Sand dunes

Biodiversity

Coastal sand dunes are much more than heaps of wind-driven sand. They are home to a number of unique native plant communities and their attendant invertebrate, lizard and bird populations which exist nowhere else. Some of these plants, such as native pīngao/pīkao, as well as spiders like the katipo, and other insects and birds are under threat from changes to their sand dune environment from introduced species and human activity.

How dunes are formed

Sand dune systems form on sheltered beaches protected from severe wave action and where there is a plentiful supply of sand and prevailing onshore winds. Dune systems frequently develop near the mouth of rivers which carry large quantities of eroded sand to the coast. Wave action then drives the sand along the coast and onshore. At low tide, when the sand dries out, it is blown onshore where it accumulates and is held by native or introduced sand-binding plants such as pīngao/pīkao, spinifex or marram grass. As the sand accumulates along the shore, fresh incoming sand is pushed up the front or seaward facing slope and trapped by vegetation forming what is called 'the foredune'. Behind this system there can be several 'back dunes', depending on the shape of the coast and the history of development. Back dunes are protected from the more severe effects of onshore winds by the foredunes. They tend to be more stable and may be thousands of years old. Between the dunes, where the water table is high, swamps, wetlands and even large coastal lakes can form. The wet sand gives these systems more stability than the surrounding dunes and extensive plant and wildlife communities can become established. Where the hollow between the dunes is free of water, extensive sandy plains can form.

Sudden changes

Sudden and dramatic changes can occur to dune systems if the supply of sand is reduced or strong winds push through the foredune. Strong winds can also increase the rate of wave erosion of the foredune, weakening the structure and letting the wind through to back dunes. These situations are called blowouts and can push sand far inland, smothering established plant communities. This type of disturbance can occur naturally, but is often exacerbated by human activity in the foredunes. The plant and animal communities which inhabit dunes are adapted to move with the sand. However farming and many other human activities behind dunes can not cope with such dramatic natural developments and many methods are employed to counter large-scale sand movements. Introduced plants and forestry have been used in many places to effectively halt or slow down dune blowouts.

Sealers Bay, Codfish Island P. J. McClelland

Wanganui Conservancy
Published by
Department of Conservation
Christchurch
2006
NS0030

Department of Conservation
Te Papa Atawhai

Katipo spider
J. Kendrick

Did you know

New Zealand's katipo spider, the female of which has a distinctive red stripe down her back, is restricted to coastal dune and beach areas, living amongst the protection of driftwood and plants. This spider has become increasingly rare as humans have tamed and impacted on much of its habitat. Introduced predators and spiders may also be contributing factors.

Cultural and archaeological values

The dune environment has significant cultural and archaeological values arising from past Māori occupation. These special areas provide a valuable source of records relating to settlement, exploitation of the environment and communication. They can also contain urupā (ancient burial grounds) which are regarded as wāhi tapu (sacred). The dune environment may also contain archaeological evidence of early industries such as sealing and whaling.

Threats

Most of New Zealand's dune systems have been modified to some degree by human activity or introduced plants. Fires have destroyed native sand-binding communities and farm animals have grazed extensive areas. Introduced plants such as marram grass, lupins and gorse now replace many of the native sand-binding plants. These plants produce a different slope and shape in sand dunes, effectively preventing the establishment of native species.

Forestry and farm development have modified once extensive natural dune ecologies to the point where recovery is now impossible. Four-wheel drive vehicles, motorcycles and even heavy pedestrian traffic on dune systems behind popular recreation beaches have caused rapid erosion.

What can you do?

Leave your vehicle in the carpark

Four-wheel drive vehicles, motorbikes and buggies are causing erosion and damage to dune environments right around New Zealand. Ask yourself is it really necessary to take your vehicle on to the beach? If you need to drive near a dune area, try to keep to the marked road or track.

Coastal and dune care codes

A number of regional councils and other government agencies have developed coastal and dune care codes to protect New Zealand's fragile dune habitats. It is important to pay attention to these codes. For instance, if fences have been erected to protect dunes, make sure you walk along the designated paths. Dunes protect our land during storms as well as offering protection to native fauna such as insects, lizards and birds.

Get involved

Around New Zealand there are a number of coastal groups actively seeking to restore or improve our coast line. You can support these groups by joining them or even helping them on workdays. One way to learn more is to contact the Coastal Dune Vegetation Network (see details below).

For more information

Visit the DOC website at **www.doc.govt.nz** or contact the New Zealand Coastal Dune Vegetation Network. This network includes individuals, industry and community groups with an interest in dune vegetation. The network has developed a series of excellent technical bulletins providing considerable information about dunes. You can learn more about the network by visiting www.ensisjv.com and selecting 'industry cooperatives' from the front page menu. This network can also give you contacts for most regional coast care groups.

Did you know

Pīkao or Pīngao, with its tufts of golden grasslike leaves, stands out in dunes. It is regarded as a Taonga (a treasure) by Māori weavers. It is also valuable as a plant for building and maintaining foredunes.

Pīngao, Kaitorete Spit, Canterbury

Great Barrier Island
R. Stanley