

# From Disaster to Restoration: The Power of People

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**Coast Care BOP Programme**

Managed by Environment Bay of Plenty

- In partnership with Tauranga City Council, Western Bay of Plenty, Whakatane, and Opotiki District Councils, and the Department of Conservation.

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New Zealand begins with  
the sea and ends with  
the sea.

The thundering surf is our frontier.

-Maurice Shadbolt

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## Early Dune Clearance: A Disastrous Beginning

Pristine dune systems are scarce in New Zealand. Fire and grazing have degraded all but the most isolated of our sandy beaches and dunes.

Centuries ago, early Polynesian settlers burnt coastal forests to provide wide ocean vistas for warning of attack by waka borne adversaries. In later times as a matter of policy, colonial Governments encouraged on-going clearance of coastal areas, through further burning of native dune vegetation, to provide easy grazing for stock throughout the country.

In the Tauranga area, regular dune grazing was a matter of survival for some farmers, due to the “Tauranga Disease”, or bush sickness, caused by the lack of cobalt and selenium in the volcanic soils. However, these trace elements are deposited by salt-spray on coastal plants, and provided a “tonic” to ailing animals. Many people nostalgically recall the romance of coastal drovers around the East Cape, with 2km long mobs of sheep, and herds of 1,000 cattle, fattened by the native coastal plants eaten during their 12 – 24 month journey to the freezing works. As a result, many native dune species are now extinct in Opotiki District.

The heavy grazing pressure through this period led to widespread destruction of the sand trapping and stabilising native plant cover, and induced severe wind erosion problems all around the country. The drifting landforms that were induced are still clearly observed on the ground and in many aerial photos. As early as 1880, the area of drifting sands in New Zealand was estimated to be 40,000ha, rising to over 120,000ha in 1909 (McKelvey 1999). The total area of NZ dunelands was estimated to be 129,500ha, meaning that ninety-five years ago about 95% of NZ’s dune lands were degraded sufficiently to allow them to be blown about at the whim of the wind, *“In few places has the impact of people on fragile ecosystems been more damaging than on coasts where loose sandy soils lie vulnerable to frequent strong winds.”* (McKelvey 1999)

The magnitude and effects of the problem were immense. In 1873, James Stewart (a settler) observed *“advancing sand dunes between Waiuku and Port Waikato, where [only] the tops of trees buried by the sand were visible, and of the dunes up to 90m high at Kaipara.”* (McKelvey 1999) An abandoned church at Waikanae, near Wellington, was buried by drifting sand around 1850, *“by 1849 the sand had progressed sufficiently to block the windows on one side,”* (McKelvey 1999), only to be unexpectedly uncovered by contractors preparing a new subdivision in 1961.

These recorded but often forgotten observations place dune ecosystems right up there with wetlands as the most severely damaged natural environments in the nation. Many believe the current condition of our dunes to be natural or normal, as this damaged state has been part of their lifetime experience of the coast, and so have no reference point to judge the immensity of the change and loss.



**Ironically, many of “the iconic” landscapes treasured today are, in reality, only mere shadows of their former splendour.**

Figure 1

- North Kaipara Dune Erosion; 1960’s.

## Exotic Plants, Erosion and Attempts to Solve the Problems

Attempts to control the human induced 'sand menace' (McKelvey 1999) involved wide scale use of introduced plant species such as marram, lupin and pines, at the expense of further damage to native plant communities and destruction of the natural habitats for many indigenous creatures. Because the introduced plants were not able to control sand movement as effectively as our native plants, storm erosion in some areas became increasingly problematic.

In tandem with this, lack of knowledge about natural coastal processes meant recognition of coastal hazards did not feature in planning documents, conspiring to create an escalating threat to buildings and roads, now too close to the sea. Protection of infrastructure and public or private assets was demanded for affected beaches, as natural sand dune reserves were depleted by consequential storm intrusion. Engineers, using the best information available at the time, produced hard structure "solutions", to tame the sea. Their rock revetment and sea wall systems proved to be very expensive, unreliable in the longer term, and destroyed the landscape and amenity value of beaches. It is now widely accepted that these hard structures do cause long-term degradation of beach systems, and should be avoided in future.



Figure 2 The Good, the Bad & the Ugly.

In the Bay of Plenty region, practices such as dune bulldozing were undertaken (e.g. Papamoa East 1958, Mt. Maunganui Main Beach 1965) for the purposes of development and improved views. Active dune grazing by livestock continued throughout the Bay of Plenty until district councils (DC's) or the Department of Conservation (DOC) afforded protection of many dune areas by acquiring and gazetting these lands as Reserves. However, cattle droving on many Opotiki beaches continued until 1995.

Another legacy of farming has been a proliferation of naturalising pest plants such as Kikuyu, Boxthorn, Blackberry, Gorse and Pampas. Further degradation occurred through poorly planned coastal residential development and population increase, by casual pedestrians, and

by dunes being used as dumping grounds for household garbage, weed infested garden waste, broken concrete etc.



Figure 3 Ohope Beach “dune?”

Earlier attempts to reduce sand loss included the inappropriate introduction of even more plants that have subsequently naturalised and dominated native plants. A local example is the Sydney golden wattle (*Racosperma longifolia* var. *sophorae*) introduced to control wind erosion of the Mount Maunganui dunes, a consequence of the 1965 bulldozing. These plants turned out to be a hybrid between two species, and instead of being a ground cover, they formed a 4m high dense coastal forest that impeded access and blocked views. In response, residents formed the Mount Coast Care group in 1994 to voluntarily remove these weeds and, at last, successfully utilise low growing native dune species.



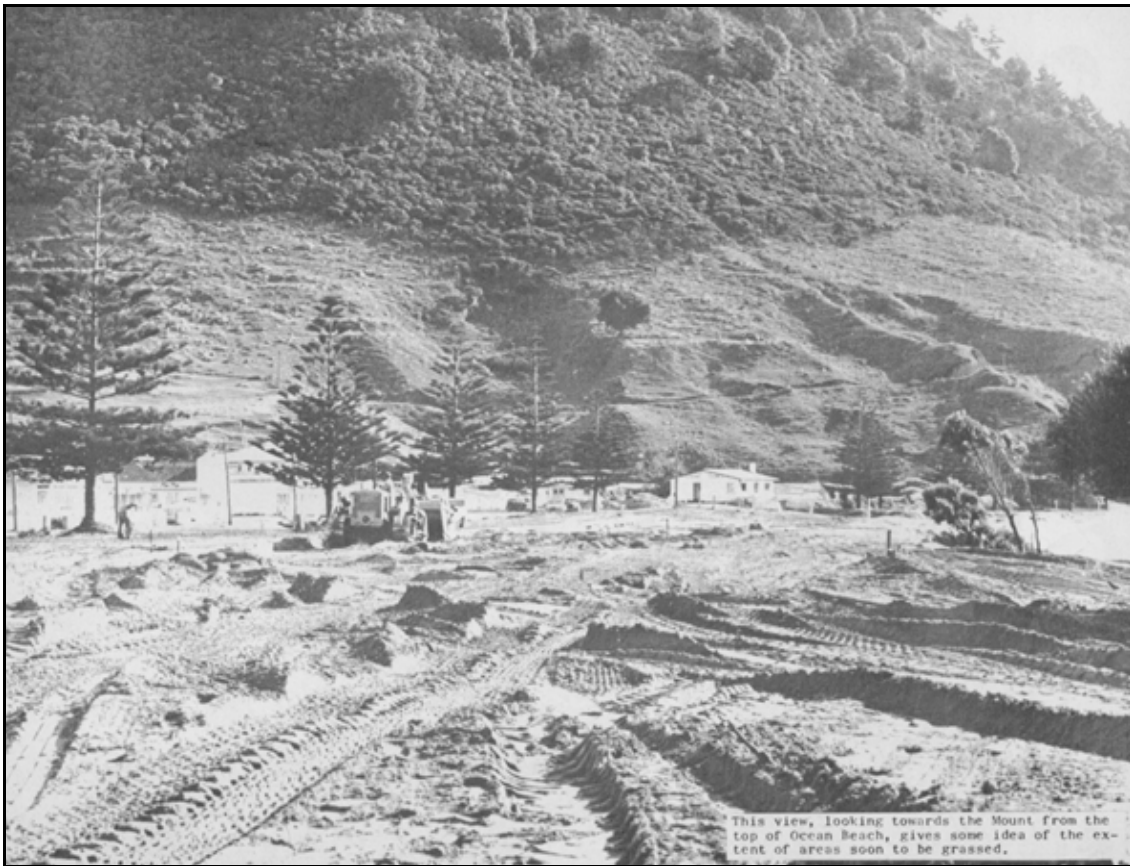


Figure 4 *Mt. Maunganui Dune Bulldozing 1965*



Figure 5 *Mount Maunganui Wattle Clearance 1994*

Clearly, the legacy of ignorance and unwitting abuse is immense, **but the tide has turned**

## Native Dune Plants: The Evolution of a Natural Way to Solve the Problems

Coastal scientists now recognise that native front dune plants have evolved to provide a critical function to dunes: the release (natural erosion) and subsequent accumulation (accretion) of sand during and after storms, to maintain an extremely effective (and free!) storm buffer along sandy coasts. This natural process is now referred to as “the Cut and Fill cycle”, in reference to the complimentary phases that exist.

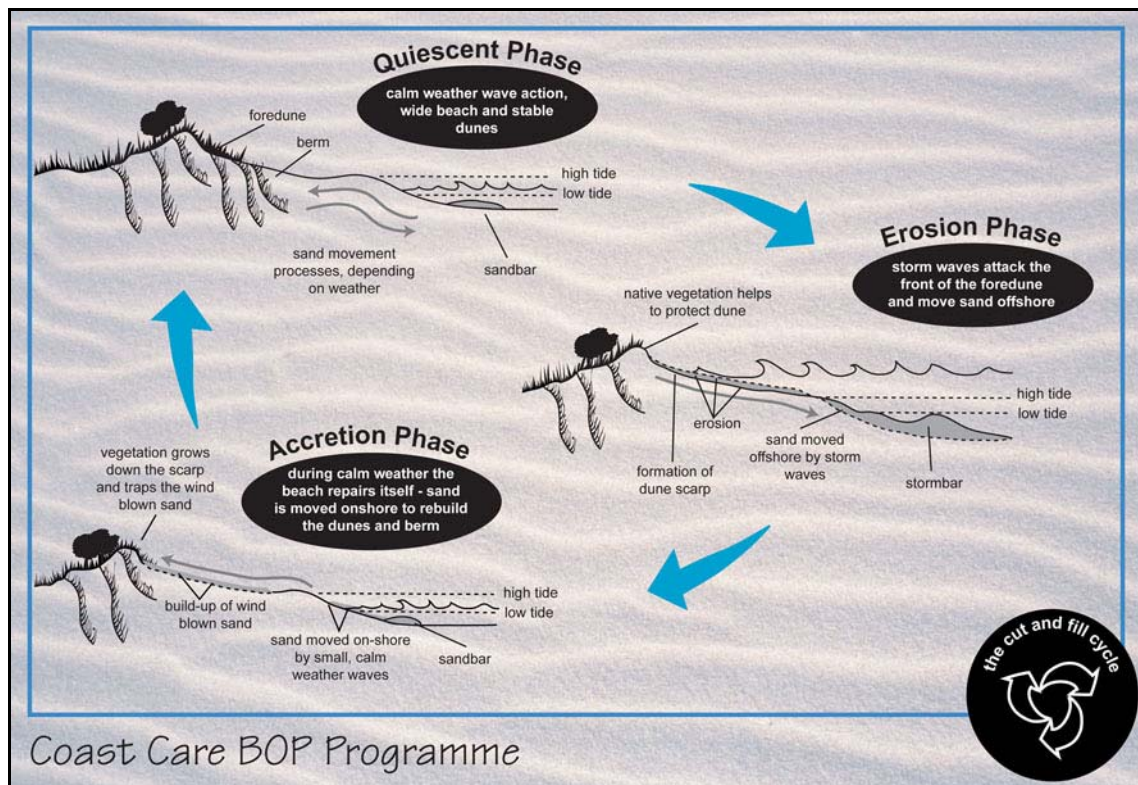


Figure 6 Cut and Fill flow Chart

All of the destructive human activities described earlier had the same disastrous impact on our dune systems: disruption of these natural and very effective coastal processes, especially the **accretion** phase of the cycle. Disruption of this important phase has simply allowed the **erosion** phase to dominate, often causing the erosion “problems” encountered today; “*Wind erosion of the beach and un-vegetated foredunes results in long term dune line recession*” (Gibb 1991).

If humans could cause all these problems unintentionally, then with **good** intent, it should be possible to reverse the damage. NZ dune geomorphologist Patrick Hesp draws the same conclusion, “*Clearly our human impact has wrought major environmental changes to.. dunefields in New Zealand, and reversal of the destructive trend of the last 600 years is long overdue.*” (Hesp 2001) However, the scale of this work is so immense, that any one group, ministry, or agency cannot tackle it alone. The only way to achieve success is through strong and effective partnerships with passionate members of the affected communities, which is just about every beach community on the sandy coast of New Zealand.

The evolution of improved understanding of the human impact on dunes led to renewed interest in utilising the plants that evolved in that environment, to systematically repair the damage. Although some botanists had deemed it nearly impossible to propagate plants like



Pingao “*I would pin little hope on being able to propagate pingao...*” (Esler 1976), through persistence and determination 3 or 4 nurseries are now producing these plants commercially. One plant nursery in the Bay of Plenty is contract growing 150,000 front dune plants annually, including 20,000 Pingao.

The Resource Management Act 1991 finally brought together the best practice desires of New Zealand’s leading coastal managers to ensure sustainable and effective, holistic management of our coastal resource. Importantly, the Act stressed the importance of integrated management and the use of methods other than regulation to achieve its purpose of promoting sustainable management (s30, s32).

## The Coast Care BOP Programme

In the Bay of Plenty, the Coast Care programme is regarded as an important management (and statutory) tool. For example, methods 6.2.6 and 7.2.4(b) of the Regional Coastal Environment Plan stress the importance of coast care for management of biodiversity and hazards.

The programme was initiated in 1993 when some staff from Environment Bay of Plenty and Tauranga District Council visited New South Wales (NSW) to experience the new wave of knowledge embodied within "Beach Care" in Australia. As a result, Coast Care in the Bay of Plenty (BOP) started in Mt Maunganui & Papamoa in 1994, based on the NSW model, by establishing strong cooperative partnerships between local management agencies and coastal communities. The new, improved understanding of natural coastal processes provided opportunities for communities to grasp the wide scale of the problem, and become involved in the solution: restoration of the natural accretion function of our dunes.

All four coastal city/district councils in the region (Tauranga, Western Bay of Plenty, Whakatane, Opotiki) and DOC in the Bay of Plenty are now engaged with the regional council to manage the Coast Care BOP Programme. Representatives of each council and DOC form the Coast Care Advisory Group, which meets every 6 weeks to discuss and review the activities of the programme throughout the region. This level of regular informative, region wide contact and open communication is pivotal to the continuing success of this nationally unique and powerful cooperative relationship. This cooperation extends to financial management of the programme, with all partners contributing roughly in proportion to their district population size.



Figure 7 Coast Care BOP "Wheel of Progress"

The aims of the Coast Care BOP Programme are to inform communities' of the important role of natural dune ecosystems, to work with and vigorously support these communities to achieve their aspirations for environmental improvement, by encouraging their active role in sustainable management of these degraded coastal lands.

Restoration of dunes has been referred to as "bio-engineering", due to the dramatic improvement made to dune function by the return of appropriate native species, a process that has good support from both communities and academia; *"Many coastal scientists.....are clearly recommending the ecological and sustainable benefits of bio-engineering."* (Jenks 2000)

New Zealand native dune plants only are utilised simply because they have evolved to excel in this harsh environment, and they provide the greatest benefit of any plants tested. In the North Island, the 4 front dune species are Spinifex, Pingao, Sand tussock, and beach spurge. These plants were identified as species of major importance back in 1911, in the "Report of the Dune-Areas of New Zealand," (Cockayne 1911) but were not used then for restoration due to difficulties with propagation, and the habitual dune grazing during that period.





Figure 8 New Zealand's Native Foredune Plants

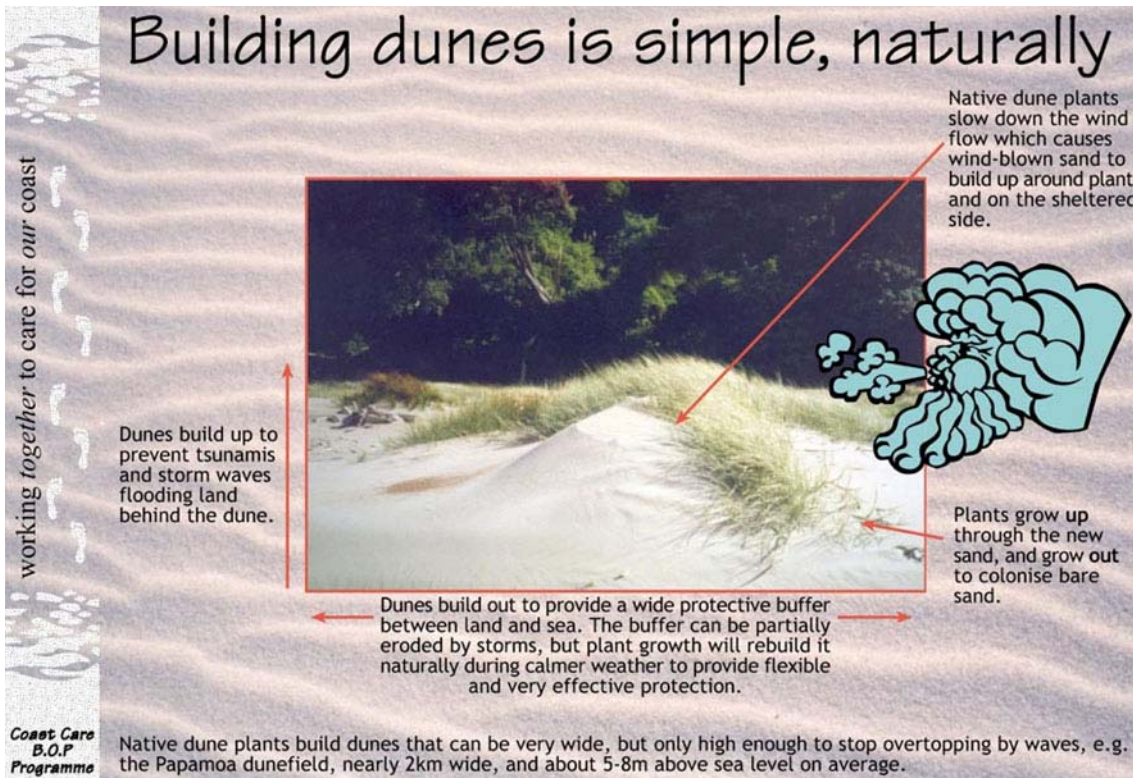


Figure 9 "Building Dunes is Simple..."

A support structure of two full time staff facilitates the programme. This ensures there is sufficient time for essential community contact and consultation, to help fulfil public aspirations, and produce public guidance information. This allows attention to be given to all who seek assistance, including the small isolated Eastern BOP communities, and some weaving Wananga groups around Tauranga Harbour. Restoration of Taonga Raranga



(treasured materials for traditional weaving) has become a very important part of the programme. Two coastal plant species have particular significance for iwi; pingao, for sustainable harvest of weaving leaves, and toetoe, for harvest of kakaho used in tukutuku panels. The 2 staff attend nearly all of the dune restoration projects, to provide information, opportunities for discussion & feedback, encouragement, and, the all-important refreshments.

Funding of the programme, as mentioned, is also a cooperative venture with all partners contributing from annual budgets for the supply of plants (purchased from commercial nurseries) and materials for our caring community members. When communities request assistance to fulfil their desires to restore their dune lands, our aim is to always answer: "YES, how can we help you." In this regard, our Councillors do not support contestable funding; this work is far too important to be left to occasional funding by chance.

TE PUKE TIMES, Wednesday, June 16, 2004 5

## NEWS

# It's time we started to look after beaches

### ■ MAYORAL MATTERS

WESTERN Bay of Plenty District Council has finished the process for its Annual Plan and Budget and will now go into decision-making mode on all the points brought up by various submitters.

The decisions council will be operating on are made through the Long Term Community Plan, on which consultation took place 18 months ago. This is more fine-tuning and is not to be confused with the Te Puke Structure Plan, which has been consulted on extensively and will be put up for decision-making shortly.

The council is very busy at the moment trying to evaluate the various suggestions from submissions.

One of the pinnacle issues is outside our district — beachfront erosion at Waihi Beach. An interesting factor developing out of that is how people value an amenity. The problem the council faces is that if any work has to be done such as protection and beach nourishment, who will pay the bill?

We've got a major issue in the Western Bay and at Pukehina. We can't take our beaches for granted any longer. It's most essential council support Environment Bay of Plenty's Coast Care programme,



Mr Weld



FILE PICTURE

**DUNES are an asset and we must do more to protect them. Coast Care officer Suzy O'Neill points out a sign urging people not to walk over dunes.**

which is also supported by Tauranga City Council.

It's essential we make sure we look after the sand dunes because they are the reservoir for sand that storms take away. Our dunes are our first line of defence.

It's been proven beyond a doubt that spinifex and pingao are the only plants that can hold the sand in place. With the impact of people and vehicles on the dunes, a big education programme is needed for residents to make sure they look after the dunes so we can enjoy our beaches.

There are a lot of other issues important to individuals and groups and we will give them due respect.

Leisure activities in the form of sports fields is one issue but it's not just sportsfields, it's parking. Any major sporting event means masses of cars, especially on Saturday mornings with children's sports.

Parking is becoming an issue and is something councils will have to give serious consideration to. In Te Puke, when children turn up for soccer at Fairhaven Park, haphazard car parking is causing concern to residents. The problem is exacerbated by changing lifestyles — people use their cars a lot more today. The council must recognise that carparks are not easy to put in place and come with a major cost attached.

Prudent coastal set backs are now a feature of Bay of Plenty coastal planning rules, a necessary and eminently sensible tool learnt from the many mistakes of the past. In association with dune restoration, the images of houses falling into angry seas are unlikely to occur in modern coastal subdivisions along our coast. In a few situations, new subdivisions are assisting the programme by providing new communities to help restore dunes damaged previously by farmed animals and feral rabbits.



*Figure 11 Waterford Estate – Front dune planting June 2004*

The activities of the Coast Care groups include:

- 1 Planning restoration work on local beach systems, in consultation with Coast Care staff.
- 2 Planting, fertilising and caring for their native coastal plants, to restore the natural accretion function of dunes.
- 3 Spreading the Coast Care ethos & pertinent information throughout the community.
- 4 Advising member councils on coastal policies for management plans and other documents.
- 5 Replacing the introduced and weed species on dunes to encourage natural biodiversity.
- 6 Constructing fences and sand ladders (only where necessary) to provide appropriate plant protection and improve access to beaches.
- 7 Ongoing maintenance of projects as required.

One of the strengths of the Coast Care BOP programme is that while it is a partnership between the regional council, district councils, and DOC, it is operated by and through local



community members taking an active role in managing their own beaches, i.e. **local solutions for local problems**. Groups decide the way in which they wish to operate, including whether or not to have formal structures like committees. The reality is that most communities simply desire to get on with the job, focussing their precious time on constructive effort. Group members make decisions about the plants and materials required for projects, which are then made available through Coast Care acquisition and supply. Providing materials in this manner, instead of funds, and keeping processes as simple as possible avoids excessive bureaucracy and the auditing that might be necessary if funds were supplied.

To ensure activities undertaken by volunteers are appropriate, Coast Care staff, who are aware of the rules and constraints applying to coastal lands, consult and liaise with programme partners and community volunteers.

## Achievements of this Community Partnership

The list of achievements to date is a testament to the vision of those who initiated the programme. Foredunes on some beaches have been fully restored, which is providing confidence in the works undertaken, and for the more difficult sites yet to be completed.

The sheer scale of anthropogenic damage to dunes means that reversal is beyond the resources of any one group. Therefore, this partnership between agencies and communities has hastened restoration at a rate beyond anything possible without the willing cooperation of all the partners.

- There are currently 28 continually active groups of Coast Care volunteers operating throughout the region, servicing nearly every concerned coastal community along the 350km regional coastline.

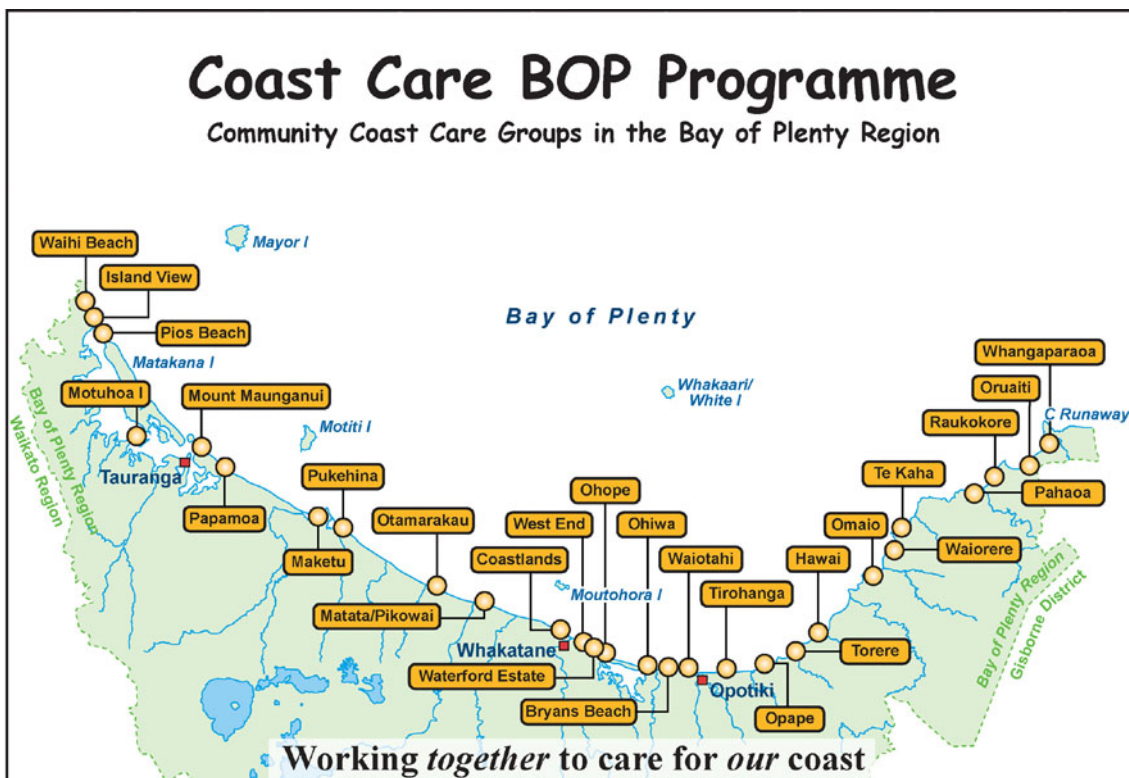


Figure 12 Bay of Plenty Coast Care Groups

- The database of Coast Care volunteers contains nearly 1,000 members who receive regular information about Coast Care projects and events.
- Again this year, the Coast Care BOP programme partners are funding nearly 40,000 native dune plants, bringing the grand total to over 240,000 plants thus far (equivalent to about 30km of front-dunes), all planted by community volunteers.



Figure 13 The 'A' Team from Whangaparaoa.

The performance of the native dune species that were planted several years ago has greatly exceeded expectations. They are consistently trapping surprising amounts of sand to restore natural function and significantly, the volume and storm buffering ability of these dunes.





Figure 14 Bryans Beach Project

- The programme in 2004 also has a strong focus on enhancement and conservation of the whole dune environment, which includes restoring biodiversity of the often severely depleted back dune areas.
- Back dune plantings are also being utilised to cooperatively restore private encroachments onto coastal reserves, through the Backyard Buffers programme.





Figure 15 Private occupation of public dune reserve.

- Restoration of some threatened native coastal plant species, e.g. *Euphorbia glauca*, *Austrofestuca littoralis*, *Lepidium oleraceum*, *Pimelea arenaria*, *Coprosma acerosa*.
- Innovative Coast Care signs liberally displayed at restoration sites ensures people realise that enhanced dune stability is a result of this programme, and that everyone can help with the effort.



Figure 16 Coast Care Signs.

- Production and distribution of 700 copies of the “Life’s a Beach” education kit to all high schools in NZ, with a reprint of 200 to meet continuing demand.
- A series of ten informative brochures and many posters have been produced to aid public understanding of the important role of natural dune systems. These resources cover both adult and school age sectors of the community.
- Frequent positive media stories provide good public information about Coast Care activities and objectives, and highlight community empowerment and participation.
- The region wide plantings have improved natural function and restored the natural character of beaches and dunes, which heartens communities and encourages support for Coast Care.
- Assisting communities with consent and planning documents has created opportunities for solutions of some “too big” issues, e.g. the Mount Maunganui Coast Care group submission to the Dredging Consent application for Port of Tauranga has resulted in

local dunes now being replenished with over 100,000m<sup>3</sup> of high quality sand during each dredging campaign, approximately every 2 years.

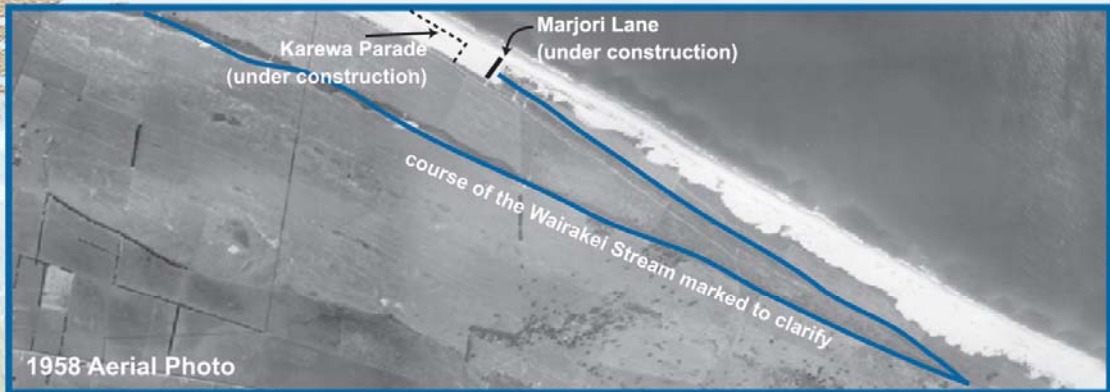
- Restored dunes are steadily increasing the width and recreational value of their intimately associated beaches, creating more beach for more people to enjoy, and increasing the security from storm surge for coastal infrastructure (see next page).



Coast Care  
BOP  
Programme

## Papamoa East Coast Care - Impact of subdivision development in 1958

working together to care for our coast



Wairakei Stream used to exit on the beach, but was blocked by developers at Marjori Lane. The front dune was destroyed by being bulldozed back into the stream to create more building sections. Karewa Parade is being formed by machinery in the white sand area to the left of Marjori Lane. Water from the stream system can now only reach the sea by flowing through the sand under the houses.



**(low tide photo)**

The heavily modified "dune" front is very unstable. The now dominant Kikuyu grass is not able to perform the accretion function of native dune plants. Water from the Wairakei Stream system is visible on the beach in this photo. This water saturates the sand, making it very prone to erosion.



**(high tide photo)**

The first year plantings did not succeed. Subsequent plantings of vigorous hardened-off plants in 1998 and 1999 have produced these results. Photo was taken after the impact of 10m waves from Cyclone Ivy in February. The restored front dune is now functioning reliably. Remnant Kikuyu will be replaced by native mid and back dune species.



in partnership  
with...







*Figure 17 – Waihi Beach, North End before planting; 1995*



*Figure 18 Waihi Beach, North End –after restoration by the community; 2003*

- Restored dunes are increasingly numerous, e.g. Waihi Beach north, Mt. Maunganui, Papamoa, Matata, Coastlands, Bryan's Beach, etc.
- Restored dunes, and their associated increasingly wide beaches, are providing better than expected buffering ability during cyclones and storms.



Figure 19 – The value of natural dunes

- People are “cold-calling” Coast Care BOP to volunteer their willing assistance to the work effort.
- Community volunteers are widening their field of interest by participating in the first invertebrate survey of the regional dunes, through 2004/05, to provide baseline data for future survey work assessing changes to invertebrate diversity.

## Continuing Challenges

While coastal areas managed by local authorities as reserves, and those managed by Iwi Authorities throughout the Bay of Plenty are becoming increasingly restored, farmed coastal land is still at risk. Some members of the farming community require some assistance to improve archaic attitudes and deleterious management techniques in this very sensitive area, in response to public comments like; *“In reality, the foreshore can become an important dry-season grazing area.”* (Edlin, 2004)

Increased basic research is urgently required to overcome challenges such as permanent control of weeds like Kikuyu and Marram, in favour of functional native species. Also, assessment of the role of mycorrhizal fungi to aid successful establishment of some native dune species is necessary.

Attitudinal change amongst the whole community is necessary to ensure universal appreciation of the critically important role of natural dune systems. Only then will the unsustainable damage by vehicle owners, horses, rabbits, farmed stock, inappropriately located development and pedestrians be prevented.

**There is a need to raise the profile of dune restoration and protection, to make this goal desirable, and therefore achievable.**

## **Conclusion: Successful Restoration by Cooperative Effort.**

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By working together with a common goal, management agencies and the community members who care for their coast have taken many local beach systems from disaster to restoration. People power, when informed and supported in a practical manner, can achieve positive changes on a scale beyond imagination.

The success of the programme can be measured in many ways, but possibly the most meaningful is the large number of sites where accretion has replaced erosion, providing a well earned sense of pride and success amongst Coast Care members. On many Bay of Plenty beaches, the simple difference between accretion and erosion is the dominance or absence of functional native front dune plants. Coastal landscapes are also being enhanced as the visually stunning New Zealand dune plants again dominate previously weedy areas.

Dune biodiversity is being surveyed by communities, to assess if improvements can be induced by re-establishing native plant populations along the coast.

Community support and understanding of natural coastal processes is increasing as the physical results of this work and informative publicity by local media help to change the attitudes of even reticent observers.

The New Zealand Climate Change Office have requested a case study of the dune restoration initiative as an example of best practice for other regions to follow, to help mitigate against predicted sea level rise.

Refinement of the programme direction, through increasing biodiversity enhancement work and sensible control of vehicle damage to dunes, will result in arguably the most natural and sustainable regional coastal ecosystem in New Zealand. Tangible benefits are accruing for coastal homeowners, tourists, and all community people who enjoy the increasingly attractive and natural landscapes of our many Bay of Plenty beaches.

**The mechanisms and policies employed in this successful programme can, and should, be utilised in every region of New Zealand.**





Figure 18 Mt Maunganui Beach access.

Coast Care people are pioneers  
There is no manual to follow  
We are writing it with each determined success.

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