# Coastal dune restoration at Island Bay, Wellington

## …a ten-year story

- **Coastal sand dunes are dynamic and iconic landscapes.**
- **Specially adapted plants are able to trap sand and build-up dunes that protect inland areas from storm surges.**
- **The natural character of dunes is threatened by physical disturbances and invasion from exotic plants.**
- **Community groups across New Zealand are active in restoring native biodiversity to urban and rural sand dunes. We conduct research to evaluate effectiveness of such restoration efforts.**


**Figure 1:** Coastal sand dune restoration research at VUCEL.

## Synopsis

In 2002, local residents protested at the bulldozing of a degraded dune in Island Bay. At this point, the Island Bay Coast Care Group was established with the aim of restoring a natural vegetation cover to the remnant dune. Over a 10 year period, volunteers have planted more than 20,000 native plants, (Fig. 2) and weeded out a similar number of non-native species (Box 1). The native plants of *Spinifex* and pīngao have been effective in trapping sand, growing the toe of the dune towards the sea and expanding the beach front. Storm water drains have been "beautified" with rocks and others have been extended by 6 metres to keep up with the growing dune (Fig 3). The dune now has a shallower, wider profile which is more resistant to erosion from storm surges and provides an expanded and more natural habitat for native animals such as skinks.

MSc student, Zach McCormach researched the history of the dune restoration at Island Bay. Other students, Samantha Jamieson, Guyo Gufu and Susanne Krejcek have been conducting experiments to determine the interactions between native and introduced plants, and the value of restored dunes as habitat for native fauna.

**Box 1**

**Native plants planted:**
spinifex, *Spinifex sericeus*
pingao, *Ficinia spiralis*
taupata, *Coprosma repens*
harakeke, *Phormium tenax*
whaririki, *Phormium cookianum*
wiwi, *Ficinia nodosa*
horokaka, *Disphyma australe*
coastal shrub daisy, *Olearia solandri*
silver tussock, *Poa cita*

**Non-native plants removed:**
marram grass, *Ammophila arenaria*
South African iceplant, *Carpobrotus edulis*
purple groundsel, *Senecio elegans*
Bermuda grass, *Cynodon dactylon*
African daisy, *Osteospermum spp.*
lupin, *Lupinus arboreus*

**Figure 2:** Community working bee in Island Bay.

***Research questions addressed include:***

- Can existing cover of marram grass (a non-native) be useful in assisting the establishment of native sand binders (via facilitation) or does it prevent establishment of *Spinifex* (via competition)?
- Do these processes change along an environmental gradient?
- Are dead herbicide-sprayed marram grass structures better facilitators than live marram for
  - *Spinifex* plantings
  - self-colonizing species


**Figure 3:** (Left panels) Seaweed and logs were initially used at the base of the dune to retain sand while plants established. Non-native plants were removed slowly over time because they act as facilitators of vulnerable seedlings (Middle panels) Top: Steep dune dominated by South African iceplant. c2003. Bottom: Thriving native species (pīngao and spinifex) and a gentler, more resilient dune slope. Sept 2012. (Right panels) Top: Fence is completely bare at toe of dune, circa 2003. Bottom: Sand has significantly raised and dune profile is more gradual. A new post and rope fence has been constructed 3-6m seaward of the original.

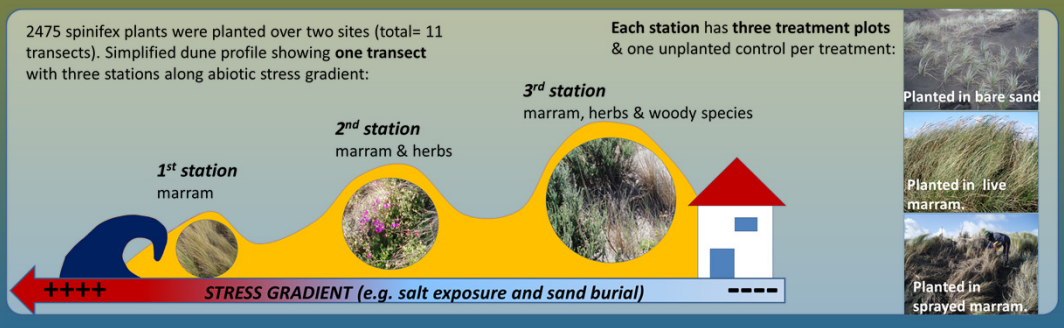


**Figure 4: Example of VUW research on coastal sand dune restoration.** Experimental design used by Susanne Krejcek to evaluate effectiveness of specific restoration activities.

***For more information, contact:*** **Stephen Hartley, Zack McCormach or Susanne Krejcek**
***Centre for Biodiversity and Restoration Ecology***
Stephen.Hartley@vuw.ac.nz , zackmack@gmail.com, Susanne.Krejcek@vuw.ac.nz
School of Biological Sciences, Victoria University of Wellington

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