Management guidelines for dune use

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Leaflet No.
V–03.2

Re-establishment of dunes:a basic approach

Introduction

An undisturbed system of coastal foredunes is in a complex state of dynamic equilibrium and its stability, shape and position depend on the interplay of the effects of wind, waves, tides and vegetation (*see* Leaflet No. II-02). A healthy dunal system acts as a flexible coastal barrier against sea erosion. The system retreats under wave attack when sand is lost to form off-shore bars, and advances during calmer weather as the dune vegetation traps windblown sand that has been returned by wave action from the off-shore bars to the beach. Dunal systems can be damaged by natural forces, by human activity or a combination of both, and when this happens, the damaged dune vegetation is no longer effective at trapping and holding windblown sand. If this condition persists, it will upset the natural cycle of advance and retreat of the dune and its vegetation. The failure to trap fresh sand blown up from the beach and the continued loss of sand from the degraded dunes due to wind erosion, decrease the effectiveness of this coastal barrier and cause the dunes to become unstable and to migrate landward.

This leaflet deals with the re-establishment of dunes that are damaged to the extent that the placement of significant quantities of sand is required to rebuild the dune to provide the robust barrier described above, and where the repair programs described in Leaflet No.V-03.1 would not be effective.

Principles of dune re-establishment

The re-establishment of coastal foredunes involves the physical replacement of a mass of sand of appropriate size, shape and location to provide sufficient protection against storm waves. Placement of the sand mass must be followed by stabilisation so that it will not be reshaped or relocated by wind action. Although the methods used in individual locations may vary, the following steps are common to dune re-establishment programs.

1. The design and construction of a dune of appropriate size, shape and location, using one or more of the following:

   (a) accumulation of windblown sand by sand-trapping devices such as brush matting (*see* Leaflet No.V-03.6) or semi-permeable fences (*see* Leaflet No.V-03.5 to lower wind velocities and deposit moving sand where it is required

   (b) importing sand from onshore sources, usually by truck

   (c) hydraulic dredging of sand from adjacent estuarine or offshore sources

   (d) reshaping the existing dunes, particularly where they have been seriously affected by wind erosion or where sand has blown inland.

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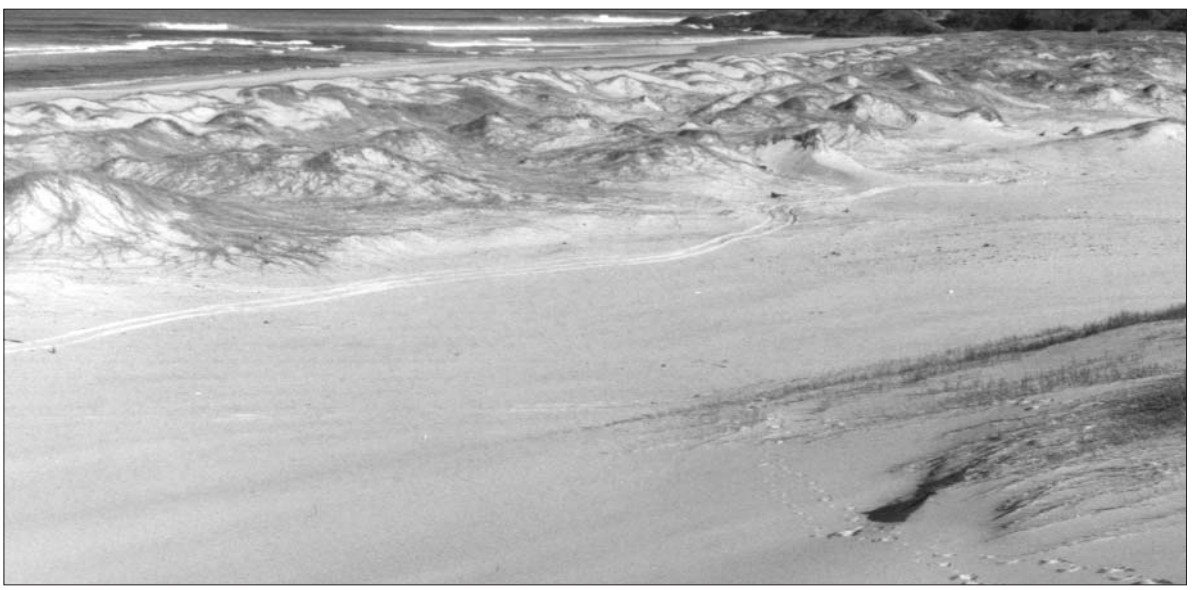
2. The immediate temporary stabilisation of the constructed dune to prevent deformation by wind action using brush matting (*see* Leaflet No.V-03.6) or a cover crop (*see* Leaflet No.V-04.1) until a stable cover of native vegetation can be established.
3. The establishment of native vegetation to prevent long-term wind erosion of the dune, encourage further sand deposition, and to allow the dune to regenerate naturally after storm damage.
4. The protection of the vegetative cover by physically excluding people, stock and vehicles and by preventing fire, all of which may cause localised or general destruction of dune plants, and result in wind erosion. If damaged areas do occur on the re-established dune, steps 1, 2 and 3 should be used to repair the damage.

In any dune restoration program it is important to appreciate that the sand dunes are designed to be eroded during storms leading to inevitable losses of vegetation, walkways and fencing.

An important objective of any dune restoration project is to minimise maintenance commitments by providing vegetation that regenerates naturally, and by using flexible or expendable structures that can resist storm attack or be replaced at minimum cost.



Fertilised sand spinifex grass re-establishing dunes on a low and unstable foreshore.