Interview TAS02.03.04

Regional Setting

This compartment extends from Conical Rocks to Sandy Cape.

It is a high energy coast exposed to south-westerly swells and storms, and to seas driven by strong, generally westerly winds. Micro tides occur here.

The dominant regional processes influencing coastal geomorphology in this region are the Mediterranean to humid cool-temperate climate, micro-tides, high energy south-westerly swells, westerly seas, carbonate sediments, interrupted swell-driven longshore transport, and the Southern Annular Mode (driving dominant south-westerly swells and storms).

Regional hazards or processes driving large scale rapid coastal changes include: mid-latitude cyclones (depressions), storm surges and shelf waves.

Justification of sensitivity

The sensitivity rating is a 3. The coastline has a declining sand budget. The beaches and dunes are a thin sand veneer perched on a hard bedrock platform above sea-level; hence, there is little potential for actual shoreline recession, although the beaches will narrow and become rockier.

The extensive, but relatively thin veneer of sand on this coast was probably mainly derived from sands reworked shoreward from the shelf during post-glacial marine transgressions. Much of the shelf sands likely originated as glacial outwash, transported down the adjacent Pieman River to the shelf from extensively glaciated highlands during glacial low sea stands. There is little or no supply of sand to the coast from rivers at the present time.

Sediment mobility modelling (Harris & Heap 2014) suggests there could be some ongoing wave-driven supply of sand from the shelf to the coast at the present time.

Despite this, it is likely that the net coastal sand budget is declining. The dominant alongshore sand transport direction is inferred to be south to north, driven by the dominating south-westerly swell. However, there is probably no continuing sand supply from the south, since Davies (1973) considered Conical Rocks to be a major barrier to alongshore transport. On the other hand, there may be leakage of sand northwards out of the compartment around Sandy Cape (Davies 1973). Moreover, there is ongoing loss of sand to landwards via transgressive dunes; their active fronts in this compartment have been shown by analysis of an air-photo time series to have progressed, up to 500 metres landwards in parts, between 1953 and 2001 (Sharples p. 168 in: RMC (2007)).

The beaches and dunes along this compartment coast are a thin sand veneer. They are perched on a hard bedrock platform, which commonly protrudes from the beaches themselves (***Figure 2***) and is commonly exposed, some metres above present sea-level, in deflation basins amongst the transgressive dunes landwards of the beaches. It is, therefore, unlikely that shoreline recession driven by sea-level rise can proceed more than a few metres landwards in most areas before meeting a rising, hard bedrock surface which will halt shoreline recession during this century at least. It is likely that beaches will become narrower in this compartment, as sea-level rise squeezes them out against the bedrock. Given the likelihood that there is a net alongshore loss of sand to the north through and out of this compartment, increasing beach narrowing will probably also progress from south to north over time. Under current downscaled climate change projections for this part of Tasmania (Grose et al. 2010) - suggesting little average annual precipitation change and a slight reduction in average wind speeds by 2100 - landwards loss of sand in transgressive dunes may persist, or perhaps decline, as it did for areas north of Sandy Cape during the twentieth century (RMC 2007).

In either case, a progressive loss of sand from shoreline areas, with only minor actual shoreline recession along what will be an increasingly rocky and thus resilient coastline, appear to be the probable outcomes for this compartment over the coming century.

Other comments

Owing to the somewhat elevated backshore bedrock platform, the parts of this compartment susceptible to coastal inundation are mainly limited to shore-face areas and estuarine reaches of the rivers and creeks reaching the coast along this shoreline.

There is no infrastructure along this coast at risk from rising seas and coastal erosion. However, Aboriginal heritage along this coast (including middens in sandy shoreline areas) is at risk from coastal erosion and beach loss.

Confidence in sources

Moderate to high confidence: Based on available geological and topographic mapping, field observations and air photo time series studies; by C. Sharples and previous regionally-relevant studies, as cited below.

Additional information

In addition to geological and topographic mapping which is available at several scales, the following references are pertinent to coastal processes and sea-level rise responses in this coastal compartment:

Davies, JL 1973, 'Sediment Movement on the Tasmanian Coast', in 1st Australian Conference on Coastal Engineering, vol. Australia National Conference Publication No. 73/1, pp. 43-46.

Grose, MR, Barnes-Keoghan, I, Corney, SP, White, CJ, Holz, GK, Bennett, JB, Gaynor, SM & Bindoff, NL 2010, Climate Futures for Tasmania Technical Report: General Climate Impacts, Antarctic Climate and Ecosystems Co-operative Research Centre, Hobart.

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.

RMC 2007, Arthur-Pieman Conservation Area Vehicle Tracks Assessment: Geoconservation and Biological Values, Department of Primary Industries and Water (Resource Management and Conservation Division), Hobart.

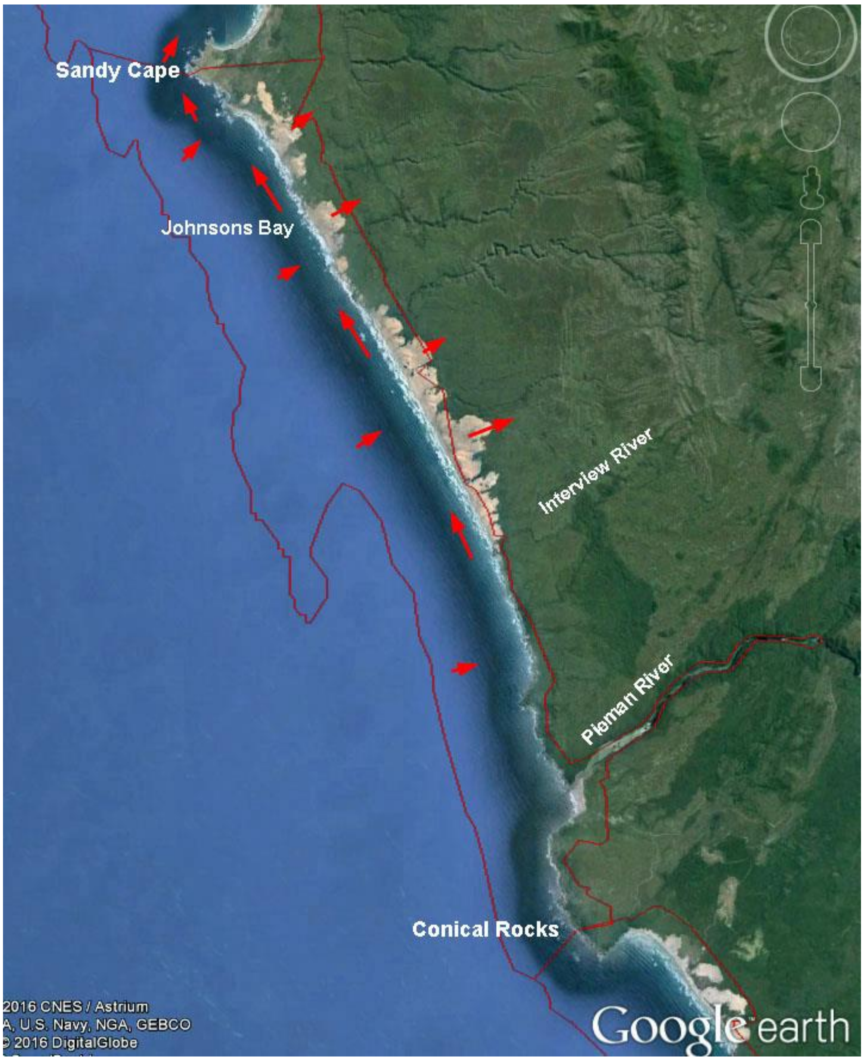

Figure 1: *Compartment TAS02.03.04 Interview. Red arrows indicate inferred current sand transport patterns, with arrow sizes indicative of inferred relative transport rates. Much of the sand in this compartment was probably originally transported down the Pieman River to the shelf from glaciated highlands during glacial low sea stands. There is little if any sand supplied from rivers to the coast at the present time.*

Figure 2: *View landwards from a typical sandy beach backed by large active transgressive dunes at Johnsons Bay. Common bedrock outcrops on the beaches and in deflation basins amongst the transgressive dunes demonstrate that the coastal sands in this compartment are mainly sitting on a coastal bedrock platform, a little above present sea-level. Hence, little shoreline recession is likely in response to sea-level rise, although the sandy beaches are likely to narrow and become more dominantly rocky shores. Photo by C. Sharples (2007).*