

The New Zealand Dunelands Inventory

This century has been a bad one for New Zealand's sand dunes and associated flora and fauna. The area of dune habitat has been reduced by afforestation, invasion by introduced species, conversion to pasture and other activities, with concomitant reduction in the range and abundance of many dune plant and animal species. Some of the bird species associated with dunes, the New Zealand Dotterel and New Zealand Fairy Tern for example, are close to extinction, while a range of dune plants, including *Euphorbia glauca* and *Gunnera hamiltonii* are close to extinction in the wild. In some regions key and once common plant species are threatened - Pingao (*Desmoschoenus spiralis*) will soon be lost from Otago and Southland coasts as a result of marram invasion, except at a handful of intensively managed sites.

Few readers will be surprised by this introduction, or the State of New Zealand's Environment 1997 account of the decline of the natural character of New Zealand's dune environments. What is not clear is exactly how much dune habitat remains, how rapidly duneland is being lost, and the degree to which remnants are representative of the natural diversity of dune environments (hereafter "dunelands"), landforms and habitats. This information is necessary if we are to evaluate the effectiveness of the New Zealand Coastal Policy Statement 1994 (particularly Policy 1.1.2), and plans and policy statements prepared under the Resource Management Act 1991 and Conservation Act 1987.

A team of staff and graduate students in the Departments of Geography, Zoology and Surveying have been engaged in a study of New Zealand's dunelands over the last 18 months. Phase One of the Dunelands Project, nearing completion, has involved mapping the location and area of dunelands from the 1950s to the present for all regions. Dunelands were identified using early topographic maps, geologic and soil maps, the New Zealand Land Resource Inventory, the Coastal Resource Inventory (Department of Conservation), the Dune and Beach Vegetation Inventory (of Peter Johnson and Trevor Partridge), published reports of the Protected Natural Area Programme and information provided by DoC and local authority staff. The historic dune maps were derived largely from topographic and geologic maps. The 1990s maps were developed from the most recent aerial

photography held by regional council and DoC offices which, in most regions, was flown over the last 3-5 years. Individual dunelands were mapped at scales of between 1:10,000 and 1:50,000, the 1990s maps being largely based on 1:10,000-1:25,000 colour aerial photography. Data has been captured and stored using the ARCHINFO GIS software.

The draft dune maps have been returned to regional councils and DoC offices over the last few months for checking to confirm that all remaining dunelands and most dunelands are mapped accurately. The maps currently being distributed were printed at a scale of approximately 1:500,000, which is too large to allow the precise boundaries of the smaller dunelands to be confirmed but necessary given the number of maps required. The accuracy of the maps is being researched by resurveying and field checking representative dunelands. The initial results are encouraging. We anticipate the sequence of dune maps will be of use within local authority state of the environment monitoring programmes.

Phase two of the Project will involve working more closely with local authority and DoC staff to refine the maps and incorporate key fauna and flora data. Our 1990s dune maps include the dune vegetation rankings derived by Johnson and Partridge but measure only area. Indicators of habitat quality are also needed. Some of the dunelands mapped have been invaded by weed species and contain few or no native plant species. We plan to develop a wider suite of environmental performance indicators and identify cost-effective field survey and data storage methodologies for use by local authorities and DoC.

Our definition of "dunelands" warrants some discussion and clarification. Dunelands comprise coastal sands covered or partly covered by native or introduced sand-binding grasses (namely *Desmoschoenus spiralis*, *Spinifex sericeus* and *Ammophila arenaria*) and associated dune species (eg *Coprosma acerosa*, *Austrofestuca littoralis*, *Pimelea arenaria* and *Raoulia australis*). We have not mapped dunes covered in pasture, plantation or native forest or woody shrubs, even though the underlying substrate may be of dune origin and duneland consistent with our definition might form were the vegetation cover to be

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disturbed. We do include inter-dune hollows occupied by wetland species (eg. *Leptocarpus similis*) where they occur within a duneland and should, at some point conduct a similar inventory of dune forest.

Our initial definition emphasized habitat in which eolian sand movement was a significant ecological factor. In fact, wind blown sand may not be significant far beyond the foredune, particularly in east coast settings. Recent work on Stewart Island and along the Southland coast

has, perhaps, made us overmindful of eolian sedimentation in exposed dune habitats. While dunes are by their very nature the result of the interaction of wind and sand a variety of duneland habitats consistent with our definition may persist in situations of infrequent or no sand movement.

Related dune work includes studies of the process of marram invasion, marram control using herbicide and development of cost-effective dune survey methodologies.

Mike Hilton

Coastal News

Coastal Dune Vegetation Network Holds First AGM

The Coastal Dune Vegetation Network, a research collaborative, was officially launched on 1st July, 1997 - after extensive consultation between Forest Research (formerly FRI) and coastal management agencies. The Network aims to provide a forum for the free exchange of information on sustainable management of coastal dune ecosystems - with emphasis on the use of vegetation to restore natural character, form and function. Activities, which include targeted research into aspects of coastal dune vegetation and effective information transfer to coastal managers, are funded by financial members (largely regional and district councils) who pay \$3000 - though non-financial members are also welcome to participate in network activities and to receive publications.

The first annual general meeting of the Network (held at the Papamoa Surf Club on the 12/13 March) brought together over 60 representatives from regional and district councils, the forestry industry, Department of Conservation, local community groups (eg Coast and Beach Care groups), iwi, coastal consultants, educational institutes, staff from nurseries growing coastal plants and researchers from Forest Research.

The first day of the meeting involved a field trip to sites of interest along the Bay of Plenty coast, hosted by Greg Jenks, Coast Care coordinator for Environment Bay of Plenty. Sites inspected included ongoing community-based restoration projects at the Papamoa and Mount Maunganui beaches (where there are significant human use pressures on the coastal systems), a replanting scheme for areas of the mountain where vegetation was destroyed by fire in December 1997 (where emphasis is being given to the planting of appropriate indigenous species while controlling the regrowth of gorse and other weeds), a magnificent stand of kanuka on coastal dunes at

Thornton, the Whakatane District Council nursery which has been successful in raising spinifex and other coastal plants, and coastal dune sites with various weed problems.

During the technical and business sessions on the second day, researchers reported on the various trials currently funded by the Network. These include a series of nursery based trials (located at Naturally Native nursery, Tauranga) designed to determine cost-effective and reliable methods for the large scale production of spinifex seedlings. Also a fertiliser (urea) trial on Bay of Plenty foredunes which is being monitored annually to determine the effects of application rates and timing on spinifex and pingao performance. The Network is also producing a series of technical bulletins for coastal managers. The first (on the native sand binding grass, pingao) is due to be published later this year and a second (dune geomorphology) is being prepared.

If you would like to know more about the Network and its activities contact either myself or Greg Steward at Forest Research, Private Bag 3020, Rotorua (ph 07- 347-5899; fax 07-347-9380.

Dr Fiona Ede, Coordinator - Coastal Dune Vegetation Network, Forest Research

Conference Announcement

Australasian Environmental Engineering Conference

26-28 April 1999 ~ Christchurch, New Zealand

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