

Activity Title:

Values and decision making case study – Pukehina

Focusing question

How do we make decisions about erosion prevention and the use of coastal land?

Resources required

- Case study: The Pukehina story – page 259
- Copying: copy the case study for independent reading or project digital image of factsheet.

Prior learning

4b Dune formation

4d Role of plants in dunes

5a The past – how have people affected beaches?

5g Beach erosion – summary of impacts

6g Values and the dunes

6e Coast Care

Method

- 1 The objective of this activity is to use a real life case study to explore how we make decisions about erosion control and the use of coastal land.
- 2 Independently, read the case study: **The Pukehina story**.
- 3 In small groups discuss and explore the following. Record answers on A3 paper and prepare to report to the rest of the class.
 - What factors caused the erosion problem on Pukehina Beach?
 - Who are the different groups who already are, or could potentially become, involved in the Pukehina Beach story?
 - What does each group need or want out of any solution developed?
 - What are the different management options that you think exist for Pukehina Beach?
 - What are the advantages and disadvantages of each of these options?
 - Weighing up these advantages and disadvantages – what else do you think should happen at Pukehina?
- 4 Groups nominate a spokesperson and report to the rest of the class. As a class reflect on the different values that people in this example have, and how we make decisions about erosion prevention and the use of coastal land.

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Values and decision making case study – Pukehina

Environmental Education Aspect:

About the environment

Environmental Education Concept:

- Sustainability
- Interdependence

Curriculum Links:

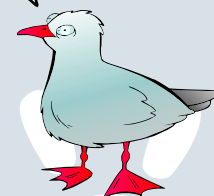
- Social Science

Suggested Curriculum Level:

Any

SUSTAINABILITY TIP!

Project a digital image of the fact sheet for independent reading and save paper!



Possible next steps

- Find out what has happened since September 2006 at Pukehina Beach. Explore how the solution compares to those developed by your groups.
- 6i Values role play – a role play activity exploring how different people value dunes and how these values can result in conflict in natural resource allocation and environmental decision making situations.
- 6j Coastal protection – different management options – an activity exploring different courses of action for different beach scenarios.
- 6m Developing a plan for action to protect the local beach – an activity designed to draw together learning from the six themes. The activity requires reflection on what has been learned, inquiry into the state of a local beach and development and implementation of a plan for action for beach protection/enhancement.



Pukehina Beach (looking towards Whakatāne)

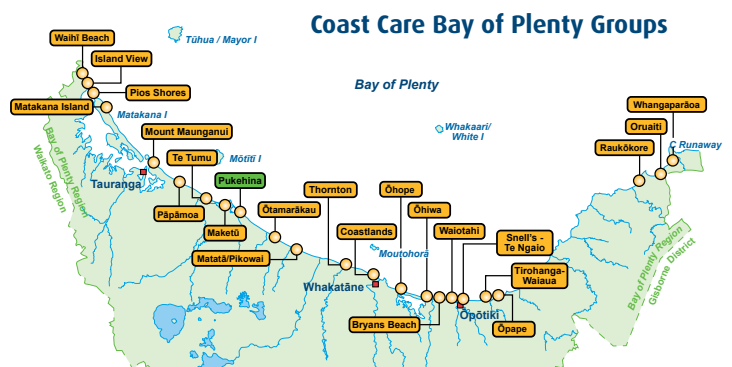
Case study: The Pukehina story

This is the story of Pukehina Beach – as told to the Coast Care Coordinator

“Pukehina Beach is at risk from serious erosion. Looking at it today we can see how erosion processes have been started by human activity.

Early grazing of stock across the whole beach has removed the vegetative cover of the front dune area. Cattle, sheep and probably rabbits have grazed Pukehina Beach and totally destroyed the cover on the front dunes. So really what’s happened is that all the dune sand has been blown inland to form very high unstable dunes (see picture below). The same situation occurs down in Ōpōtiki at Hikuwai. At Pukehina this situation will continue as long as the dunes are being dominated by introduced species, such as marram, ice plant and daisies. They originally probably helped the

dunes build so high. Marram accumulates sand on the crest of the dune rather than on the front slope. Much of the marram has now died off but the high dune legacy remains.



Stormy seas cause sand loss at Pukehina

On 18 September 2005 a combination of low barometric pressure, high King tides and a strong easterly swell caused dune erosion that left many Pukehina beachfront residents very concerned. Some houses have been built too close to the beach at Pukehina and during these heavy seas the unnaturally steep dunes retreated as far back as private property boundaries. Many Pukehina residents remember another similar

storm in July 2000, which eroded dunes at different portions of the beach. Environment Bay of Plenty [Bay of Plenty Regional Council] approved residents’ request to renourish their beach with clean sand from the Pongakawa stream (already dredged for drainage purposes). Negotiations continue amongst the residents with this proposal.

(Source: Coast Care News, Issue 13, Summer 2006).



But to compound all of this, now the farmers inland – who have a flooding problem on their low lying land – have formed a group called the Waihi Drainage Society. That society has been given permission to keep the Pongakawa canal dredged. The Pongakawa canal was originally a stream which ran out into the little Waihi estuary. This estuary then fed onto Pukehina Beach.

You have to think here for a moment – where does sand on the beach come from? Well, a lot of it comes from eroded material that is washed down rivers and streams. By keeping that canal dredged they are removing sand that would naturally replenish Pukehina Beach.

The volume of sand dredged is around about 4,000 cubic metres per year. This limits the amount of sand that can be supplied to Pukehina Beach. They dredge it out of the canal and dump it on the side of the banks, then take it away and sell it.

So at Pukehina Beach you have a double whammy!

Firstly, the dune processes have been totally interrupted by grazing and probably burning and other farming activities.

Secondly, the sand that would normally have reached the beach to replenish it through supply of sediment from inland areas, now doesn't get there because it is all dredged from the canal.

I guess you could say, to add insult to injury, the dune was then planted up by locals who wanted to have gardens in front of their houses. The plants they put onto the dunes (in their gardens) can't cope with the normal cut and fill (erosion) processes on the coast. (Picture 4 shows what can be done with beach restoration and the replanting of native dune plants).

The cut part will happen anyway. The erosion phase will always occur whether the dune is covered in native plants or introduced plants. It is usually worse with introduced plants. The fill part of the cycle can never occur now because those plants won't trap the sand when it comes back onto shore.

Western Bay of Plenty District Council became involved in the question of how the sand from the Pongakawa canal should be used. Rather than selling the sand it could be used to put back down onto the beach, to help replenish the dune system.



Picture 2 and 3: Images of erosion problem at Pukehina Beach



To do this though, the council needed some funds. The council wanted a user pays system – where the users (the residents) would supply these funds. The proposition was that beach line property owners would pay \$80 per year for the supply of the sand from the dredged canal.

People behind the beach front, on the other side of the road (the land side of the road) would pay \$20 per year. Unfortunately this all occurred at a time when Western Bay were raising rates. It didn't come at a good time for residents already trying to cope with a 56 percent rate raise. So the idea became very unpalatable. But was it really an expensive option?

Not really. You will find that this \$80 cost – the charge that Western Bay of Plenty District Council wished to make – is nothing compared to the cost of doing either nothing at all or doing any other alternative. Table 1 shows the costs of different management



options. Simple dune restoration projects are cheap in comparison with other options. And many of the costs are paid for by Coast Care Bay of Plenty which you would imagine would make this option more attractive to residents concerned about rising rates!" Now this

work has succeeded. The plan is being implemented building on the success of a trial in 2006.

Below - Picture 4: The transformation of dunes in front of housing with the planting of natives.

Before and after Pukehina Beach



September 2005: 3 weeks after the initial storm damage.



May 2007: New runners are ready to trap the next lot of blown sand and increase the width of the dune!

Table 1: Different Coastal Management Options and the various costs and benefits of each. (Source: Coast Care Coordinator, Bay of Plenty 2007)

| | Direct Costs | Maintenance Requirement | Impact on Beach |
|---|-----------------------------|--|--|
| Simple dune replanting programme with community input | \$10–\$40 per linear m. | Minimal; perhaps some targeted fertiliser for one or two subsequent years. | Dune and beach increase in width, improving recreation, amenity and function of the improving dune buffer. |
| Dune restoration including educational programmes | \$25–\$60 per linear m. | Minimal; perhaps some targeted fertiliser for one or two subsequent years. | Dune and beach increase in width, improving recreation, amenity and function of the improving dune buffer. |
| Dune reshaping and replanting | \$250–\$500 per linear m. | Minimal; perhaps some targeted fertiliser for one or two subsequent years. | Dune and beach increase in width, improving recreation, amenity and function of the improving dune buffer. |
| Seawalls and revetments | \$1500–\$4000 per linear m. | Expensive maintenance or full rebuild required every 20–40 years. | Beach continues to erode, reducing or destroying public access and recreational use. |



September 2005: 3 weeks after the initial storm damage.



July 2006: Residents paid for sand trucked in from the Pongakawa Canal which was spread in front of their properties.



July 2006: Residents fence off the new plantings to keep feet out!



May 2007: New runners are ready to trap the next lot of blown sand and increase the width of the dune!

Find out more

If you want more information on Coast Care groups and programmes contact:

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Bay of Plenty Regional Council in partnership with Tauranga City Council; Whakatāne, Western Bay of Plenty, and Ōpōtiki District Councils; and the Department of Conservation.