Importance of dune vegetation

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Leaflet No.
III–02

Pioneer zone vegetation

The pioneer zone colonised by sand-stabilising plants usually extends landward from the debris line on the beach to the crest of the foredune. Where the beach is eroding, this zone can be very narrow or completely absent. Where the beach is accreting rapidly, the pioneer zone can cover the berm and the whole of the foredune.

Pioneer plants constitute the initial vegetation which colonises newly developed sand accumulations. This vegetation may eventually be replaced by grassland, shrubland, coastal heath, scrub, woodland, forest or wetland during the development of vegetation zonation. Pioneer zone vegetation generally does not complete the stabilisation process but it prepares the dune soil and provides other habitat conditions for establishment and growth of other vegetation types (e.g. woodland or scrub).

Herbaceous plants of the pioneer zone play a dominant role in dune formation. They grow in a manner that helps build dunes in conjunction with wind action. Plants growing on the upper part of the beach and berm trap windblown sand and initiate formation of a low frontal dune. By continuing to grow and trap windblown sand, they increase the rate and height of dune formation and determine the pattern of vegetation development of the coastal dune system. Most of the pioneer plants occur on the seaward slope and crest of the foredune where they are exposed to

The pioneer zone vegetation dominated by beach spinifex grass *Spinifex sericeus* and goat's foot convolvulus *Ipomoea pes-caprae* is trapping windblown sand and forming a new dune seaward of the previous foredune.

Beach Protection Authority Queensland

Queensland Government Environmental Protection Agency

ISSN
0312–7796

salt spray, sandblast, strong winds and, in the case of those on the seaward slope, the risk of periodic flooding by the sea.

Herbaceous plants of the pioneer zone usually have strong underground root systems and surface runners. The most effective sand-trapping plants are fibrous-rooted perennial grasses with the following characteristics:

- rapid lateral spread by horizontal or underground stems
- rapid vertical growth by upright stems (the stems usually grow upward as fast as sand accumulates around them)
- stems that develop roots at progressively higher levels from the joints or nodes, as sand accumulates.

The pioneer zone on beach/foredune systems in south-east Queensland can be divided into several subsystems:

1 The debris line zone is located at or just above high water mark, and is colonised by the upright annual sea rocket *Cakile maritima* and the sprawling herbaceous perennial sesuvium *Sesuvium portulacastrum*. Sometimes the creeping perennial sand spinifex grass *Spinifex sericeus* germinates and grows near the debris line. Plants are not always present in this zone.

2 The grass zone occurs above the debris line and includes the berm and the lower portion of the seaward slope of the frontal dune. This zone is colonised almost exclusively by sand spinifex grass but sea rocket, sesuvium and the creeping vine goat's foot convolvulus *Ipomoea pes-caprae* occasionally occur.

3 The herbaceous vine zone occurs on the upper portion of the seaward slope of the frontal dune. Goat's foot convolvulus grows in conjunction with sand spinifex grass and often forms a dense cover but usually it has an open growth habit. Angular pigface *Carpobrotus glaucescens*, beach primrose *Oenothera drummondii* and scented fan-flower *Scaevola calendulacea* are herbaceous perennials also found in this zone where vegetation cover is generally more dense than in the grass zone.

4 The woody herbaceous vine zone occurs towards the top of the seaward slope and on the crest of the frontal dune. Plants commonly found here include snake vine *Hibbertia scandens*, dune couch *Zoysia macrantha*, sand spinifex grass, beach primrose, angular pigface, scented fan-flower and goat's foot convolvulus. Creeping plants of coastal wattle *Acacia sophorae* are sometimes found in this zone. These plants frequently occur in the woodland zone, where they can provide an almost complete ground cover.

The dunes formed by pioneer zone vegetation are a vital buffer, protecting valuable real estate and development from wave erosion during storm conditions.