ADAPTATION ATLAS – Coastal Case Study: Australia and NZ East Coast storm resilience

1. Bondi Beach, Sydney – December 2014:

Lots of fun, sun, sea, sand – but also a total lack of beach stabilising beach vegetation

Bondi Beach – December 2014

But does the complete lack of beach vegetation shown above really matter? Maybe locals insist there isn't sufficient space for plants on their beach? Why bother re-establishing the original and indigenous vegetation when these plants might just be a nuisance and get in the way…??

- **and then the Sydney storm impacted here - just 4 months later - in April 2015**

From The Sydney Morning Herald 22 April 2015: "The destructive winds, which topped 130km/h, dumped blankets of sand from Sydney's beaches onto nearby streets and carparks."

Bondi Beach – April 2015

Bondi Beach sand storm 21 April – above and below (Source – The Guardian Newspaper - Sydney)

Note: The first in this series of photos reveals that Bondi Beach is completely devoid of natural beach and dune vegetation. These storm photos very clearly illustrate that huge volumes of sand were readily moved by the storm winds, blown up and over the back-beach seawall plus fences, and rapidly relocated inland. This vital sediment is now lost forever from this beach compartment. And this is only one storm in one year.

This alarming situation impacting on beaches repetitively ensures huge losses of valuable sediment whenever winds reach sufficient velocities to create this natural sand movement (saltation) in those unnatural circumstances, as illustrated by the above photos. All mobile sand was lost due to a lack of beach plants.

However, there exists one low-cost technique to arrest these losses while improving natural beach function and this is also proven to build wider beaches – by utilising a proven low-cost and natural technique - assiduous restoration of the indigenous halophyte C_4 beach vegetation. This simple but innovative action traps and stabilises all that valuable sand resource and retains it on the beach berm, while actually creating broader beaches for the recreational benefit, enjoyment and safety of beach visitors and residents alike.

Assiduous beach restoration represents a true low-cost and win-win for everyone:
beach communities + beach ecosystems + beach administrators + beach managers with strained budgets.

Facts regarding the many benefits of beach restoration by utilising community action are plainly revealed in the Bay of Plenty region of NZ. At that location, greater than 120km of formerly and similarly degraded beach systems have now been assiduously restored by simply using the indigenous halophyte (salt-tolerant) vegetation that evolved on these beaches to successfully provide coastal storm buffer functions – naturally.

The sand being accumulated by those restored locally-native beach plants is providing impressive and enduring results for many beach-side communities. And this simple operation offers unequivocal and recent proof that this environmentally-ethical and affordable coastal transformation programme significantly aids tourism while keeping sand where it belongs – on our beautiful beaches.

The images below reveal some of these results and benefits as they relate to one such restored beach – the ever popular Mount Maunganui Beach, as illustrated below:

2. Mount Maunganui Beach, NZ – January 2012:

Lots of fun, sun, sea, sand – but now on wide, restored beaches with naturally stabilising vegetation

PHOTO: **BAY OF PLENTY TIMES**

Mount Maunganui has been described as being ***"as Riviera as New Zealand gets"***, according to the latest **Lonely Planet Travel Guide**. And this photo reveals one of the reasons for that wide claim.

NOTE: the above beach and vegetated dune is being enjoyed quite thoroughly as a relaxing, recreational paradise. But just as importantly, this beach system is now growing wider due to restorative plantings 10 years prior - in 2002. That fact will ensure this current picturesque situation will remain a certainty for very many future years. This element is being monitored by the striped post near the serene sunbathers.

This restorative planting ensures any mobilised sand is trapped by these new plants. Consequently this beach system has advanced seaward by over 25metres since 2002, including the 6 metres of extra sand accumulated to a depth of +50cm in the 2 year period as shown in the 2012 and the 2014 photos (see the striped sand datum post above and below). The research data collected here reveals an accumulation rate of 3m^3 of fresh sand/lineal metre of beach over those 2 years, or 1.5m^3 of fresh sand/year. And this once-only ethical beach restoration costs less than NZ$50/lineal metre.

And this sand accumulation (or accretion) simply continues now – without further input - whenever onshore winds deliver fresh supplies. This occurs even during oceanic storms that were previously damaging, when volumes of sand were blown up onto and occasionally blocked the nearby road. But now this valuable coastal resource merely adds fresh sand to the burgeoning beach & dune.

The earlier degraded state of dunes here was simply encouraging relentless erosion of this beach, similar to the Bondi Beach example shown above. This problem can be compared to 'rust never sleeps'. Loss of precious sand would have simply ensured those ongoing losses of valuable sediment from naturally protective storm buffers, exacerbating the human-induced erosion problems. This continuum eventually would have prompted demands for expensive, community-impacting and unsustainable seawalls. That occurred on nearby Waihi Beach – at a cost of NZ$6million for the 1km of new seawall (NZ$6,000/lineal metre, or 120 times the cost of assiduous beach restoration).

But all that excess can be prevented by proactive, inexpensive re-planting of the original evolutionary-advanced native halophyte foredune plant species where they belong as shown below – on your beach.

MOUNT MAUNGANUI BEACH JUNE 2014: AT THE SAME LOCATION (BUT DIFFERENT ANGLE) AS THE BOP TIMES PHOTO ABOVE.

Adding to the wide appeal of this already very popular beach (shown in the above photos) is some recent and outstanding news from TripAdvisor (Source: **BOP Times 18 February 2015):**

"Mount Maunganui - best beach in NZ, and … ranked as one of the best beaches in the South Pacific. TripAdvisor today announced the winners of its Travellers' Choice Awards for top beaches. The awards recognise the best beaches globally.
"In New Zealand, Tauranga's Mount Maunganui beach has topped the list for the third year in a row and took out **second place in the South Pacific Top 10 Beaches list.**
"We loved this beach so much that we came back three times during our short stay in Tauranga. The beach is pristine, and the water inviting. The views are beautiful."

It is now abundantly apparent this littoral ecosystem restoration work also provides a multitude of lowest-cost tangible benefits for many similarly managed coastal areas.

Which alternative would you choose from the above: beach 1 or beach 2?