Flinders Island: Foochow TAS01.01.01

Regional Setting

This compartment extends from Stanley Point to Stellars Point.

It is exposed to Tasman Sea swells and winds, although it is sheltered from south-westerly swells which propagate eastwards through Bass Strait. The compartment experiences a micro-tidal range. However, strong tidal currents around the northern and southern ends of Flinders Island may play a role in transporting sand to 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

The sensitivity rating for Foochow Beach is probably a 1. It is likely to be gaining sand and continuing to prograde, so may be a very late responder to sea-level rise. Higher local ratings are given to the saltmarshes (sensitivity 3) and sandy shores (sensitivity 5) within the Northeast River estuary.

Sand in this compartment was probably originally sourced from rivers flowing onto the Bass Strait plains during glacial phase low sea stands, including some supplying sand from glacial erosion (Forth and Mersey rivers). There is also a significant biogenic (carbonate) sand component in Bass Strait. Sand was transported eastwards and south-eastwards by wind during glacial low sea stands (Bowden

1983), and was also redistributed landwards by wave action during post-glacial marine transgressions (Davies & Hudson 1987). Sediment transport modelling (Harris & Heap 2014) suggests there is likely to be continuing onshore transport of sand to this compartment, which probably has a gaining sand budget.

A wide strand plain indicates Foochow Beach has prograded significantly during the Holocene (and previous interglacial high sea stands). However, a lack of dating studies means the timing of progradation is poorly constrained. Together with modelling implications of a gaining sand supply, the current condition of the beach and foredunes suggests the beach may be continuing to prograde, with continuing sand accretion fast enough to outpace occasional erosion events (***Figure 2***). However, there is a need for an historic air photo time series study to determine whether the beach has actually prograded in recent decades. The indications are that Foochow Beach may be actively gaining sand at a rate sufficient to 'keep up' with sea-level rise for longer than most beaches in Tasmania.

Within the swell-sheltered but tidal and permanently open Northeast River estuarine lagoon, saltmarsh shores are not eroding but do appear to be migrating landwards, with *Sarcicornia* invading the backing *Melaleuca* zone which is dying off. Feral pigs are causing some damage by digging the *Sarcicornia* (Observations by C. Sharples and V. Prahalad 2014). However, sandy estuarine shores in wind-fetch exposed locations are exhibiting recently active shoreline recession (***Figure 3***), and with little capacity for wave-driven shoreline recovery, it is likely these are early responders to sea-level rise which may be expected to continue receding.

Other comments

There is very little infrastructure close to the shore in this relatively remote compartment, the most notable being road access at Northeast River mouth and Patriarch inlet.

Inundation susceptibility along most of this shore is minimal owing to foredune barriers, except at inlets such as Patriarch Inlet.

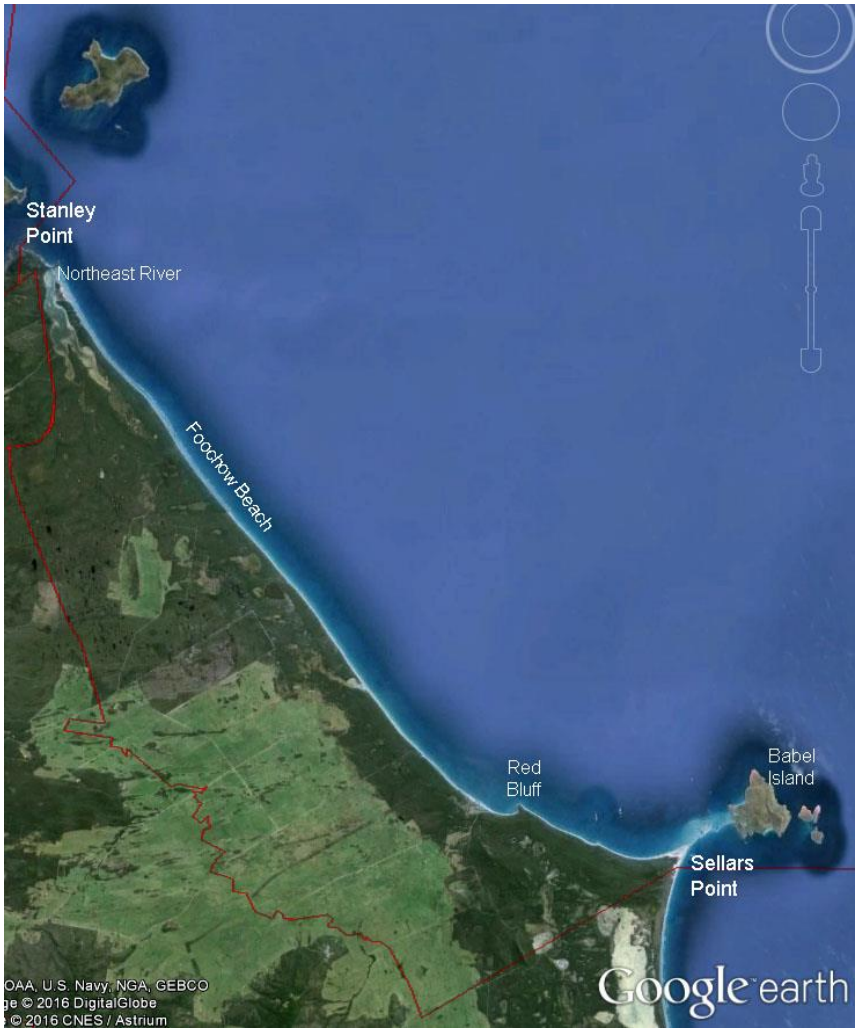

Figure 1: *Compartment TAS01.01.01 Flinders Island: Foochow. Comprising almost 33 km of unbroken sandy beach between protruding bedrock outcrops at Northeast River mouth and Red Bluff, Foochow Beach is one of Tasmania's longest uninterrupted beaches (equal with Ocean Beach, which is within a few metres of the same length).*

Figure 2: *Foochow Beach showing large incipient foredune seawards of partly scarped established dune, typical of the full length of the beach. This beach is backed by multiple parallel dunes and beach ridges, is probably continuing to receive a significant input of shelf sand, and may be actively prograding, although dune dating and historic air photo time series studies are needed to confirm this. Photo by C. Sharples (2006).*

Figure 3: *Active shoreline recession is undermining mature Melaleucas on more wind-fetch exposed shores within the swell-sheltered, permanently open tidal estuary of Northeast River, behind northern Foochow Beach. Photo by C. Sharples (2014).*

Confidence in sources

Medium confidence: Based on field observations and existing geological mapping, with no detailed studies of coastal processes having been undertaken; although, Sutherland and Kershaw (1971) provide some pertinent information, and some relevant inferences can be made from regional studies including Davies and Hudson (1987) and Bowden (1983). Dune dating and air photo time series studies are still needed to properly understand twentieth century and present-day shoreline behaviour in this compartment.

Additional information

Bowden, A 1983, 'Relict Terrestrial Dunes: Legacies of a Former Climate in Coastal Northeastern Tasmania', *Zeitschrift fur Geomorphologie N.F.*, vol. 45, pp. 153-174.

Davies, JL & Hudson, JP 1987, 'Sources of shore sediment on the north coast of Tasmania', *Papers and Proceedings of the Royal Society of Tasmania*, vol. 121, pp. 137-151.

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.

Sutherland, FL & Kershaw, RC 1971, 'The Cainozoic Geology of Flinders Island, Bass Strait', *Papers and Proceedings of the Royal Society of Tasmania*, vol. 105, pp. 151- 175.