

KAITORETE SPIT



A unique sand dune area in need of protection

By Margaret Peace
Executive Councillor

Kaitorete Spit is south-west of Banks Peninsula in Canterbury. It is the largest remaining dune area in New Zealand where the vegetation is still dominated by pingao (*Desmoschoenus spiralis*) and where native plants are still a conspicuous component of vegetation.

The Kaitorete Spit extends 28 km south from Banks Peninsula in Canterbury and is the largest remaining dune area in New Zealand dominated by pingao.

Photo S. Courtney

During 1972–1973, I spent hundreds of hours on Kaitorete Spit studying plant species, climate and soils as part of my masters degree. This involved experiencing the Spit in all its moods, from blistering summer heat to winter temperatures well below freezing, dehydrating nor-westers and gale force southerly winds laden with salt. The time spent in that wild and desolate landscape provided me not only with an intellectual exercise but also a chance to appreciate a vast expanse of sea, sand and fascinating vegetation in complete solitude — a "wilderness" experience within only 50 km of a major city.

Formation of the Spit

Kaitorete Spit is a barrier beach formed by deposition of Rakaia river gravels along the coast commencing some 6000 years ago, with sand deposition commencing probably about 1000 years ago. Such gravel beaches with associated dune systems are extremely rare world-wide. Forming the seaward boundary of Lake Ellesmere, the spit measures 28 km long, being 3.2 km wide at its eastern end and tapering to 100 m wide at its western extremity (see diagram). The dune system is largely shaped by the onshore south west winds. In the western 8 km the shore line is

being cut back, foredunes measure up to 7.6 m in height and their seaward faces are continually wave-trimmed. For the next 13 km eastward the coastline is building out, and dune height decreases gradually to about 1.5 m. In the most easterly sector dunes are reduced to a mere scattering of sand over the gravel.

Dune profiles are gently contoured, characteristic of sand under pingao. Relicts of much older dunes are scattered over a sandy plain landward of the coastal dune complex. Large deflation hollows up to 200 m across form a prominent feature between the parallel ridges of foredunes and rear dunes.

A severe climate and poor soils

Climate and soils interact to make the spit an extraordinarily adverse environment for plants. Rainfall measurements on the spit indicate a mean annual figure of 515 mm (20 inches) and less than 400 mm in some years. Added to this, the water-holding capacity of the ground is unusually low, since as well as the high proportion of stones in the profile the sand itself is extremely coarse.

Very high evaporation rates prevail for much of the year because of the dry north-west winds characteristic of Canterbury.

together with very high summer temperatures — up to 38 °C in the shade at surface level. As a consequence, dryness of the air affect plants for at least twelve hours per day for four or five months of the year. No doubt plants rely to some extent on moisture supplied by internal condensation of water vapour just below the surface, as well as dew, which is frequently heavy. Soil nutrient levels are low, even on the old dunes, indicating unusually slow soil development.

Vegetation uniquely adapted to harsh conditions

In spite of all these limiting factors, it appears that a remarkably stable vegetation cover was able to evolve on these dunes, partially persisting to the present day, though adversely affected by fires in Maori times and since 1850 by grazing management which also included deliberate burning up until 1948. Existing native species include thirteen shrubs, ten herbs, and seven grasses and sedges. Ngaio, akeake, and kowhai are represented by a few old specimens, presumably relics of a formerly more abundant shrubby vegetation which probably included kanuka. Ake ake (*Dodonea viscosa*) and *Meuhlenbeckia astonii* are found here at the southern-most limit of their distribution. The prostrate broom (*Carmichaelia appressa*) is a species found only on Kaitorete Spit. It is probably a key component of the ecosystem because of its role as a soil building nitrogen-fixer. It is also very important in providing a favourable micro-environment for less hardy species. However, the prostrate broom is under constant browsing pressure from hares, rabbits, sheep and cattle, the

last causing major damage by tearing off large branches. It appears that most of these plants are old and there is no sign of regeneration in spite of abundant seed production.

All the native species are perennials, able to survive and even grow throughout the driest part of the year — in contrast to the introduced plants which are mostly winter annuals exploiting the period of least water shortage between May and October. Catsear, sorrel and Australian sheep's burr survive as perennials, but their leaves wither in the summer drought.

A whole range of adaptations to dry conditions can be observed among the native plants. Some, like *Clematis afoliata* and prostrate broom are leafless. Leaves when present are generally very small, narrow, covered in a thick cuticle, (i.e. pingao), or covered with woolly hairs as in scabweed (*Raoulia australis*) and woollyhead (*Craspedia lanata*). All the native species have extensive root systems, to enable them to absorb and store all available water. Low mounds of scabweeds only a few centimetres high may have roots seventy centimetres long; Prostrate brooms only twenty centimetres high may have roots over three metres long.

The vegetation of the Spit is unique and enough of the native vegetation remains today to provide some idea of its primitive state.

Threats from weeds, grazing and mining

Unfortunately the introduced marram grass (*Ammophila arenaria*) was planted about twenty years ago on eroding dunes about half way along the Spit, and more has



Prostrate broom in flower — Kaitorete Spit.
Photo S. Courtney



Prostrate broom *Carmichaelia appressa* is found only on the Kaitorete Spit. The plant in this photo has an unusual erect form.
Photo S. Courtney



To cope with the drying, windy conditions of sand dunes, plants have developed special forms. Prostrate broom has no leaves, while woollyhead *Craspedia lanata* shown here is covered in hairs — Kaitorete Spit.

Photo S. Courtney

been planted at the site of a sand quarry near the eastern end. However it is virtually confined to these areas from which it could readily be removed. Several hundred pines, planted 15 years ago on the fore-dunes for about 2 kilometres, are now dropping their first cones. They are serving no useful purpose, are an incongruous element in the landscape, and should be eradicated before spreading further. No other introduced species appear to represent a threat to the native vegetation through competition.

Reserves at risk

In 1979, two areas of the Spit were gazetted as Scientific Reserves. The larger of these, comprising 169 hectares, was intended to constitute a core area representing some of the most interesting biological features. However, since then little effort has been made to protect the Reserve which is still being used for grazing sheep and cattle by the lessee of the adjoining Crown land block. Rabbits and hares, together with the stock, represent a most damaging factor in such a fragile ecosystem where the natural physical factors already impose severe limitations on the plants. It is also important to exclude four-wheel drive vehicles and trail bikes from the dunes. A draft management plan is due out shortly for public comment.

Mining

Since 1952, sand extraction from the



Sand mining operations by Habgoods Ltd have now destroyed 11 hectares of pingao covered foredunes at Kaitorete. The sand is used for concrete blocks. Photographed March 1984.

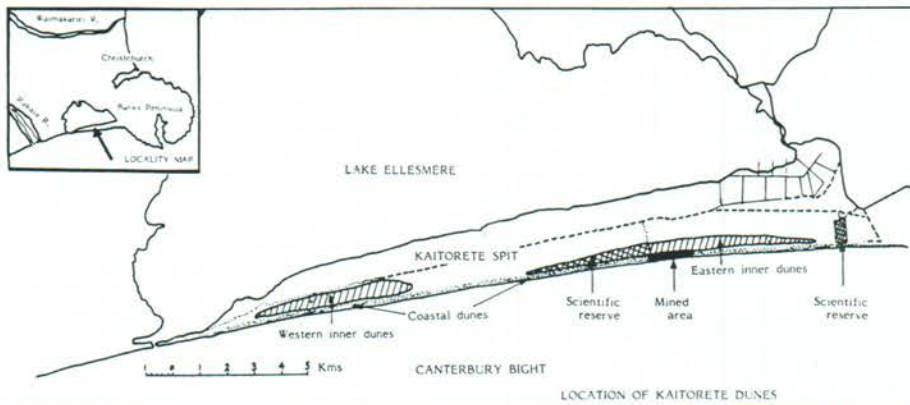
Photo M. Peace

eastern dunes has been undertaken by a contracting company, originally without any agreement or payment, but since 1964 under a renewable licence from the Lands and Survey Department. Currently a total of 11 hectares of pingao covered dunes have been removed along a 1050 metre stretch, a total of about 274,384 cubic metres of sand. Removal of sand from this dune system is quite unjustifiable. The natural process of dune rebuilding at this end of the Spit is minimal, the ecological damage is immense and alternative sources of sand do exist for the company's operations.

On 8 March 1984 the mining company, Habgoods Ltd, were given three months to apply for a licence under the Mining Act, which would give the public opportunity to object.

On 26 June 1984 Habgoods posted an application for a mining licence over a further 23.4 hectares of the Kaitorete pingao-covered dunes. Our Society is objecting to this application and we hope that the Department of Lands and Survey will also object.

A special study written by a Lands and Survey planning officer, J. D. Palmer in 1980 and made public by the Department concludes that "in view of the Kaitorete dunes natural, cultural, archeological and recreational values ... the present extent of reserve land is inadequate. The whole Crown land dune complex is worthy of reserve status".



Natural Sand Dunes Need Help

It is time to stop further damage and destruction of our remaining natural sanddunes.

We now recognise that these dunes and their special plants and animals are just as distinctive and important as our great kauri forests. We also know where our remaining natural sand dunes are and that few of them are adequately protected. The DSIR's Biological Resources Centre will document this information more fully as it works through New Zealand identifying opportunities for a representative reserve network. Unfortunately this work could take ten years or more and meanwhile modification and destruction of natural dunes will continue.

Fortunately many of our remaining natural dunelands are on Crown owned land. Their future lies in the hands of the Minister of Lands and his Land Settlement Board. If the dunes are given reserve status, their further destruction for forestry, farming, mining, urban and recreational developments will be stopped. Further grazing damage should also stop provided the reserves are properly managed.

The Royal Forest and Bird Protection Society is already active in advocating better protection for natural dunelands throughout the country, including:

- Pressing for removal of stock from the natural dunes of the Te Paki Farm Park in the far north.
- Seeking a western extension of the Waipoua Forest Sanctuary to include kauri forest on dunes around the Wairau River.
- Seeking a halt to sand mining of the Crown owned pingao dunes of the Kaitorete Spit as well as control of stock.
- Seeking to prevent the construction of the Feltex logging road around the pingao covered dunes of Sand Hill Point, Waitutu.
- Advocating reservation of the podocarp dune forests of the Haast lowlands and for better controls on beach mining in South Westland.
- Appealing to the Land Settlement Board to give reserve status to the nationally important Crown owned dunes at Mason Bay, western Stewart Island currently under a pastoral lease.

Reserve status for natural dunes will not remove the threat of invasion by weeds such as marram, gorse and lupin. A programme of control, where feasible, by hand and through careful spraying will be needed. It is encouraging to see this work already underway to protect natural dune vegetation in Fiordland National Park and on Stewart Island.

Cultural use of pingao may become increasingly important to the Maori people. Provision must be made for a sustained supply of pingao for weaving and other cultural purposes. Obviously such a supply should not rely heavily on the vulnerable surviving pingao populations. Instead a programme of pingao revegetation should be encouraged to bring pingao back to marram blanketed beaches such as Brighton, Dunedin; Waimairi, Christchurch; Waikanae; Wellington and Muriwai, Auckland. Already some Maori groups have started growing pingao for cultural purposes.

For 140 years our natural dunelands have been disappearing from the landscape. We can't afford to lose any more of them. We need your support for our national campaign to protect our finest dunelands. You should also consider walking your local beach and if you find pingao plants, weed out any encroaching marram grass.

Dr Gerry McSweeney
National Conservation Officer



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Cover: Few dunes covered in native vegetation remain today. Pingao (*Desmoschoenus spiralis*) covered dunes once dominated Tautuku beach, South East Otago shown here, but pingao has now been ousted by introduced marram grass.

Photograph: A. F. Mark

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Saving our heritage!

I write my first editorial as President of the Society in the midst of a general election campaign. By the time you read this there will be a new administration and possibly a change of Government. For the incoming Government there are significant nature conservation priorities.

Firstly they should recognize that preservation of our natural environment is not a selfish or narrow objective. By preserving nature we are protecting the key features of our country that distinguish us from the rest of the world. Our kauri forests, coastlines, forests, tussock grasslands, lakes and rivers occur nowhere else in the world. They deserve protection in their own right and are also a major attraction for visitors to this country who will leave behind nearly \$600 million in foreign exchange this year.

Preservation of a representative network of natural areas throughout the country is one of the highest priorities for nature conservation today. The scientific methodology for the programme has been developed by the DSIR's Biological Resource Centre and needs an adequate funding base. The test of the programme's effectiveness, however, must be whether reserve recommendations are implemented in the face of rapid change of natural ecosystems throughout the country by the expansion of forestry and agriculture.

The present imbalance in our reserve system urgently needs correction. Lowland forest areas are inadequately protected — Punakaiki, Waitutu, Karamea forests, South Westland's kahikatea and Whirinaki are all areas of importance. Wetland protection is essential. Our wetlands of national and international importance

need permanent protection and the Government should adopt a wetlands policy as soon as possible.

Government funding which is accelerating the clearance of native forest and the drainage of wetlands on private land through Rural Bank loans and Forestry Encouragement Grants must be subject to environmental controls.

Non forested ecosystems including shrublands, tussock grasslands and natural dunelands are very poorly represented in our present reserves. The major responsibility to secure protection for all these areas rests with the Government. Crown lands encompass many of the threatened and poorly represented natural areas left in New Zealand. This issue of "Forest and Bird" focuses on some of the Crown owned areas that deserve protection. Protection of these areas could occur at little cost to the taxpayer yet with major benefits for nature conservation, recreation and tourism.

Nature conservation and protection on private land is also important and involves careful negotiation and consultation. The ultimate decision to reserve must always rest with the private land-owner. Crown purchase of all privately owned natural areas is unrealistic except for a few of the most important sites. However, incentives should be offered to make it attractive to private landowners to retain natural areas. Our Society will continue to encourage the protection of natural areas on private land through covenants such as the Queen Elizabeth II Trust open space, and through the provisions of the Reserves Act and by local authority planning procedures.

Dr A. S. Edmonds, President

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