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Pursuing Geoheritage and Geoconservation in Australia

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Assessment of the coastal dunes between Scarborough Beach and Trigg Island.

This assessment is mainly of the dunes and partly on the vegetation. The assessment draws on information in Semeniuk *et al.* (1989) in their study of the Quindalup Dunes and the coastal sector study of Searle & Semeniuk (1982).

The coastal dunes between Scarborough Beach and Trigg Island belong to the Cape Bouvard to Trigg Island Sector of Searle & Semeniuk (1985) and are essentially a single set of coastal dunes comprised of shore-parallel sand ridges and depressions extending along the coastal for some 5 km. They front a terrain of former limestone cliffs (see Semeniuk & Searle 1986).

Today, as a result of storms and wind mobilisation to landward of the fore-dunes, the entire belt of coastal dunes between Scarborough Beach and Trigg Island is cliffed at its seaward edge at its contact with the storm level of the beach (see terms after Semeniuk & Johnson 1985) and, as such, there is no fore-dune - the first dune is the first sand ridge some 5 m high.

At central Scarborough Beach, where Bush Forever site 310 is located, the coastal dunes consist of a seaward shore-parallel sand ridge 5 m high, a landward linear depression, and another shore-parallel sand ridge 7 m high further landwards (Fig.1). At northern Scarborough Beach, where Bush Forever site 308 is located, the coastal dunes consist of a seaward shore-parallel sand ridge 5 m high, a landward linear depression, another shore-parallel sand ridge and its leeward linear depression, and further landwards the (most-landward) sand ridge some 12-15 m high (Fig.2), truncated by West Coast Highway.

While the largest scale of landforms consist of shore-parallel sand ridges and depressions, each some 15-25 m wide, with 2-3 ridges comprising the coastal set, at the smaller scale, the ridges themselves and the depressions are comprised of 'chaots' (a term by Semeniuk *et al.* 1989 to refer to a dune terrain of random sand hills and their intervening depressions). In fact Semeniuk *et al.* (1989) describe 'chaots' as occurring in ridge form.

Geomorphically, and in terms of coastal geoheritage (Brocx & Semeniuk 2009a), the significance of the dune belt of sand-ridge-and-linear-depressions in the Scarborough Beach and Trigg Island area is that in the central coastal and southern coastal plain area they are not that common. Further north, the wind direction changes direction (Searle & Semeniuk 1985), and coastal dune also correspondingly change form and are incomparable (Semeniuk *et al.* 1989).

Most of the coastal terrain in the Cape Bouvard to Trigg Island Sector consists of limestone rocky shores (Semeniuk & Johnson 1985) and where there is sand accumulation it is commonly in the form of cusped forelands (Searle & Semeniuk 1985; Semeniuk *et al.* 1989) – these are incomparable geomorphically in their setting to the narrow shore-parallel belt that front former cliffed limestone terrain such as in the Scarborough Beach and Trigg Island area. The only other location where there

is a linearly extensive narrow belt of shore-parallel beach ridges is at North Cottesloe. In detail, in regards to beach ridges, other coasts with beach ridges belong to cusped foreland settings such as at Point Becher (Semeniuk & Searle 1986; Searle *et al.* 1988, Semeniuk *et al.* 1988, 1989) and, again, are incomparable geomorphically in their setting to the narrow shore-parallel belt that fronts former cliffed limestone terrain such as in the Scarborough Beach and Trigg Island area.

To assess the significance of the sand ridge system in the Scarborough Beach and Trigg Island area, from a viewpoint of their (geo)heritage value, the Geoheritage Tool-kit of Brocx & Semeniuk (2009b, 2015) can be used. This is an IUCN-endorsed technique to evaluate landforms and geology. Using the Geoheritage Tool-kit, the sand ridge belt of the Scarborough Beach and Trigg Island area is evaluated as State-wide significance because of the occurrence of a linear belt of the ridge-and-depression system outside a system of a cusped foreland, and the occurrence of chaots as the smaller-scale landforms comprising the ridges and the depressions.

In terms of vegetation, the flora is inhabiting a distinct system of ridges and depressions and forms a distinct system of vegetation assemblages in response to the high-ground and low-ground of the topography (*i.e.*, the ridges and depressions). Also of significance, in addition to the changes in flora according to the topography-related habitats (chaots, ridges, depressions), there is a gradient of vegetation composition in relation to distance from the strand, sea spray, and winds. In this context, even though today it is fragmented, the vegetation-and-habitat system form an important system of dunes showing an ecological gradient that is of State-wide significance.

References

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Figures



Figure 1: Sand ridges and depression with small-scale chaot dunes at Bush Forever Site 310



Figure 2: Vegetated sand ridges and depression fronted by a sand ridge and depression with chaot dunes at Bush Forever Site 308

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