



## Bell Peak - Cooper Point QLD03.07.02

### Regional Setting

The dominant regional processes influencing coastal geomorphology in this region are the wet tropics to humid sub-tropical climate, south-east trade winds, mega-meso tides, strong tidal currents, low to moderate south-east seas (local wind-waves), the dominantly terrigenous sediments with interrupted northerly longshore sediment transport (low-moderate), the El Nino Southern Oscillation (driving sea-level variability, tropical cyclone frequency, beach erosion/accretion cycles); and the Madden-Julian Oscillation (driving weather patterns including monsoons and tropical cyclones).

Regional hazards or processes driving large scale rapid coastal changes include: tropical cyclones, storm surges, river flooding, and variable longshore sand transport.

This compartment extends from Bell Peak to Cooper Point.

### Justification of Sensitivity

The sensitivity rating is 4. The shoreline is stable but sediment supply is limited and predicted to decline.

- Coastal sediment delivery from Mulgrave River appears to be released in pulses associated with cyclone activity and sediment stripping from the valley floor (Leonard and Nott 2016).
- The Mulgrave and Russell Rivers converge and flow through the Mutcheno Inlet, where sediment has built an ebb tidal delta and sand flats.
- In the southern section of this compartment there are two northeast facing embayment beaches, Rocky Point Beach and Bramston Beach. Sediment supply to these is predicted to decline.



- The Mulgrave and Russell Rivers currently deliver around 290 kt/yr of suspended sediment, which is roughly 5.8 times what it would be under natural vegetation and runoff conditions (see Brodie et al., 2011), although bedload is only likely to comprise ~10% of the total.

#### **Other comments**

- Apart from the outflow of the Mulgrave and Russell Rivers, much of the sediment is locally derived, forming steep granitic sand beaches.
- The impact of cyclonic events is likely to be more severe, with longer beach recovery times.

#### **Confidence in sources**

Medium confidence in sources.

#### **Additional information (links and references)**

Brodie, J, Lucy A. McKergow, I P. Prosser, M F, Hughes, A and Hunter, H (2011) Sources of Sediment and Nutrient Exports to the Great Barrier Reef World Heritage Area, *Australian Centre for Tropical Freshwater Research report 03/11*

Coventry, R J, Hopley, D, Campbell, J, Douglas, I, Harvey, N, Kershaw, A P, Oliver, J, Phipps, CVG. and Pye, K (1980) The Quaternary of Northeastern Australia, *Chapter in* Henderson, R.A. and Stephenson, P.J. (eds.), *The Geology and Geophysics of Northeastern Australia*, Geological Society of Australia, Queensland Division, Brisbane (pp 375-419), ISBN 0 909714 67 3



Leonard, S and Nott, J (2016) *A Holocene fluvial archive of the Mulgrave River, Northeastern Australia: influence of tropical cyclones and sediment delivery to the Great Barrier Reef*. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 441 (Part 4). pp. 845-853.

Pringle, A W (1991) Fluvial Sediment Supply to the North-East Queensland Coast, Australia, *Australian Geographical Studies*, Vol.29(1), pp.114-138

Short, A D (2000) *Beaches of the Queensland Coast: Cooktown to Coolangatta*, Australian Beach Safety and Management Program, University of Sydney Press