

## Conference Presentations 16-17th February, Ohope, 2011



2011 Conference Sponsored by:





# Dune Restoration Trust of NZ National Conference Presentations Bay of Plenty Beach Bonanza 16-17th February, Ohope, 2011

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### Note from the Editor

The Dune Restoration Trust Conferences are organised collaboratively between agencies and community groups. Our conferences are public events and are attended by a wide range of people including government agency staff, local community members and industry groups. Our programmes include a set of invited speakers, a dedicated "Regional Round-up" session where community groups present their own work, as well as a field trip. Not all of the community presentations are included in this document as many were not formal or written presentations. For further detail about any information within this document, please email [info@dunestrust.org.nz](mailto:info@dunestrust.org.nz).

## Thanks for creating a great conference!

Thanks to all those who supported and participated in this years conference in Ohope. Once again we had a fantastic couple of days with some very inspiring speakers from throughout the country. It was a full house at the Ohope Sand and Surf Conference Centre which provided the opportunity to catch up with folks, celebrate the successes and discuss the issues groups are facing, as well as experience some of the Bay of Plenty beach sites, operations and hospitality. The following pages summarise the talks from the event including a great range of community coast care projects as well as policy and research updates. A special thanks to the Bay of Plenty conference team and our sponsors:



## Fieldtrips provided time to discuss the 'hows' of dune restoration.



Nursery operations at Naturally Native



Reshaping and replanting along Ohope Beach

This year there was a lot of discussion about back dunes, as many groups have already put major efforts into front dune areas. Groups talked about the types of plants and spacings needed, the importance of weeding and pest control as well as how to get funding and resources for their projects. Attendees visited Coast Care work including a major reshaping project at Ohope beach (see next page).

Photos taken by Michael Bergin.

## Congratulations to the 2011 award winners!

There are so many fantastic projects going on around the country, it was difficult to pick the two award winners. However these two groups showed just how a small number of dedicated people can have a greatly positive impact - congratulations!

The Best Community Group Award, sponsored by Taupo Native Plant Nursery, went to the Waihi Beach Care Group. Waihi Beach resident Jim Covern said the award was a tribute to a small band of people who in some cases had worked behind the scenes for many years restoring the dunes. Waihi Beach School pupils have also done planting in conjunction with the Bay of Plenty Regional Council Coast Care programme. (From Bay of Plenty Times 17th March)

The Best Coastal Restoration Project Award, sponsored by Naturally Native, was presented to the Maketu Ongatoro Wetland Group for their work restoring the estuary and protecting dotteral habitat. See their update on page 4.



Congratulations to the Waihi Care Groups members.  
Photo: Bay of Plenty Times

## Dune Extent & Vegetation Mapping in Bay of Plenty

Nancy Willems, Environmental Scientist, Bay of Plenty Regional Council (BOPRC)

### Background to the project

Bay of Plenty Regional Council's Natural Environment Regional Monitoring (NERM) programme is designed to collect and report on a variety of environmental data including terrestrial biodiversity. The purpose of the program is to monitor the efficiency and effectiveness of our regional policies and plans and to help in their development into the future. Dunes are listed as a national priority for protection and are also included in our RMA obligations. However, there are no national standards for monitoring dunelands and while there are some quantitative methods of vegetation monitoring and we need to understand the extent of dunelands first before getting down to that level of detail.

This project was established to identify whether or not the duneland ecosystem is being maintained, with a focus on vegetation. The plan was to establish an overall picture for the region in terms of just knowing what we have and an idea of what state it's in, so looking more at the broader picture. There does need to be scientific robustness behind the work, but I also felt that rather than monitor fine detail just for ecology's sake, we needed to establish a system that would provide for the council's needs as well, which are sometimes a little broader brush than a plot based approach on its own. While natural changes do occur in vegetation, it is becoming more and more common for our ecosystems to be heavily affected and sometimes driven by exotic species and/or human related impacts. So understanding what's happening in the dune vegetation is essential in determining whether or not the ecosystem will be maintained in the long term, with a predominantly indigenous character.

### Phase 1: Desktop preparation

The historic extent of dunelands was mapped based on aerial photography and existing knowledge of the regional landscape. We used the term 'wild and undeveloped' because we couldn't say indigenous dune vegetation and needed a fairly broad term that pretty much separated the undeveloped parts of the dunes from those that have been converted to intensive human uses. Broad land-cover categories and a series of belt transects were added (not physically marked on the ground). Our biggest site is 36 km long, and there were a few sections like that, that needed additional transects.

Transects that fell on non-sandy coastline were ignored. The purpose of the transects was to provide a basis for estimates of cover, for example pest plants and threatened plants, over a smaller area than the entire site. The intent was to re-map the transects five yearly, while the entire extent will be done every ten years. The transects also provide potential for other sampling, such as invertebrates.



Landform map, Pāpāmoa Beach and lower Kaituna River.

### Field Survey

Printed copies of aerial photos were taken into the field so that vegetation types could be physically drawn on to them and labelled in hard copy for later digitisation. This was sometimes quite difficult where the sites were so big they couldn't all be seen from one or a few points, or on areas where the dune strip is quite wide. The vegetation mapping uses the Atkinson (1985) method which describes vegetation and incorporates both structure and composition elements into the description.

The vegetation mapping recorded a vegetation type and brief description for each vegetation polygon. Pest plants were recorded and a cover estimated for both individual species and for pest plants overall, to give an indication of the weediness of the dunes. This was done by vegetation polygon rather than by transect. Threatened and significant plants were recorded by GPS and an estimated cover class (recce plot classes) assigned for each species. Management recommendations were also recorded in the field, and most often related to the highest priority pest plant species for control, although other issues did come up like stock exclusion or encroachments in different parts of the region.

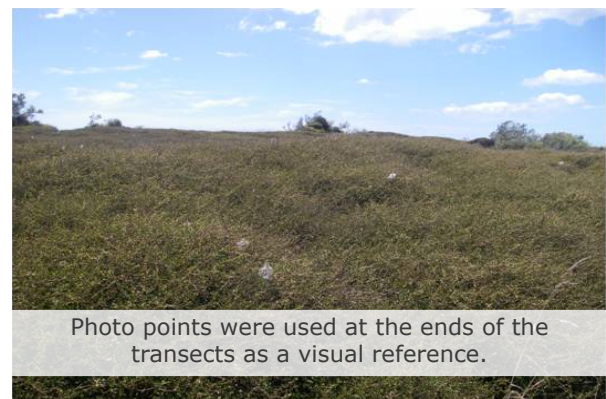


Photo points provide good records of the vegetation types recorded, and the visual character of the dunes.

## Dune Extent & Vegetation Mapping Continued...

### Back to the office

All the vegetation polygons were digitised over aerial photography in GIS software. The data was entered into spreadsheets arranged in a few different ways to cross-reference everything back to transects and so that it could be manipulated in different ways. We learned a lot during this process for example: other pieces of data that would have been useful to collect or build in, data that might have been better collected in a different way, data that should be attached to the spatial layers from the beginning.

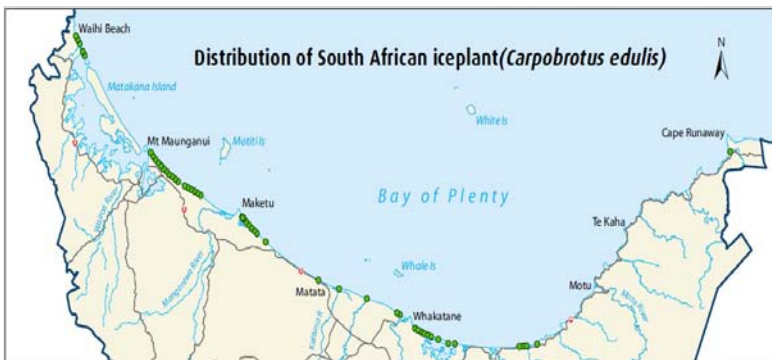


Vegetation polygons were digitised over aerial maps.

### Analysis

We did some analysis of vegetation/dune change over time, using historical information, which was indicative but not specific to dunelands. We then concentrated on the characteristics in terms of current vegetation composition and structure, how weedy the dunes are and what kind of impacts are occurring that need to be managed. This included the spatial distribution of pest plants and impacts across the region, again focussing on the transects and any spatial patterns that arose. For example you might expect some weeds or impacts to be more strongly associated with housing than with the more 'remote' parts of the dunes or that you might get a higher diversity of weeds around housing.

Distribution of South African iceplant.



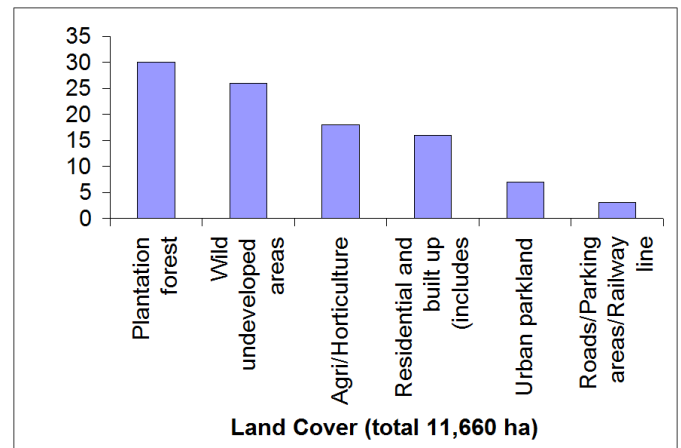
The spatial analysis example (above) shows the distribution of South African iceplant on the transects across the region. It shows presence-absence only and doesn't give an indication of estimated cover. For a lot of species the cover class estimates were very much the same across the region and there were few transects that really stood out as having really high cover for any one species. What I was aiming for, and more or less

achieved, was a quick visual of where the weeds occurred. I could also, in the future, do a similar visual but add some colour coding for the different cover class estimates and compare over time, looking for shifts to low cover classes and decreasing numbers of transects showing species presence.

Note that this was not an exhaustive examination of all exotic plants, just those identified as 'worst dune weeds' - marram, kikuyu, pampas, saltwater paspalum, buffalo grass, pigs ear, evergreen buckthorn, African boxthorn and Japanese spindle tree. We did similar mapping for impacts and for threatened and significant plants.

### Results – vegetation change

At a regional level we've got 11,660ha of historic dunes landform. Today plantation forest covers about 30% of that, and nearly half is covered in urban developments and roading or rail. 26% remains as wild and undeveloped, that's about 3005ha. Which means that 74% of the historic landform has been developed for human use of some form or another. Keeping in mind though that the term wild and undeveloped for us says only that there aren't houses or farms or other development on that part of the dunes. It says nothing about their condition, what's impacting on them or how reversible some of those past and present impacts might be. The national statistic stands at around 11.6% of the original extent of the dunes remaining in vaguely indigenous vegetation cover.



As expected most of the vegetation was of lower stature, e.g. grassland, vineland and sedgeland. 32% of the vegetation was in structural classes that would be more than 2m in height. Of which only 2.2% was considered to be dominated by indigenous species. We do have one section of dunes just west of Matatā where native coastal species are establishing under a eucalyptus canopy, but this is really the only section that could claim to be forest and have a reasonable indigenous component. The other area of note is the kanuka along the Thornton coast which dominates 70ha or more in a restricted part of the coast, and is a variety of kanuka endemic to the BOP.

## Dune Extent & Vegetation Mapping Continued...

### Analysis Continued

Not unexpectedly, a lot of the dunes were classed as grassland (26%) and vineland 18%. There was a disturbing amount of exotic dominance in the grasslands, but pohuehue vineland makes up 18% of the region's dune cover on its own, so that was a more pleasing result. Sedgeland, rushland, reedland and fernland were also characterised by nicely indigenous dominant vegetation types, but only make up 18% of the dunes vegetation cover.

### Results – current vegetation

On a landform basis the vegetation didn't bring up anything unexpected. The berm was 89% spinifex grassland, the incipient foredune was more than half spinifex dominated vegetation types. The vegetation was still pretty variable, especially once you get off the berm and incipient foredune. Of the 184 vegetation types, the established dune included 106 of them. 9.1% of the transects had an estimated exotic cover of over 50% and the average for all the transects was 30%.

A comment from one of our pest plant guys was "that's really quite weedy".

### Results – spatial distributions

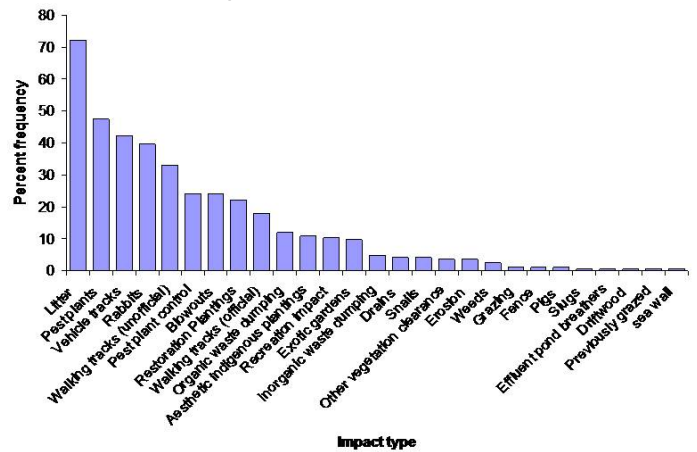
I didn't find any strong patterns such as high pest plant cover associated with residential areas. Of the transects with more than 50% exotic cover, the adjacent land use was quite variable, everything from residential to undeveloped, reserves, farms. Some of the sites of the lowest cover were found around residential areas, although for low cover there did appear to be more of an association with areas of less development. So that might suggest that residential housing isn't necessary the cause of high pest plant cover, nor does any one particular land use appear to be associated with particularly high or low pest plant cover.

I also had a look at the diversity of pest plants and how that was distributed across the transects on the assumption that you might expect a higher diversity of exotic and pest plant species around higher population areas. There was a tendency for transects with a higher average number of pest plant species to be those in front of housing areas at Ōhope, Mt Maunganui and the length of Pāpāmoa and Waihi Beach. The highest counts of pest plant species were at Piripai and Ōhope Spits, which are off the end of housing areas rather than directly in front. East of Ōpōtiki transects that averaged more than five pest plant species seemed to occur at the more prominent beach and river mouth access points.

The median number of pest plant species per transect was four and the maximum was 13. The highest number found on any transect was 21. Two pest plant species showed strong correlation with parts of the coast - the Australian coast tea tree (thankfully confined to Matakana Island), and

south african iceplant which aligned with concentrations of residential housing. Pampas was one that was probably the most common species and buffalo grass and Pig's ear have been noted in the dunes but didn't show up on any of the transects.

We also scored a range of impacts on the dunes, such as litter, blowouts and vehicle tracks which highlighted areas being effected by multiple pressures. While we did find some positive impacts – such as restoration plantings, pest plant control (although this can be positive and negative) and use of official access points – these were grossly outnumbered by negative impacts. With regard to threatened and significant plants, Pingao was probably the only species that was found right across the region, on nearly every transect between Mt Maunganui and the Kaituna River Mouth, and with lesser frequency outside that area. This may reflect coastcare activities.



### Examples of methodology issues that need improvement:

- Estimates of cover can be subjective and differ between observers
- Data can be awkward i.e. using large spreadsheets that need to be reinterpreted into spatial layers
- We need to clarify the statistical robustness of the data and complement the broader brush assessment with robust quantitative data
- The methodology doesn't pick up scattered individuals or populations of threatened or significant plant species

### But on the positive side...

One thing we have achieved is complete ground-truthed coverage of the region's dune extent and vegetation, which gives us a good basis to monitor for change in extent and also to build future monitoring. We also have more detailed and up-to-date vegetation information that relates directly to sites identified for coastal planning and could provide outcome monitoring for operational programmes. We've made an important step towards monitoring a national priority ecosystem.

BOPRC would like to thank the numerous BOPRC staff who helped with this project as well as contractors Wildland Consultants and Mieke Kapa.

## The New Zealand Coastal Policy Statement 2010 and its Relevance to Dunes.

Graeme Lacock, Department of Conservation, Whanganui

### Introduction

The New Zealand coastal Policy Statement 2010 (NZCPS) was released on 4 November 2010, and took effect on 3 December 2010. Its main purpose was to state policies in order to achieve the purpose of the Resource Management Act (RMA) in relation to the coastal environment of New Zealand.

The NZCPS has four main sections, i.e. Preamble, Application of this policy statement, Objectives, and Policies. Not all of these pertain to coastal dunes. For the purposes of this exercise I've focused on the sections of the NZCPS that I consider to be relevant to dunes and their management. You may consider other sections to be relevant as well, so I recommend that you read the policy yourself.

"there's a lot of really exciting stuff in the policy statement, such as the precautionary principle, strong statements on strip development, climate change and the need to plan in a 100 year timeframe, and a really strong message about vehicles on beaches"

I know many of you will find the topic boring and won't read any further, so I'll sum it up now by saying that there's a lot of really exciting stuff in the policy statement, such as the precautionary principle, strong statements on strip development, climate change and the need to plan in a 100 year timeframe, and a really strong message about vehicles on beaches. There's plenty for coastal management advocates to work with, and progressive councils can make a lot of friends (and enemies – can you have one without the other?). I won't cover everything to do with dunes here, but I will list the relevant sections, and elaborate on some of the more exciting stuff.

### Preamble

The Preamble lists characteristics, qualities and uses that mean there are particular challenges in promoting sustainable management. Key issues are also identified in the preamble. These include loss of natural character, landscape values and wild or scenic areas, continuing decline in species, habitats and ecosystems, compromising open space and recreational values, continuing coastal erosion and other hazards exacerbated by climate change, and use of vehicles on beaches causing ecological damage and conflicts with other users.

### Application of this policy statement

This section deals with how people acting under the RMA must apply the NZCPS. For me the critical statements here were that regional policy statements, regional and district plans must give effect to the NZCPS, local authorities must amend policy statements and plans as soon as practicable (a potential loophole – what is practicable?), and that for resource consent applications authorities must consider the provisions of the NZCPS. I find the use of the word "must" quite encouraging.

### Objectives

There are seven objectives, of which the first six are relevant to dunes. These are:

- To safeguard the integrity, form, functioning and resilience of the coastal environment and sustain its ecosystems, including.., dunes.
- To preserve the natural character of the coastal environment and protect natural features and landscape values;
- To take account of the principles of the Treaty of Waitangi;
- To maintain and enhance the public open space qualities and recreation opportunities;
- To ensure that coastal hazard risks taking account of climate change, are managed;
- To enable people and communities to provide for their social, economic, and cultural wellbeing and their health and safety, through subdivision, use, and development;

Each objective has a few bullet points on how it is to be achieved. For instance, the objective about social, economic and cultural wellbeing recognises that the protection of the values of the coast does not preclude use and development in appropriate places and forms, and within appropriate limits, and that some activities can only be done at the coast.

Continued overpage...



The policy on vehicles is far reaching and includes the use of vehicles on beaches, foreshore, seabed and adjacent public lands. Photo: Auckland Council

*New Zealand Coastal Policy Statement Continued...*

**Policies**

This is the longest section of the NZCPS. There are 29 policies. Of these numbers 1, 2, 3, 4, 6, 7, 11, 13, 14, 15, 16, 17, 18, 19, 20, 22, 24, 25, 26, 27 and 29 are particularly relevant to dunes. Each policy contains a number of points that need to be taken into account.

From a dune management point of view I consider the most important policies to be:

- 3) Precautionary approach
- 11) Indigenous biological biodiversity
- 13) Preservation of natural character
- 14) Restoration of natural character
- 15) Natural features and natural landscapes
- 18) public open space
- 19) Walking access
- 20) Vehicle access
- 21) Identification of coastal hazards (including tsunami; at least 100 years!)
- 25) Subdivision, use and development in areas of coastal risk (100 years!)
- 26) Natural defences against coastal hazards (never thought I'd see this!)
- 27) Strategies for protecting significant existing development from coastal hazard risk (pt 2(a): focus on approaches to risk management that reduce the need for hard protection structures and similar engineering interventions).

Policy 20 (vehicle access) is worth a read. I think it has far-reaching implications, because it controls use of vehicles on beaches, foreshore, seabed and adjacent public land where any of the following might result:

- Damage to dune or other geological systems and processes;
- Harm to ecological systems or to indigenous flora and fauna (no mention of threatened status)
- Danger to other beach users;
- Disturbance of the peaceful enjoyment of the beach environment;
- Damage to historic heritage;
- Damage to habitats of fisheries resources (commercial, recreational, customary);
- Damage to sites of significance to tangata whenua.

I've highlighted a few of the statements that demonstrate the power and possibilities of New Zealand Coastal Policy Statement. As I said earlier, this is my view of the highlights of the document. I'm sure you'll identify your own pet statements that are relevant to your situation when you read the policy statement.

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## Conference 2011 - out and about



Participants talking about nursery operations at Naturally Native Whakatane (left) and discussing dune erosion and management at Ohiwa Beach (below).



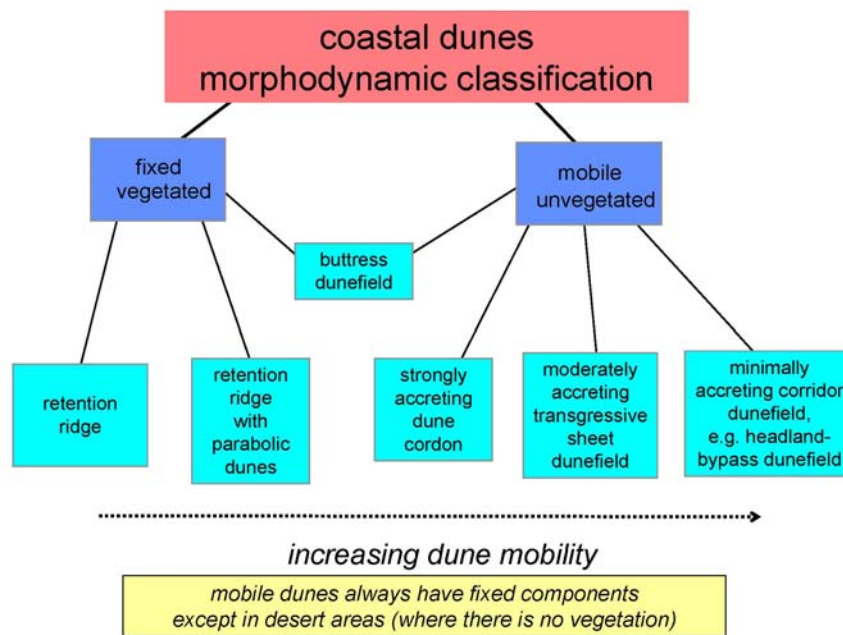


## Southern African Coastal Dunes - An Overview

Werner K. Illenberger (werner@illenberger.biz), Jenny R. Burkinshaw & Izak C. Rust

Coastal dunes and dunefields can be classified into two morphodynamic types: fixed (vegetated) and mobile (unvegetated):

- Fixed coastal dunes consist of vegetated dunes; the vegetation retains sand in these dunes. They include morphological types such as hummock dunes, foredunes, retention ridges and precipitation ridges. Plants are able to cope with the rate of sand influx, and dune growth is mainly upward.
- Mobile coastal dunes typically incorporate mobile unvegetated dunes that transgress landward (but can also move alongshore, depending on wind orientation). The rate of sand influx is so high in relation to vegetation vigour that plants are swamped and the dunes or dunefields are unvegetated and mobile. They include morphological types such as parabolic dunes, transverse dunes, transgressive sheet dunefields and headland-bypass dunefields. This range corresponds to a increasing dune mobility index that relates wind energy to vegetation vigour.



A mobile system will always include fixed vegetated components (e.g. the landward margin of a transgressive sheet dunefield is a vegetated precipitation ridge), except in hyperarid desert areas where there are essentially no plants.

Sand supply, vegetation and wind are the main factors determining dune formation. Sand is readily available on the sandy beaches of half-heart bays down-drift of sediment-supplying rivers around much of the southern African coastline. Dune vegetation vigour is dependent mainly on climate, wetter and warmer climates favouring vegetation. The existence of plant species that can cope with moving sand is a major factor affecting vegetation vigour; there are numerous such species in southern Africa. There is large variation in wind energy along the southern African coastline, with winds blowing onshore in some areas and offshore in other areas.

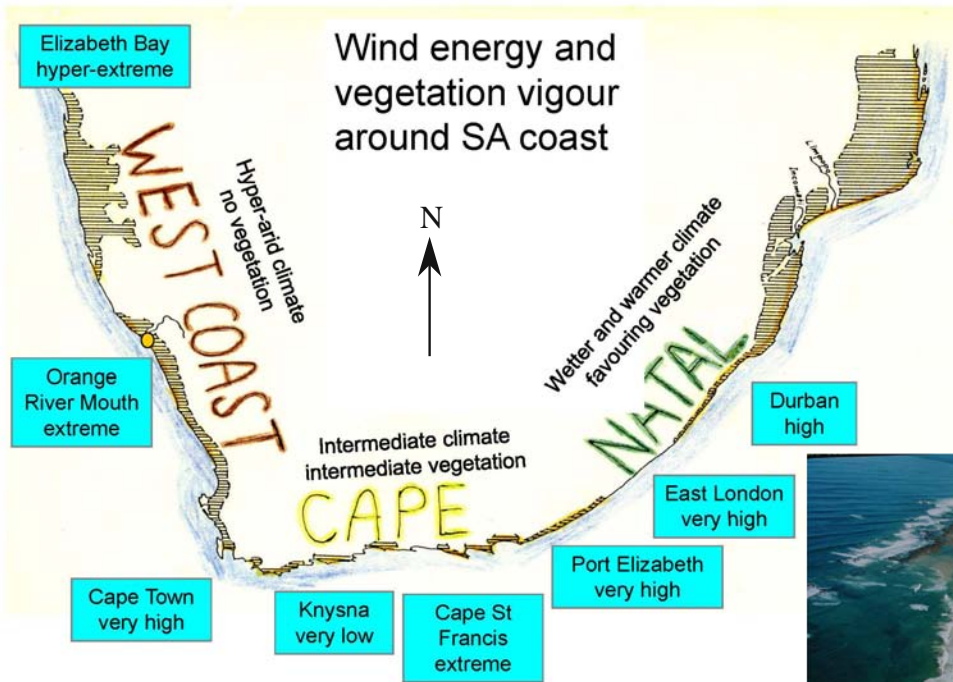
All these factors combine to form a large variety of coastal dunes around the southern African coastline (See overpage). Large well-vegetated retention ridges up to 183 m high are found along the north-east coast where the climate is warm and wet with moderate energy wind, and the Tugela River

supplies abundant sand. Along the southern and south-east coasts conditions are cooler and somewhat drier, with low to high energy winds. Dunes here vary from retention ridges to parabolic systems to transgressive dunefields 1-3 km wide and 5-50 km long, to headland-bypass dunefields up to 18 km long.

Aridity and wind energy increase northward along the west coast, both eventually reaching extremes; also, the Orange River supplies much sediment, resulting in a plentiful supply of sand. All these very favourable factors result in a rather special case, the Namib Sand Sea, 100 km wide and 500 km long with unvegetated active dunes up to 300 m high, with some sand derived from the interior, but mostly a transgressive coastal dunefield, fed with sediment over the past few million years from the downwind shore.

Almost all the other coastal dunes occurring in semi-arid to humid climates have formed over the past 6 500 years, after the sea reached its present position following the post-glacial transgression. Coastal dunes formed during earlier sea-level highstands are now fossil vegetated dune deposits.

Southern African Dunes Continued...



The Namib Sand Sea north of Elizabeth Bay. A hyper-arid desert millions of years old (above & below).



## Ohope Coast Care: Dune Restoration and Re-contouring

Pete McLaren and Pim de Monchy

### The Project...

Residents in partnership with Whakatane District and BOP regional Councils have worked hard to restore dunes at Ohope Beach since 1995 and have been successful where landowners are committed to pest and plant control. There has been less success in large areas of the beach where residents feel less ownership.

In 2009 several kilometers of the beach had a 1-3m erosion scarp and the dunes were dominated with weeds with very few native sand-binding plants. A decision was made to re-contour and re-nourish the beach to slow/reverse the erosion and to reintroduce native sand binding plants to restore an active dune zone.

The permitted works criteria limits the size of any one operation which worked well because it contained the risk by having several small sites rather than one long continuous site being exposed at any one time. Works were carried out on two 120m long sites initially, with a subsequent four sites completed. The inclusive works cost \$40/metre which is not high compared with other types of management.

During earth works the dune toe position was maintained and the slope angle reduced from 60-65 to 20 degrees.

Sand was dumped landward of the cut and the slopes were planted the following day with spinifex and pingao at 2plants/m<sup>2</sup>.

Basic fencing was erected and each month plants were fertilized and weeded and dune profiles monitored.

25 months after planting. 15 days later, tropical cyclone Wilma struck.



Swell from ex cyclone Wilma, Whakatane. Photo supplied & published in Whakatane Beacon

### Our observations...

The re-contouring project has worked well to complement the areas of the beach that are managed under the standard Coast Care model with landowners.

Sand accreted all along Ōhope during 2009/10 (El Nino), with exception at river mouths and stormwater outlets. There has been no significant difference in sand volume between treatment and non-treatment sites, but there is a different distribution along profile. The method has resulted in a heavy foredune of native plants which survived large storm events.

Same site as above after cyclone Wilma. In established plantings there were plenty of runners among the debris.

In newer plantings, one of the differences in resisting the storm was the heavy increase in biomass.



## Large Scale Dune Restoration to Protect Significant Assets: Kaitoke Beach Great Barrier Island

Harley Spence (harley@coastline.co.nz) & Patrick Thorp

### Background

Kaitoke is a large barrier beach system some three kilometres in length on the eastern side of Great Barrier Island (GBI). The beach lies immediately seaward of the Claris airfield, the main GBI transport hub. Auckland City Council's Transport Safety Assets and Operations (TSAO) managed the Claris Airfield until the "Super City" restructuring. In 2006 Coastline Consultants conducted an initial assessment of the Kaitoke dune system after concern was expressed by locals over possible sand inundation of the airfield threatening its' long term viability. The dunes were in a severely degraded state - resulting from the original development of the airfield and the impact of grazing pests, particularly rabbits. The airfield was vulnerable to inundation from windblown sand during east and north-east storm events.



Kaitoke Beach, which fronts Claris airfield, was severely degraded resulting in large amounts of wind-blown sand collecting on the runways.



Restoration included rabbit control (above), planting marram in the short term while native species were collected, propagated & planted (below).



### Dune Restoration Programme Initiated

In late 2006 Coastline Consultants and Growing Edge Partnership developed a multi-faceted dune management and restoration program that focused on protecting the airfield. Key elements from other large scale dune restoration projects, e.g Port Waikato and Marakopa beaches (Waikato Region) and the Sandtoft forest (Whanganui), were incorporated into the project design.

A number of significant issues needed to be addressed to implement the restoration programme at Kaitoke beach to protect the Claris Airfield including: the rabbit population; the need to develop goals in close consultation with key parties, i.e. DoC (the land owners), the GBI Community Board, Iwi and TSAO; the lack of any eco-sourced native dune vegetation for restoration plantings; and the lack of any long term dune monitoring data.

Over the past four years these issues have been addressed and the works program has included dune profile and vegetation monitoring, pest control, eco-sourced seed collection and propagation, restoration planting, marram removal and continued consultation and community involvement.

### Results and Conclusions

A new and effective restoration planting technique was developed at this site that initially used the locally available exotic Marram (*Ammophila arenaria*) as a nurse species and subsequently established natives sand binding grasses Spinifex (*Spinifex sericeus*), Pingao (*Desmoschoenus spiralis*) and Sand tussock (*Austrofestuca littoralis*). This method has provided initial protection for the Claris Airfield quickly and inexpensively. The area has successfully been transitioned into native sand binding vegetation and now provides long term protection for the airfield as well as biodiversity benefits for GBI. The local community has been involved both in decision making processes as well as in restoration activities. We believe this method is transferable to other large scale degraded dune sites.



Marram was planted as a short term sand catcher (aerial view left). Marram was sprayed out (below) as native species were planted & established.



The authors would like to thank Ngati Rehua and GBI Community Board members, GBI Doc and Council staff for their energy and involvement in this project.

## Te Tumu Kaituna - Template to Protect Significant Dunelands

Tom Walters, Manu Pene (Te Tumu Kaituna) & Pim de Monchy (BOP Regional Council)

### Te Tumu Kaituna

Te Tumu Kaituna was originally settled by Te Arawa and the original Te Tumu Pa was built at the mouth of the Kaituna River at Maketu. The whole Papamoa Te Tumu area was a battlefield from 1830 between Ngai Te Rangi & Ngati Haurua against Te Arawa Whanui and specifically Ngati Rangiwewehi. Many Rangatira of Ngai Te Rangi, Tapuika, Tuhourangi and Ngati Whakaue were killed in these battles and some owners see the whole area as wahi tapu even today.

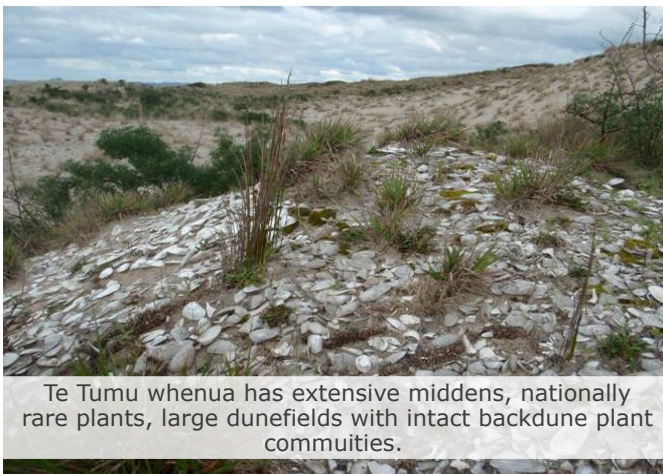
In later years the land was formed into Trust blocks which remain subject to the difficulties of managing land under communal ownership. The area had little use prior to 1980 when it was grazed for some years and had occasional sand mining. There have been plans to develop the land, but the Trustees do not support dense urban development and want to be able to retain ownership and control including the protection of wahi tapu.

### Collaborative Biodiversity Plan

The BOP Regional Council Biodiversity Programme has offered a means of protecting the land and progressing some of the Trust's goals. The programme provides funding (up to 75%) for landowners who want to protect and restore their ecological treasures. Sites must have some form of legal land protection (such as Nga Whenua Rahui Kawenata Agreement) and have a formal Biodiversity Management Plan which outlines all aspects of restoration. The Trust's Long Term Strategy also includes allowing stock to graze land outside of the BMP area and developing a camping area.

Proposed works for year one are to:

- Obtain NZ Historic Places Trust authority
- Fence vehicles/stock from natural dune plants
- Rabbit-proof fence approx. 8.25 hectares
- Eradicate rabbits and do maintenance control
- Begin weed control & scientific studies



Te Tumu whenua has extensive middens, nationally rare plants, large dunefields with intact backdune plant communities.



Fences will be erected to control vehicle access.

Warea te one tapu  
 Ka hura tangata a uta, me tiakina atu ki tangata a tai  
 Ka hura tangata a tai, me tiakina atu ki tangata a tua  
 Kia oti ake te mahara ma te taiao mo ake tonu atu

Clear the sacred pathway  
 Let those who care for the hinterland be as one with those who reside by the seaside  
 Let those who care for the seaside, be of one thought with those of the hinterland  
 Only then will the care of the environment be secured forever

## Protecting Dotterel at Maketu Spit

Julian Fitter

As a small community group we are careful not to bite off more than we can chew, while our long-term goal is to see the Lower Kaituna River, Maketu and Little Waihi harbours declared a Ramsar site, we are currently working on Maketu Spit which is a 3-5km long sand spit forming the seaward side of Maketu Harbour and running from the mouth of the Kaituna River to Maketu.

While our immediate work on the spit is to help the colony of 10-12 pairs of endangered New Zealand Dotterel, we are also developing a Biodiversity Management Plan for the whole spit, this being the best way to ensure long-term protection of the dotterel and other species. Our work has been in five main areas:

1. Observation and monitoring of the NZ Dotterel colony, this also includes monitoring the Variable Oystercatchers that breed on the spit, and the large colony of Red-billed Gulls (300 pairs) and White-fronted Terns (120 pairs) that help to make the spit an exciting place in spring and summer.

2. Trapping and control of mammalian pest species, mainly hedgehog, rat, cat and stoat, but we also have to control Black-backed Gulls which breed on the spit and enjoy a tasty dotterel chick for lunch.

3. Removal of Rubbish – we have a major clean-up once a year, and then collect rubbish when monitoring or trapping.

4. Removal of pest plant species, so far this has involved removing small Pampas grass plants and uprooting Tree Lupin, as well as removal of gorse and boxthorn.

5. Planting of native species, mainly Pingao and Spinifex, but with some coastal shrubs and also Pohutakawa.

6. Developing an education programme with Maketu Primary School which included a poster competition and a workshop to make papier-mache dotterel which were then displayed as a flock on our stand at the Maketu Kaimoana Festival.

This year we have trapped fewer pests which is a good thing and have had better breeding results from the dotterel and oystercatchers, the gull and tern colonies were also much larger than last year.

For the future our Biodiversity Management Plan (updated annually) will guide us for the next five years. This ensures that we have funding in place for the various projects within the plan. One aspect of this is an initial biological survey which has already shown a good range of native plants and a very large population of invertebrates, including a species of spider new to science - we hope to have this described later this year.



Winning school poster designs were used as part of the signage and advertising.



Maketu Ongatoro Wetland Group

Congratulations to the Maketu Ongatoro Wetland Group who won the Dunes Trust Best Coastal Restoration Project Award this year! The Best Coastal Restoration Project Award is kindly sponsored by Naturally Native.

## Dune Restoration in Northland

Laura Shaft, Coastcare Coordinator, Northland Regional Council

### 1000's of new plants in the dunes

CoastCare groups around Northland were busy again last winter planting spinifex and pingao to help bind and rebuild our sand-dunes. Approximately 4500 spinifex and 4000 pingao were provided by NRC's Environment Fund and planted at Hihi, Baylys Beach, Täpeka (Russell), Tern Point (Mangawhai), Taipä, Pataua North and Waipü Cove. 15,000 spinifex plants and 3500 pingao were planted out on Mangawhai spit by the Mangawhai Harbour Restoration Society and volunteers – funded by DOC – and 1500 spinifex by the Waipapakauri Ramp Coastal Care Group. Planting will take place again this coming winter on dunes around the region.

### New sign design

A number of new CoastCare signs were erected in Spring. These provide information about the importance and function of dune systems and dune plants, as well as local information on the dune restoration project. We worked closely with the local CoastCare groups, as well as DOC and district councils, in producing the signs to ensure that relevant information was included. Smaller signs are also available to groups to encourage beach users to keep off regenerating dunes.



For more info, go to...  
[www.nrc.govt.nz/coastcare](http://www.nrc.govt.nz/coastcare)  
<http://www.facebook.com/CoastCareNorthland>  
 Email Laura on [lauras@nrc.govt.nz](mailto:lauras@nrc.govt.nz)  
 or call 0800 002 004

### Vehicles on Beaches Initiatives Working

We had another busy summer on the beaches but have again had a reduction in complaints relating to vehicles on beaches incidents. In the Bream Bay area the number of complaints received by Whangarei District Council (WDC) dropped from 40 in summer of 2009-2010 to only 12 over the same period this summer. WDC attribute this reduction to a combination of their Vehicles on Beaches Bylaw (2009), which included a 30kph speed limit and a no vehicle zone at Ruakaka and to the Safe Beach driving awareness programme. Beach patrols were again held around the region and a number of events were attended to raise awareness of dune protection and safe beach driving.

## Taipa - a great example of what can happen when everyone works together.



Taipa 2008, before dune restoration work



Taipa 2011, after dune restoration work. Photos NRC

The project has been led by Taipa Beach Improvement Society with support from NRC, Far North District Council (FNDC), Department of Conservation (DOC), Taipa Area School, and the local community. Since 2008 when walkways down to the beach were constructed and the first spinifex planted the beach has been transformed.

Where there was an eroding bank covered by kikuyu is now a thriving foredune with healthy spinifex and pingao plants. Taipa Area School is located right by the beach and teachers and students have had a lot of involvement in the project. Betsy Young of care group Te Roopu Whakaoranga O Te Taha Moana is now working with the school on a new pingao programme and students are currently growing their own pingao plants.

## Te Roopu Whakaoranga O Te Taha Moana

Te Roopu Whakaoranga O Te Taha Moana (sometimes called 'The Pingao Group') grow pingao from seed and educate children and adults, alike, about the ecological and cultural importance of this plant.

Betsy Young, James Tuhi, Gill Taylor and other group members, visit schools around the Far North to teach children about the importance of pingao.



They take children to the beach and show them where and how to plant pingao, as well as how to look after the plants, collect seed, propagate, replant and then harvest plants for weaving. They run pingao weaving workshops and teach about the traditional uses of the plant.

They have received a number of awards for their work and this year Betsy is going to write a book about the Houhora Kohanga Reo she has been working with.



Betsy teaching Houhora Kohanga Reo tamariki about pingao and the dunes.



James Tuhi speaks to the Taipa Area School about toheroa and mahainga kai.

We have started a program with the Taipa Area school. This will be a three year program starting from scratch - laying out the dune for planting, cleaning, landscaping, planting and caring for the area over the long period.

At the school, I demonstrate the steps for harvesting pingao, cleaning and getting it ready for weaving. The little black trays are the propagation system I use to show the children about pricking out and propagating pingao.

Betsy Young  
Photos care of Betsy Young





## Castle Cliff, Wanganui - Sadness & Success

### Graeme and Lyn Pearson

Ted's (Frost) death in July 2010 was a great sadness to all of us in the Coast Care group, we have lost a mentor and an inspirational leader. Fortunately Ted had built a solid foundation. He had established a plan (2020 Vision for the Castlecliff Coastal Reserve) and vision for the future, nurtured strong links with all the "stakeholders" and secured funding and generous in-kind support from several sources. It is thus a great pleasure to report many successes in this last year which we are all very proud of.

Three of our main outcomes are:

- High level of hours contributed (130 hrs/month) - since March 2009 1,694 voluntary hours, valued at \$42,000 have been contributed.
- Good survival of 2009 plants and over 600 new plantings. The established plants are now more visible and both Coast Care members and others involved in recent planting sessions have received compliments from locals walking in the reserve.



School children are provided with a 30min discussion, focusing on the history and botany of the coastal reserve.

The WWF grant has been awarded to Progress Castlecliff to allow the employment of a part-time coordinator for the Coast Care Group, to expand the coordination and educational role of the group. The WWF requires monitoring of the environmental impacts, so the group has initiated animal, plant and bird monitoring procedures and a recording program. An "environment trail" for school children is being developed with the assistance of Terry O'Connor.

### Media and Website

Three local newspapers have published stories featuring Coast Care activities and Castlecliff Coast Care's project featured on National Radio's Sunday morning program, on 21st November. Doc have kindly put our activities on their website, see <http://www.doc.govt.nz/getting-involved/volunteer-join-or-start-a-project/join-a-group/whanganui/castlecliff-coast-care/>.



Castle Cliff Coast Care have received a Regional Weedbusters award as well as a DoC Conservation award.

None of these achievements would have been possible without the help of the dozen or so regular Coast Care members, Community groups and Schools, plus the organisations and firms providing financial and in-kind support. Castlecliff Coast Care gratefully acknowledge the financial and in-kind assistance of the Wanganui District Council and their staff, Horizons Regional Council and their staff, Dept. of Conservation (both locally and in Wellington), World Wildlife Fund, Wanganui Royal Forest & Bird Soc., River City Tree Services, Kii Tahurangi Nursery and CIE Nursery.



- With the assistance of WDC staff three signs have been designed and erected. An educational focus was chosen for the design of the sign close to the Duncan Pavilion, and has been complimented by a demonstration area of native sand binding plants. On the rear dunes two signs highlighting the positive work of the Coast Care group and its supporters were erected.

Essential aspects to our groups success:

- Collaborative Planning and Review. We recently met to review progress, successes and improvements to be made from the last five years with all our stake holders. It was a very successful meeting and a further five year plan was made.
- Funding and Resources. We have received funding from a range of sources including the Wanganui District Council, DoC Community Conservation Fund as well as plant purchases, Horizons and Weedbusters grants and the World Wildlife Fund (WWF).
- Education and Ownership. Developing "ownership" is a key component of any Community development program. People contributing their time "have learned through participation and discussion" about the fragile dune areas, and how the native plants used in dune restoration can help to stabilize and enhance the area.

## Petone Beach, Wellington Harbour

Graeme Lyon – Convenor, Friends of Petone Beach.

The Friends of Petone Beach are a small informal group which aims to develop dunes at the beach to:

Restore dunes as a natural feature of the Petone Beach to:

- Mitigate against potential rising sea level,
- Minimise storm surge damage,
- Mitigate against the next tsunami,
- Restore native biodiversity, and

Reduce wind-blown sand to streets and properties adjacent to the beach, by planting native plants, mainly pingao and spinifex and by removing weeds and marram.

The group has now planted along most of the 2km of the previously bare sea wall. The photos (right) show the change at Beach St between February 2009 and January 2011. Other parts were planted from 2006 onward and dunes up to 15m wide have developed. Some transects have been surveyed to document these changes. The group has also replaced most of the marram dunes east of the Wharf with native pingao, spinifex and are trialling several species of back dune plants. The trial has showed a very commendable survival of 74% of the plants (12 species) over three years since planting. The site is very exposed to the occasional southerly winds which send cold salt spray and sand over the plants, as well as many competing weeds and the infertile sand substrate. No fertiliser is applied since planting and these back dune plants have not grown much but most have survived! Future work is now concentrated on weeding with a small group of enthusiasts 2 mornings a month, and some new planting west of the wharf.

Much of the achievement has been due to the enthusiasm on energy of the volunteer coordinator at the Hutt City Council and the Council which provided some funding, with other funding from the Greater Wellington Regional Council and the Ministry for the Environment.



Petone beach seawall, before restoration work, February 2009

Photo: Graeme Lyon



Petone beach seawall, after planting and fencing, January 2011

Photo: Graeme Lyon

## What has your group been up to lately?

We learn a lot from our Regional Round-up Presenters. Come to the next Conference or email an update for our newsletter.

You can also email if you would like to get in touch with any of the groups who presented at the 2011 Conference.

[info@dunestrust.org.nz](mailto:info@dunestrust.org.nz)

## Effects of an Invader on Native Species at Queen Elizabeth Park

Guyo Gufu (MSc candidate, Victoria University of Wellington), Contact: Guyo.Gufu@vuw.ac.nz

### Introduction

In New Zealand, the natural character of coastal dunes has been lost from over 70% of their extent between 1950s and 1990s (Hilton, 2006) due to a combination of coastal development, invasion by introduced plant and animal species, farming, and forestry (Hilton et al, 2000).

In some early restoration projects the South African iceplant *Carpobrotus edulis* and *Carpobrotus chilensis* were used to stabilise bare sand because of their rapid growth, tolerance to exposed conditions, and sand burial. *Carpobrotus spp* often form dense mats and would seem to exclude the establishment of native flora. *Carpobrotus edulis* particularly is considered an unwanted organism (Biosecurity New Zealand). However, there is little quantitative information on how it interacts with other fore-dune species. Restoration plantings are usually preceded by removal of the exotic species, yet these exotic plants may have some facilitative effects on the native species. *Carpobrotus edulis* may yet have a role as a useful stabiliser, creating appropriate micro-conditions suitable for establishment of native species.

We initiated a research project at Queen Elizabeth Park along Kapiti Coast where the dune face is mainly covered by South African iceplant, *Carpobrotus edulis* interspersed with bare spaces. While *C. edulis* stabilises dunes, it is not effective in repairing storm-damaged dunes between storm episodes owing to its prostrate growth form that may not help trap as much sand as upright plants. The main aim of the project was to study the effects of *C. edulis* on establishment of *Spinifex sericeus* at the fore dune region with general research questions hoped to be addressed being: (i) whether *C. edulis* has facilitative effects or competitive exclusion on *Spinifex*; (ii) whether the effects differ along the gradient of the dune face, and (iii) whether *C. edulis* has any allelopathic legacy that hampers establishment of *Spinifex*.

### Materials and Methods

Selected plots were assigned to three treatments where *Spinifex* seedlings were planted: (i) into stands of *C. edulis* (Iceplant), (ii) in plots from where *C. edulis* has been removed manually (Removal), and (iii) in open spaces where there was no pre-existing vegetation (Bare). Twelve seedlings of *Spinifex sericeus* were planted per plot, six at the bottom of the dune face and six towards the top to investigate differential response along the gradient. The distance between the seedlings at the bottom of the fore dune and the ones towards the top varied between 2 – 4m according to the size of dune face. The seedlings were planted between 15th and 17th November 2010 spaced 40-50cm apart within a plot. Seedlings were planted at a depth of at least 20 cm - equivalent to the depth at which they were in the root trainer sleeves. Two pellets of a slow

release compound fertilizer (20:4:2; N: P: K) were applied in each planting hole before transplanting the seedlings. Due to the dry weather the plots were watered with 500 l from an industrial sprayer on one occasion at the end of November. Survival of the *Spinifex* seedlings was assessed periodically at an interval of about four weeks. As survival rate stabilized, the number of leaves per plant per treatment, as a function of growth, was determined.

### Preliminary Results

Survival data was first collected on 15th December, 2010 (four weeks after planting) at which point a total of 185 seedlings survived out of an initial 252 (73% survival). Seedling survival continued to drop from month to month and seems to have stabilised at 46% for the months of March and April (Fig. 1).

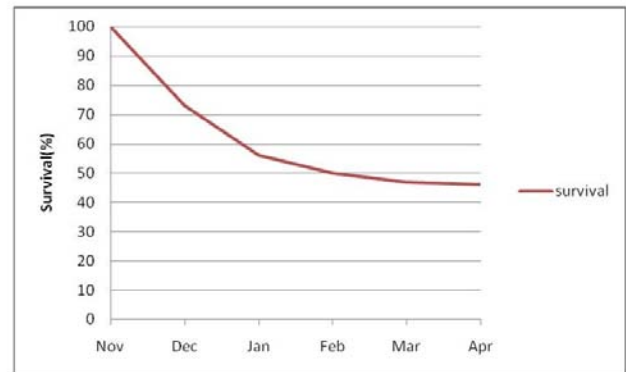


Fig 1. Overall survival of *Spinifex* seedlings over time

During the first month (December), within-treatment survival of seedlings was significantly higher for plants at the bottom of the dune face ( $F_{1, 36} = 5.129$ ;  $P = 0.03$ ; Fig. 2). This did not persist in the subsequent months probably due to a storm event that resulted in undercutting of the dunes. Spread of *Carpobrotus* into neighbouring removal plots was minimal and no sprouts of *Carpobrotus edulis* from buried structures were noted at the removal plots.

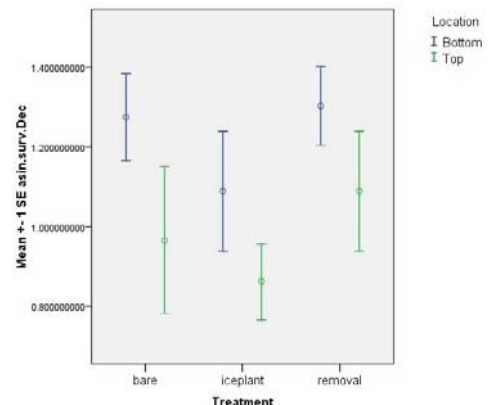


Fig 2: Effects of treatment and location on mean seedling survival for December 2010 (location had a significant effect;  $P = 0.03$ ).

### Effects of an Invader Species Continued...

In the month of January treatment had an effect on survival, though not significantly ( $F_{2, 36} = 2.8$ ;  $P = 0.074$ ; Fig. 3), with survival being higher at the removal plots. Survival consistently remained higher for removal plots and lowest in the bare plots. Plants in the removal plots had a significantly higher number of leaves than those in the other treatments ( $P=0.02$ ; Fig. 4).

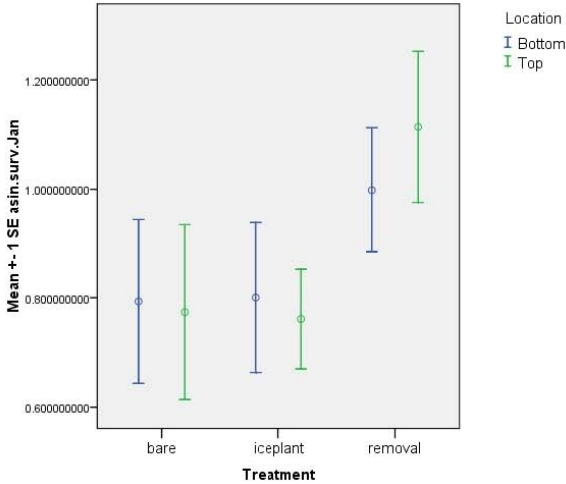


Fig 3: Effects of treatment and location on mean survival for January (treatment had an effect)

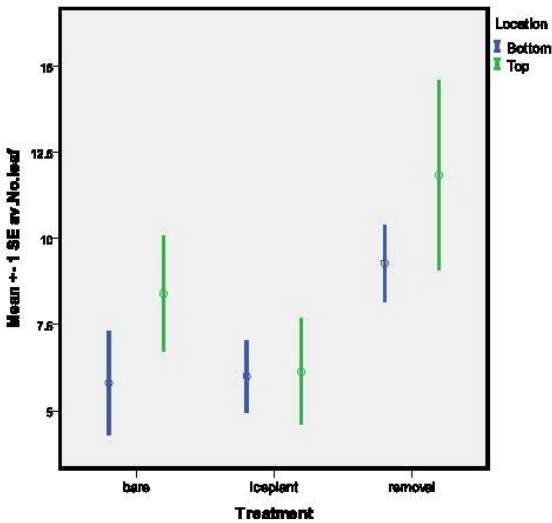


Fig 4: effect of treatment on average number of leaves

### Discussion and Conclusion

Factors that may have had a confounding influence on initial survival include drought and the steep nature of the dune face slope which made it difficult to attain the recommended planting depth. By

middle of December some seedlings had 5-10cm of the root trainer soil exposed due to wind erosion. However the higher rate of seedling survival at the bottom of the dunes during the driest month (December) suggests that the seedlings have been buffered against conditions that are harsher at this location. Therefore, the expectation that facilitation would initially be the dominant effect of the iceplant on native species, and that the degree of facilitation differs along the dune gradient seems plausible.



Fig 5: The same plot in December (left) and January (right) following storm undercutting

A severe storm undercutting in January decimated plants at the bottom of the dune face cancelling out the facilitative effect of the iceplant (Fig 5). There was evidence of human and dog trampling in the plots assigned to bare treatment accounting for the observed lower survival rate. Therefore, episodic disturbance events seem to be as important as environmental stress in determining survival. Seedlings within the plots of iceplant appeared slenderer and had fewer leaves than those in the other treatments, most probably due to competition. The fact that the observed higher moisture content of the soil with iceplant intact has not translated to continued higher survival further suggests that competition was at play.

The generally higher number of leaves and survival rate of seedlings in the removal plots suggest that substrate modification by the iceplant may have improved soil conditions to the advantage of the seedlings. Therefore, at this stage there is no evidence to support the notion that *C. edulis* has inhibitory residual effects on successive plants.

Are you carrying out research in the coastal/dunes area?

Come to our next conference or email an abstract for our newsletter. We also have members who may be able to help you out with project work.

[info@dunestrust.org.nz](mailto:info@dunestrust.org.nz)

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