# Freycinet TAS01.02.05

## Regional Setting

This compartment extends from Friendly Point to Cape Sonnerat.

The coast is micro-tidal, receives refracted south-westerly swells as well as more direct Tasman Sea swells, and is also highly exposed to seas generated by extra-tropical cyclones (East Coast Lows).

Strong tidal currents occur in Schouten Passage, between Freycinet Peninsula and Schouten Island.

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 is a 3 for swell-exposed Wineglass Bay Beach (late responder with stable sand budget). The remainder of this coast is resilient hard rock which will mostly show little response to sea-level rise before 2100, although sporadic instability may occur.

Most of the shoreline in this compartment is hard, steeply sloping, granite bedrock, which will be generally resilient and show little change in response to sea-level rise before 2100. However, sporadic slumps and rock-falls do occur on hard rocky coasts, and a large coastal rockslide has occurred in this compartment in recent

decades (see Figure **Error! No bookmark name given.**). Sea-level rise is likely to cause some increase in the frequency of such events on hard coasts (Trenhaile 2011). Hence, further similar slumps may occur on this coast before 2100, although they will probably still be relatively infrequent.

The well-known iconic Wineglass Bay Beach is the only sandy beach in this compartment, and is located in a deep embayment between large rocky headlands. The white sands forming the beach probably originated from rivers, draining areas (including local granite highlands) that were eroding more rapidly under Pleistocene glacial phase climates. After rivers distributed the sands to the adjacent continental shelf during the glacial low sea stands, it was probably reworked onshore into the Wineglass Bay embayment during post-glacial marine transgressions.

There is no significant quantity of sand being supplied to Wineglass Bay from rivers and creeks at the present time, nor does sediment mobility modelling (Harris & Heap 2014) indicate a potential for significant continuing supply of sand directly into Wineglass Bay from the shelf at the present time. Although the swell wave exposure of this compartment can be expected to drive generally northwards littoral currents along this coast, the large rocky promontory of Freycinet Peninsula, and particularly Cape Forestier to the south, probably prevents leakage of sand into Wineglass Bay from that direction (Davies 1973). There is probably no more than minor leakage northwards out of this deep embayment.

Wineglass Bay Beach probably, therefore, has a mostly stable sand budget, which is unlikely to lose significant sand from the deep embayment during erosion events. Given its exposure to a refracted swell capable of returning eroded sand to the beach, Wineglass Beach will probably be a relatively late responder to sea-level rise which will not show significant shoreline recession for some decades.

### Other comments

This compartment is uninhabited National Park, with no infrastructure assets at the shore, apart from walking tracks and camping areas at either end of Wineglass Bay, and access tracks and camping areas further north at Sleepy Bay and Bluestone Bay.

Coastal inundation hazards are mostly extremely limited, due to the steeply sloping rocky shores along most of this coast. However, some low-lying areas behind Wineglass Bay Beach may be susceptible to flooding, including the camping area and tracks at the south-east end of the beach.

## Confidence in sources

High – medium confidence: No detailed coastal process studies are available for this compartment. However, the relatively simple coastal geomorphology suggests a predictable late response to sea-level rise.

## Additional information

Good relevant topographic and geological mapping at several scales are available for this 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.

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.

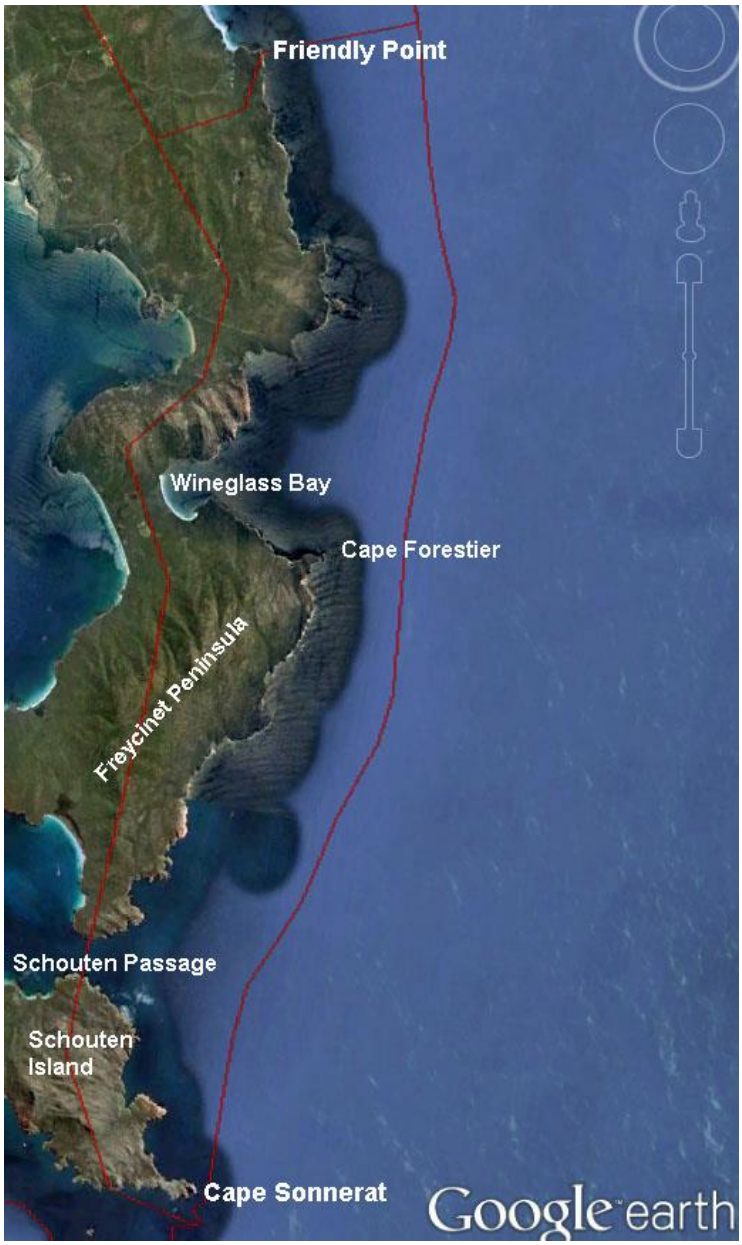
Friendly Point
Wineglass Bay
Cape Forestier
Freycinet Peninsula
Schouten Passage
Schouten Island
Cape Sonnerat
Google earth

***Figure 1:*** *Compartment TAS01.02.05 Freycinet.*

***Figure 2:*** *A major rockslide in the generally-resilient hard granite cliffs just south of Cape Forestier (Wineglass Bay Beach visible to the right). The date of this rockslide is uncertain but probably within the last few decades, demonstrating that even the most resilient hard rock shores occasionally show significant changes. Photo by Michael Spaulding (Tasmania Parks & Wildlife Service, 2012).*