South Davey TAS02.02.01

Regional Setting

This compartment extends from South West Cape to Hillard Head.

This is a south-west facing coast, directly exposed to very high energy and frequently stormy south-westerly swells. Micro-tides occur here. Geomorphic evidence (orientation of active transgressive dunes) indicates that the strongest winds and by implication, seas, are north-westerly.

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 for the compartment's three beaches is a 5. They are probably early responders to sea-level rise which are already receding and likely to continue doing so. The remainder of this compartment comprises hard rocky shores which are resilient.

Beach barrier sands in this compartment are probably mainly derived from shelf sand reworked onshore by wind during glacial low sea stands (undated but likely Pleistocene vegetated aeolian sand sheets mantle parts of this coast for several km inland in parts) and by wave transport during post-glacial marine transgressions (the shelf sands may include sands of glacio-fluvial origin transported down the Crossing and Old Rivers from the glaciated highlands during glacial low sea stands). Ongoing sand supply from present day rivers is negligible, although modelling suggests there

may be some minor ongoing wave-driven sand supply from the shelf (Harris & Heap 2014). Each beach is embayed between prominent rocky headlands and there is unlikely to be significant alongshore movement of sand in or out of these embayments. However, Stephens Beach and, to a lesser extent, Noyhener Beach, are losing sand inland by aeolian erosion and transport in active transgressive dunes. A declining sand budget is likely at Stephens Beach, with little net gain or loss at the other two beaches.

All three beaches in this compartment (Stephens, Noyheener and Window Pane) exhibit very high (30m plus), actively eroding dune fronts which have been in an eroding condition for several decades at least (Cullen 1998). Exposure of palaeosols in the dune scarps at Stephens and Noyheener Beaches imply a degree of dune front recession that is unprecedented in the twentieth century at least (see ***Figure 2***). Although beach monitoring has only started recently at Stephens and Window Pane Bay Beaches, there are only minor indications of intermittent foredune recovery on a short stretch of Stephens Beach (Eberhard et al. 2015). Whereas it is likely that dune front erosion has been triggered and continued by storm wave action at all three beaches, the north-westerly exposed Stephens Beach is also losing sand landwards from the dune front by aeolian deflation into active transgressive dunes (see ***Figure 1*** and ***Figure 3***).

With a history of active dune front erosion, with little recovery for at least several decades now; exposure to frequently stormy high energy swells, seas and winds; and any onshore sand gain being clearly insufficient to allow beach recovery, it is likely that these three beach barriers are early responders to sea-level rise and are likely to continue receding with ongoing sea-level rise

Other comments

Apart from the beach surfaces, coastal inundation is not a significant hazard elsewhere in this compartment, where steep high dunes and steep rocky shores are present.

This coast is entirely uninhabited with national park land tenure, and is part of the Tasmanian Wilderness World Heritage Area. Infrastructure potentially at risk from

coastal erosion or inundation is limited to a few campsites. However, a very extensive Aboriginal midden complex is being gradually eroded and deflated at Stephens Beach.

Figure 1: *Compartment TAS02.02.01 South Davey. Mostly steep, resilient, hard rock coast with three embayed sandy beach barriers.*

Figure 2: *Prominent palaeosols exposed in dune-front erosion scarps such as this one at Noyheener Beach imply that the current recession of such dune fronts is greater than has occurred at these beaches since these palaeosols were formed. This palaeosol has not yet been dated, but dates obtained on similar palaeosols at Nye Bay (40 km north of Port Davey) yielded ages ranging between 400 and 750 years BP (Pemberton & Cullen 1999), suggesting that this degree of dune face recession is likely to be unprecedented, over the twentieth Century at least. Photo by C. Sharples.*

Figure 3: *Strongly deflating dune front backed by active transgressive dunes at the north-west-facing Stephens Beach. It is likely the erosion of this dune front was triggered by wave attack. However, extensive active transgressive dunes backing this beach suggest that aeolian erosion and sand transport is currently a significant factor in both the recession of the dune front and (inland) loss of sand from the system. Photo by C. Sharples.,*

Confidence in sources

Medium confidence: Several studies available, but better understanding of past beach behaviour is needed.

Additional information

Cullen, P 1998, *Coastal Dune Systems of South-Western Tasmania: Their Morphology, Genesis, and Conservation*, Nature Conservation Report No. 98/1, Parks and Wildlife Service, Tasmania.

Eberhard, R, Sharples, C, Bowden, N & Comfort, M 2015, *Monitoring the Erosion Status of Oceanic Beaches in the Tasmanian Wilderness World Heritage Area: Establishment Report*, Nature Conservation Report Series 15/3, Department of Primary Industries, Parks Water & Environment, Tasmania, Hobart, Tasmania.

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.

Pemberton, M & Cullen, P 1999, 'Soils, stratigraphy and shells; Coastal dune development in parts of western Tasmania', in J Hall & J McNiven (eds), *Australian Coastal Archaeology*, ANH Publications, Department of Archaeology and Natural History, The Australian National University, Canberra, vol. No. 31, pp. 271-277.