss of sand via active transgressive dunes. Sediment mobility modelling (Harris & Heap 2014) implies there is unlikely to be significant ongoing gain of wave-driven sand to these beaches from the shelf.

Given that the sand budget for each of the three sandy embayments is probably quite stable and static, and that swell-exposure means that all three sandy beaches have the capacity for swell-driven beach recovery after storm events, it is likely to be some decades before these beaches show a persistent progressive shoreline recession in response to sea-level rise. Although the status and history of these beaches are not well known, they do not appear to be progressively receding at present.

A short section of the Pirates Bay Beach at Eaglehawk Neck is backed by a sandy isthmus, which is itself subject to erosion on the western swell-sheltered side by local wind-waves driven by westerly winds from Norfolk Bay. However, such wind-waves approach the Neck via a long narrow waterway in which wind-wave propagation is likely to be attenuated. Hence, it is likely that the western side of the isthmus is less susceptible to wind-wave erosion than might be the case in a less confined inlet.

Other comments

Due to steep coastal slopes, inundation is not a significant risk for most of this compartment. Some limited areas associated with the three embayed sandy beaches in this compartment may be prone to inundation, and increasingly so with ongoing sea-level.

The main infrastructure potentially at risk from either inundation or shoreline recession within this compartment is the Arthur Highway at Eaglehawk Neck, which crosses the sandy isthmus at low elevation on its western side, where the highway is susceptible to storm surge inundation today, and will be more at risk from both inundation and shoreline recession in future with ongoing sea-level rise.

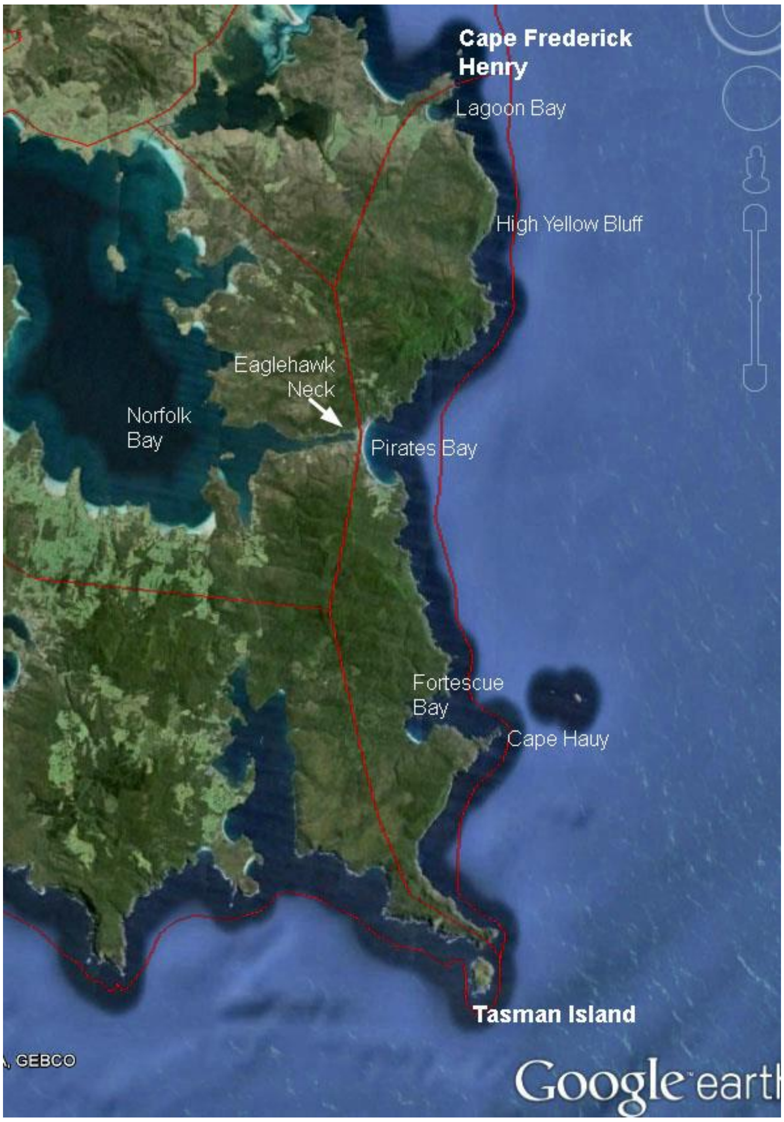

Figure 1: *Compartment TAS01.03.04 East Tasman.*

Figure 2: *A large active slump in hard Triassic sandstone coastal cliffs at High Yellow Bluff. Although the cliffed hard rock coasts of this compartment are generally stable and resilient, rock falls and slumping do occur sporadically and are likely to become more frequent with ongoing sea-level rise. Photo by C. Sharples (1994).*

Figure 3: *Resilient stable hard-rock sea-cliffs are the dominant coastal landform in this compartment, such as the dolerite cliffs of Cape Hauy (seen here in calm weather). Photo by C. Sharples (2013).*

Confidence in sources

Medium to high confidence: No previous detailed coastal geomorphic studies are available for this compartment. However, expected coastal behaviour is readily interpretable from available geological, topographic and geomorphic information.

Additional information

No detailed coastal geomorphic or hazard studies are available for this compartment. However, pertinent topographic and geological data at several scales is readily available.

The following references have been cited above:

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.

Trenhaile, AS 2011, 'Predicting the response of hard and soft rock coasts to changes in sea level and wave height', *Climatic Change*, vol. 109, pp. 599-615.