



## Geographe Bay (south) WA06.01.01

### Regional Setting

The dominant regional processes are the Mediterranean to arid climate; the El Nino Southern Oscillation (driving sea-level variability); Southern Annular Mode (driving south-westerly swells and storms); strong sea breezes; micro to meso tidal, mainly diurnal; south-westerly swells; southerly seas; and carbonate sediments with moderate northerly longshore transport.

This coastline is susceptible to regional hazards, including extra-tropical cyclones, mid-latitude cyclones (depressions), storm surges, and river flooding (sub-regions only).

This compartment extends from Cape Naturaliste to Point Casuarina.

### Justification of sensitivity

The sensitivity rating is a 4, because the coast has an existing supply of sediment reworked from the Capes region south of Cape Naturaliste, and biogenic sediments derived from the offshore reefs and seagrass meadows. Both sources are likely to decline and be unable to keep pace with sediment demand required to maintain existing coastal landforms and shoreline position. Additionally, foredunes backing the beaches are unstable and have been reworked frequently in part due to migrating sand bars.

### Other comments

A discontinuous offshore reef encloses an extensive zeta-form bay between Cape Naturaliste and Casuarina Point. Between the reef and shore are shelving platform reefs, seagrass banks, rock platforms and drowned Pleistocene landforms, such as the lithified cores of old dune lines and rocky pavements. Along the shore, small bay beaches along the mixed sand and rock coast between Cape Naturaliste and Point



Piquet give way to narrow sandy beaches, dunes backed in the south by a narrow, Holocene foredune plain separating the ocean from backbarrier lagoons - Toby Inlet, Broadwater, Wonnerup Estuary and the Vasse Estuary. Further north, a mainland barrier over-rides older sediments, including rock platform, from near Peppermint Grove to Casuarina Point. One stream, the Capel River, debouches into the ocean in this northern section.

Any assessment of hazard and risk along this coast, or for localised reaches of shoreline should be cognisant of longshore sediment transport and bar dynamics. Local retreat of the shoreline, apart from that caused by structures, has been associated with bar dynamics, particularly following the eastward migration of transverse bars along the shore.

There is considerable potential for marine inundation of the lagoons landward of the foredune plains via estuary entrances and drainage channels without floodgates. This problem is likely to be exacerbated by coincidental stream discharge and river flooding from the Whicher Scarp, with breaching of the frontal dune.

Despite geomorphic descriptions of barrier landforms and shoreline movement, there is a need for scientific investigation of the influence of the underlying calcarenite pavement east of Wonnerup.

### **Confidence in sources**

High confidence. Based on detailed studies.

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

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