Derwent - D'Entrecasteaux TAS01.04.05

Regional Setting

This compartment extends from Cape Direction-Cape de la Sortie to Hopwood Point-Rossel Point.

It contains the mainly estuarine coastal environments of the Derwent, Northwest Bay and Huon Rivers, with variable swell exposure (moderate to nil) and variable wind-fetch exposure, with local wind waves being the dominant waves over much of the compartment. Micro-tides occur here. There are likely to be some tidal current influences on sediment transport but these processes are poorly understood for this compartment.

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

This compartment has a sensitivity rating of 3 to 5 for sandy shores, depending on swell and wind-fetch exposure. The unprotected soft-rock shores are rated at 5. Some sandy and soft rock shores are likely to be early or medium-term responders to sea-level rise. The hard rocky shores are mostly resilient.

Beach sands in this compartment are likely mainly glacio-fluvial sands, supplied to the Storm Bay continental shelf by the Derwent and Huon Rivers from glaciated highlands during glacial low sea stands, and reworked onshore during post-glacial marine transgressions. There is negligible present-day sand supplied by rivers, and modelling suggests little potential for present-day continuing onshore sand supply from the shelf to this mostly low-swell environment (Harris & Heap 2014). There may be some contribution from ongoing shoreline erosion of Triassic age sandstones, but quantities are probably small. Most beaches are well-embayed between rocky headlands, with probably little potential for alongshore sand movement between embayments in most cases. In some cases where natural longshore sediment transport was occurring, this has been halted by artificial structures (e.g. Long Beach, Sandy Bay).

With most sandy embayments neither losing nor gaining sand significantly, sandy beach behaviour in this compartment varies widely, depending substantially on the degree of swell and/or local wind-fetch exposure. Some moderately swell-exposed sandy beaches such as Bellerive, Howrah and Kingston Beaches have to date shown substantial recovery from erosion events and are likely to continue to do so for some time, making them likely late responders to sea-level rise. Other swell-sheltered but wind-fetch exposed sandy shores, such as the north part of Gorringes Beach (see ***Figure 2***), southern Snug Beach (Northwest Bay) and northern Isthmus Bay Beach (Bruny Island neck), are showing an ongoing trend of progressive shoreline recession without recovery. These are probably early responders to sea-level rise which are likely to continue receding with ongoing sea-level rise.

Many of the soft rock (cohesive clayey sandstones, conglomerates and boulder clay) shores within this compartment have, in the past, been covered with protective structures indicative of past erosion problems (e.g., at Sandy Bay and Middleton). Those which have not been protected generally show clear signs of active (albeit slow and episodic) shoreline recession (see ***Figure 3***). These are a shoreline type which cannot recover from erosion and can be inferred to have been continually, albeit slowly, receding since the last post-glacial marine transgression ended, circa 6,500 years ago. The recession of this type of shore is expected to accelerate with sea-level rise (Trenhaile 2011), and thus unprotected soft rock shores in the Derwent estuary and D'Entrecasteaux channel are probably early responders to sea-level rise.

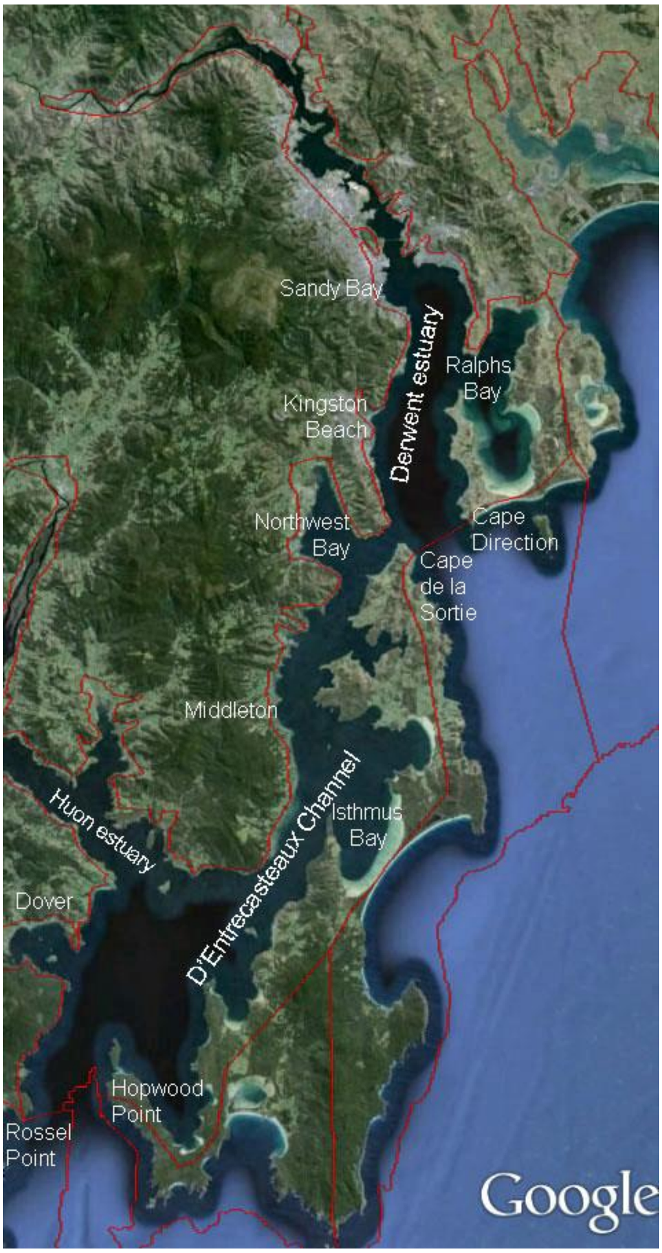

Figure 1: *Compartment TAS01.04.05 Derwent - D'Entrecasteaux.*

Figure 2: *Whereas most swell-exposed beaches in this compartment are continuing to recover from erosion events and show no indication of a recessional response to sea-level rise, some beaches with no swell exposure (and thus little capacity to return sand to the shore after wind-wave erosion events) are showing significant recession with no recovery. This example at Gorringes Beach in Ralphs Bay is typical of a number of sandy shores in Ralphs Bay and D'Entrecasteaux Channel, where indicators such as mature trees that must have germinated landwards of the high water mark are now isolated by progressive shoreline recession, and so imply an existing long term recession trend. This can be expected to accelerate with sea-level rise. Photo by C. Sharples.*

Figure 3: *An actively eroding, soft-rock shore at Margate (Northwest Bay). Exposure of semi-lithified, cohesive clayey sandstones and conglomerates such as shown here are a feature of this compartment, and they are nearly everywhere showing active, progressive (albeit slow or episodic) shoreline recession wherever they are not artificially protected. At this location, the progressive recession is threatening the esplanade road immediately above this scarp. Photo by C. Sharples.*

Other comments

A great deal of infrastructure assets, including roads and residences, are at risk from shoreline recession in this compartment.

Coastal inundation is also a significant hazard to many shores in this compartment, including townships at Dover, Snug, Kingston Beach, Sandy Bay (Marieville Esplanade) and Lauderdale.

Confidence in sources

Moderate confidence: Several comprehensive first pass studies available (e.g., Sharples (2006), Sharples and Donaldson (2014), Sharples (2015)) but few detailed hazard assessments (Carley et al. 2008).

Additional information

Beach profile monitoring for several beaches within compartment: www.tasmarc.info

Carley, JT, Blacka, MJ, Timms, WA, Anderson, MS, Mariani, A, Rayner, DS, McArthur, J & Cox, RJ 2008, *Coastal Processes, Coastal Hazards, Climate Change and Adaptive Responses for Preparation of a Coastal Management Strategy for Clarence City, Tasmania*, Water Research Laboratory, University of New South Wales.

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 2006, *Indicative Mapping of Tasmanian Coastal Vulnerability to Climate Change and Sea-Level Rise: Explanatory Report. 2nd Edition*, Department of Primary Industries & Water, Tasmania, Hobart.

—— 2015, *A First Pass Identification of Coastal Hazards for the Huon Valley Council LGA*, Huon Valley Council & NRM South, Hobart.

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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.