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Community Perceptions of Coastal Processes and Management Options for Coastal Erosion

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Executive summary

Long-term management of the coast is an important and challenging task. Some of the challenges faced by coastal managers include maintaining and protecting public access and natural character, protecting people and property from natural hazards, and sustainable planning and use of natural and physical resources. As an added complexity, these issues must also now be addressed within the intergenerational dimension of climate change and its range of associated effects.

Coastal residents, absentee coastal property owners, beach users and visitors all have a stake in how the coastline is managed. However, to date, the aspirations of the 'coastal community' in the widest sense have only been identified to a limited extent. The general framework for this study is one of community involvement in coastal hazard mitigation. Understanding the perspectives of the community, including people's viewpoints about what they value about the coast, whether they really understand how coastal processes work, and what their preferred community management options or outcomes might be, can assist with setting goals for long-term coastal planning.

For this study, research was carried out in three communities on the east coast of the Coromandel in January and February 2007. The communities selected were Whangapoua, Tairua and Waihi Beach. These locations were chosen as they illustrate both a range of severity of current erosion threats and of approaches to coastal protection.

Following the completion of survey data collection, a basic data report (Becker *et al*. 2007) was produced, which presents the postal survey results in tabular and graph format. A further report (Stewart *et al*. 2007) was also produced, containing a detailed analysis of the findings from the interviews with the beachgoers, as well as a preliminary analysis of data from the postal questionnaires.

This report presents a more in-depth analysis of the results from the postal questionnaire and links the results back into the wider coastal work programme. Results are also interpreted in light of a new national direction on preparing for climate change in the coastal zone. A particular focus is to determine public attitudes towards coastal erosion and its management, and to what extent there appears to be a mindset of 'taming' coastal processes (sometimes referred to as 'holding the line') compared to that of a more sustainable viewpoint of 'living with' natural processes.

What people value about the coast

Overall, it is clear that the natural, unspoiled character of the coast is of central importance to the Coromandel coastal communities surveyed. Good access to the coast is also important. The values held as most important by respondents are in general compatible with a paradigm shift away from 'taming natural coastal processes' towards 'living with natural coastal processes'. These values include retaining the natural character of the coast where possible, promoting natural-looking beaches and protecting sand dune systems and protecting scenic values.

Perceptions of coastal processes

In this study, respondents' level of agreement with a series of statements is used to determine their perceptions of coastal processes and coastal management options.

There is a high level of agreement with the statement that '*We must accept that coastal erosion is a natural process at the coast'*, as less than 10 per cent of responses are at the disagreement end of the scale ('strongly disagree' or 'disagree'). Thus, as well as valuing natural character as an attribute of the coast, respondents are also willing to accept the reality of coastal erosion as a natural coastal process. Respondents' management preferences appear to be linked with their level of agreement with the statement. Respondents who favour the option of 'doing nothing' are substantially more likely to strongly agree with the statement, and conversely respondents favouring the construction of hard defences are less likely to strongly agree. These findings perhaps indicate a link between accepting coastal erosion as natural and being willing to work within a management paradigm of 'living with natural processes' as opposed to 'taming natural processes'. Results of cross-tabulation analyses also indicate that the direct, day to day experience of living at the coast appears to be a factor in accepting coastal erosion as a natural process.

Respondents demonstrate a reasonable level of knowledge about sand dune processes, as indicated by the level of agreement with the statement that '*The width of the dune changes during the year*'. Factors such as length of property ownership and proximity of respondents' property to the beachfront are found to increase the likelihood of strongly agreeing with this statement, suggesting that experience plays a role.

A more varied level of knowledge is found about sand dune rehabilitation (as indicated by disagreement with the statement that '*Once a dune is destroyed there's no way to bring it back'*). Waihi Beach respondents were substantially more likely to agree that sand dunes can be reintroduced along a shoreline (49% strongly disagree, compared to 20% of Tairua respondents). This result is very likely due to the successful reintroduction of dunes along stretches of Waihi Beach where previously there were seawalls (for instance, at Brighton Reserve and Coronation Park).

The most mixed responses are shown towards the statement that '*There is a range of methods available to stop coastal erosion indefinitely*'. Waihi Beach respondents are more likely to strongly agree (34% strongly agree, compared to 12% of Tairua respondents). Reasons for this difference are not known, but it may simply be because erosion issues (and management methods such as rock walls) are more visible at Waihi Beach.

Management preferences

Overall, respondents' management preferences are aligned well with Waikato Regional Council's Coastal Erosion Risk Mitigation Strategy (Dahm, 1999) and its central theme of encouraging coastal residents to live with coastal erosion rather than thinking in terms of modifying natural coastal processes. Dune planting is a very well-supported and uncontroversial option, and the option of managed retreat is also approved of by over half of the sample of respondents. Support for the construction of hard defences is not high, particularly at Waihi Beach, a location at which rock walls have been constructed to protect private property. Open-ended responses provide further valuable insights into respondents' views on coastal management.

Funding of erosion control

The majority of respondents hold the view that where private property is at risk from coastal erosion, the private owners themselves should be responsible for funding erosion control measures. This option is supported by 72 per cent of the Tairua sample

and 83 per cent of the Waihi Beach sample. A group of 15 respondents at Waihi Beach who reported that their properties are already being affected by erosion is strongly in support of private owner funding of erosion control. This group is also, compared to other respondents, more in favour of other sources of government funding being involved, implying that they see cost-sharing arrangements as being appropriate.

Concluding comments

In general, the findings of this study indicate that there is good philosophical support in coastal communities for 'living with natural processes' as opposed to 'holding the line' approaches to coastal erosion and its management, at least among participants in this study. Opportunities exist to build this understanding throughout the wider community, and to promote more natural management options that reflect this paradigm. How exactly this could be done still requires further investigation. While people may philosophically agree with certain approaches, practical implementation may not be as straightforward (e.g. dune planting may not be appropriate in certain areas as a way of managing erosion). However, such a philosophical basis provides a good starting point to work with communities to address coastal erosion problems in ways that reflect being able to 'live with natural processes' rather than using a 'hold the line' approach as a first or only option.

This study shows that people with direct experience of coastal matters, long-term experience of living on the coast, or general environmental experience are more likely to have a better understanding of the coastal environment and to prefer natural approaches to management. Opportunities exist to harness such experience for use in future coastal planning. For example, existing coastal or environmental groups could be specifically involved in providing input into plans and strategies. They may also provide a conduit for educational activities and assist in increasing other members of the public's understanding about coastal issues. Likewise long-term local residents and property holders should be involved in planning for the future as much as possible. Research shows that the earlier and more involved people are in such a process, then the more likely it is that better and timelier environmental outcomes will be reached.

Finally, in terms of undertaking coastal erosion mitigation, many survey respondents indicate that they are not averse to cost-sharing arrangements. There are opportunities to investigate this idea further with communities, to see how such arrangements might work in practice.

1 Introduction

Long-term management of the coast is an important and challenging task. Some of the challenges faced by coastal managers include maintaining and protecting public access and natural character, protecting people and property from natural hazards, and sustainable planning and use of natural and physical resources. As an added complexity, these issues must also now be addressed within the intergenerational dimension of climate change and its range of associated effects (MfE, 2008).

There are also other planning challenges in coastal management. Within the legislative framework, tensions exist, and need to be resolved. A number of Acts exist that relate to coastal management including the Resource Management Act 1991, Local Government Act 2002, Reserves Act 1977 and the Civil Defence and Emergency Management Act 2002. Additionally the New Zealand Coastal Policy Statement (NZCPS) must be adhered to as it is a statutory document.

Private values (such as property rights) must be balanced with public values such as access to and preserving the natural character of the coast. Community awareness, and political awareness and will may lag behind scientifically-based approaches to management. Finally, planners may also be constrained by historic decision-making and past land-use decisions (Britton, 2008).

1.1 Coastal management paradigms

Waikato Regional Council's *Coastal Erosion Risk Management Strategy for the Waikato region* (Dahm, 1999) describes four basic options for avoiding or mitigating coastal erosion hazards. These are to:

- manage land use and development in hazard risk areas;
- protect and enhance natural systems which buffer coastal erosion (e.g. beach and dune systems);
- accept and live with coastal erosion; and/or
- modify natural coastal processes or landforms.

Dahm notes that the first three of these options involve a focus on human use and behaviour while the fourth focuses on managing the nature and/or behaviour of the natural coastline. The management strategy proposed in Dahm's report has a central focus on the first three options. Site-specific strategies involving the fourth option are retained as an option at problem sites such as Buffalo Beach and Cooks Beach.

Clearly, the proposed overall strategy is oriented towards approaches involving modifications to human use of and behaviour towards the coast – sometimes called a 'nature-centric' approach.

Similarly, in their 2006 report examining the feasibility of managed retreat from coastal hazards, Turbott and Stewart report that there are two broad alternatives for managing coastal hazards. These are to:

- adopt a strategy of holding the current shoreline; or
- adopt a strategy of retreat from the hazard.

The first approach has been generally preferred over the past century at least, but is increasingly questioned because of high ongoing costs, uncertain long-term feasibility and adverse environmental effects. Therefore, the second approach is now becoming favoured.

In July 2008, Ministry for the Environment (MfE) released the second edition of its detailed guidance manual entitled 'Coastal Hazards and Climate Change – a Guidance Manual for Local Government in New Zealand'. This contains an updated assessment of the science of climate change based on the findings of the Intergovernmental Panel on Climate Change's Fourth Assessment Report (2007).

This manual emphasises the need for a fundamental 'paradigm shift' in management of the coast from a mindset of taming coastal processes (sometimes referred to as 'holding the line') to that of a more sustainable viewpoint of living with natural processes. The table below briefly summarises the main features of the prevailing, current paradigm and the forward-looking one.

Historical or prevailing paradigm		Forward-looking paradigm
Hazards such as coastal erosion viewed as 'abnormal' coastal behaviour	→	Living with coastal erosion as a natural cyclic process that helps shape the natural characteristics of the coastal margin
Predominantly reactive approach to managing coastal hazards after an event occurs	→	Proactive and strategic long-term approach to managing coastal hazards
Managing coastal processes	→	Influencing people
Focus on a single management objective based on physical impacts such as protection of front-row property owners	→	Balanced consideration of a wide range of environmental and social objectives, including protection, but also issues such as natural character, public access, cultural values (and more)
Decision-making based on short-term timeframes	→	Support for long-term planning appropriate to the intended timeframe of the decisions being made and ongoing climate change impacts

Source: MfE (2008)

Of particular note in MfE's Guidance Manual is the guidance given on long-term planning for climate change. Existing development setback recommendations are based on a projected sea level rise by 2100 of 0.5 metres (Environment Waikato 2002). The manual advocates that the findings of the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (IPCC 4th Assessment Report, 2007) be used as the basis for planning. It states that for planning timeframes up to 2100, the projected sea level rise of 0.5 metres should be considered as a base level (relative to the 1980-1999 average). The manual also considers assessments of potential consequences from a range of possible higher sea level rises. At the very least, it suggests that risk assessments should consider the consequences of a mean sea level rise of at least 0.8 metres. For planning horizons beyond 2100, an allowance of 10 mm of sea level rise per decade is recommended (MfE 2008).

The IPCC 4th Assessment Report was based only on studies published up until 2005, and there is an increasingly prevalent view that the IPCC's sea level rise predictions may be underestimates. Rahmstorf *et al*. (2007) summarised recent climate

observations in comparison to the projections on which the IPCC estimates were based, and found that measured rates of sea level rise (that is 3.3 ±0.4 mm/year between 1993 and 2006) were substantially greater than the estimated rates of sea level rise (<2 mm/year) used for the IPCC projections. The largest contributions to this rapid recent rise are from ocean thermal expansion and melting from mountain glaciers and the ice sheets of Greenland and Antarctica. A key insight is that while the IPCC's predictions are based on a linear rate of increase to 2100, sea level rise is now expected to accelerate as the planet gets hotter (Rahmstorf, 2007; Rahmstorf *et al*., 2007; Rignot *et al*., 2007; Tedesco *et al*., 2008).

The topic of sea level rise dominated a recent international congress on climate change hosted by the University of Copenhagen, held in March 2009. Scientists noted that sea levels are rising faster than expected; new data were reported on accelerated rates of ice loss from the Greenland ice sheet over the past decade. Many scientists now consider sea level rise of one metre or more increasingly likely by 2100, and also have highlighted the important point that sea level rise will not stop in 2100 but is likely to continue to rise for many more centuries beyond. A preliminary synthesis report of the key findings of this congress is now available (Richardson *et al*. 2009).

In addition to sea level rise, climate change is expected to exacerbate other drivers of coastal hazards (MfE, 2008). These include more frequent and severe storms, storm surges and storm tides, wave climates and changes to the sediment supply to the coast. Many of these effects are poorly characterised at present.

These findings give added emphasis to the need for a fundamental change away from the prevailing paradigm in coastal management of 'taming' natural hazards, to a more anticipatory approach based on a willingness to work around natural processes and variability. This in turn is based on the need to manage the human dimension rather than trying to manage coastal processes.

1.2 Research on community involvement in coastal hazard mitigation

In her review of community perceptions of coastal erosion hazards, Dahm (2003) noted that relatively few studies had explored social factors such as public attitudes and perceptions of this hazard, but had focused largely on physical processes, planning and engineering solutions.

Similarly, the book '*The New Zealand Coast: Te Tai O Aotearoa*' (Goff *et al*. 2003) is described by the authors as a book that summarises coastal research in New Zealand. Most of the book is devoted to physical coastal processes and there is only one brief mention of coastal protection and no mention of any social science research on coastal communities.

More recently, Glavovic outlines his vision for 'sustainable coastal communities in the age of coastal storms' (Glavovic, 2008). He argues that for coastal communities to be resilient to natural hazards, and avoid scenarios such as the devastation caused by Hurricane Katrina to New Orleans, it will be necessary to transform the current model of coastal planning from a top-down to a bottom-up approach. Glavovic argues that coastal communities need to be empowered to work collaboratively to devise locally

appropriate, people-friendly and ecologically sustainable solutions for living at the coast.

Coastal residents, absentee coastal property owners, beach users and visitors (note that these categories may overlap) all have a stake in how the coastline is managed. However, to date, the aspirations of the Coromandel 'coastal community' in the widest sense have only been determined to a limited extent. For instance, for the Buffalo Beach and Cooks Beach erosion management strategies, Beca Carter Hollings and Ferner (2006a, 2006b) carried out detailed benefit-cost analyses (BCAs) for management options for these 'hot spot' areas of problematic erosion. A wide range of criteria were used for assessment (under the broad headings of social impacts, environmental impacts and economic impacts), but the BCAs were carried out by project teams consisting of technical specialists. As Dahm (2003) notes, public and technical assessments of risk often differ considerably. In particular, she observes that although lay people "may lack some information about hazards, their basic conceptualisation of risk is often much richer than that of experts and may reflect legitimate concerns that are typically omitted from expert risk assessments." Thus it is important that the community is involved in discussions about coastal erosion, natural hazards and options for coastal management.

1.3 Study aims and objectives

As described in Section 1.2, the community has an important, and hitherto underdeveloped, role to play in coastal management. The current study was initiated by the Waikato Regional Council as a step towards greater involvement of the community in coastal management.

The general framework for the study is one of 'community involvement in coastal hazard mitigation'. Understanding the perspectives of the community, including people's viewpoints about what they value about the coast, whether they really understand how coastal processes work, and what their preferred community management options or outcomes might be, can assist with setting goals for long-term coastal planning. This work contributes to an ongoing body of research in the Waikato region about community understanding and coastal management (see previous studies including: Dahm, J., 1999; Environment Waikato, 2002; Dahm, C., 2003; Thomson, 2003; Dennis *et al*., 2005; Horvath-Hallett, 2005; Stewart *et al*., 2005; Blackett and Hume, 2006; and Turbott and Stewart, 2006).

The overall aim of this study is:

> *'To identify the value of the coast to communities, to identify peoples' understanding of and interaction with beach management options, with the results of this study being able to inform the formulation of future planning strategies for coastal management.'*

Specific objectives are to investigate:

- the value of the coast to communities (including visitors as well as residents);
- public perceptions of erosion;
- public perceptions of different erosion management strategies (including planning tools such as development setbacks);
- public preferences for different coastal protection schemes, and reasons for these preferences;

- respondents' experiences with local coastal protection schemes at the contrasting study locations; and
- respondents' level of involvement with coastal protection schemes.

Three communities on the east coast of the Coromandel Peninsula in the North Island of New Zealand were selected for the study: Whangapoua, Tairua, and Waihi Beach (Figure 1.2). These locations were chosen as they illustrate both a range of severity of current erosion threats and of approaches to coastal management.

Whangapoua is not considered to be currently under threat from erosion. A dune management scheme is in place around the centre of the beach; elsewhere along this beach, beachfront property owners have generally planted their own frontages to stabilise the dunes. Tairua's Ocean Beach has a community dune management scheme currently in place, and has some visible erosion problems at the southern end. Waihi Beach has a 'package' of coastal protection measures in place, including two sections of rock wall, training and reinforcing of two creeks with sandbags, and a dune management scheme.

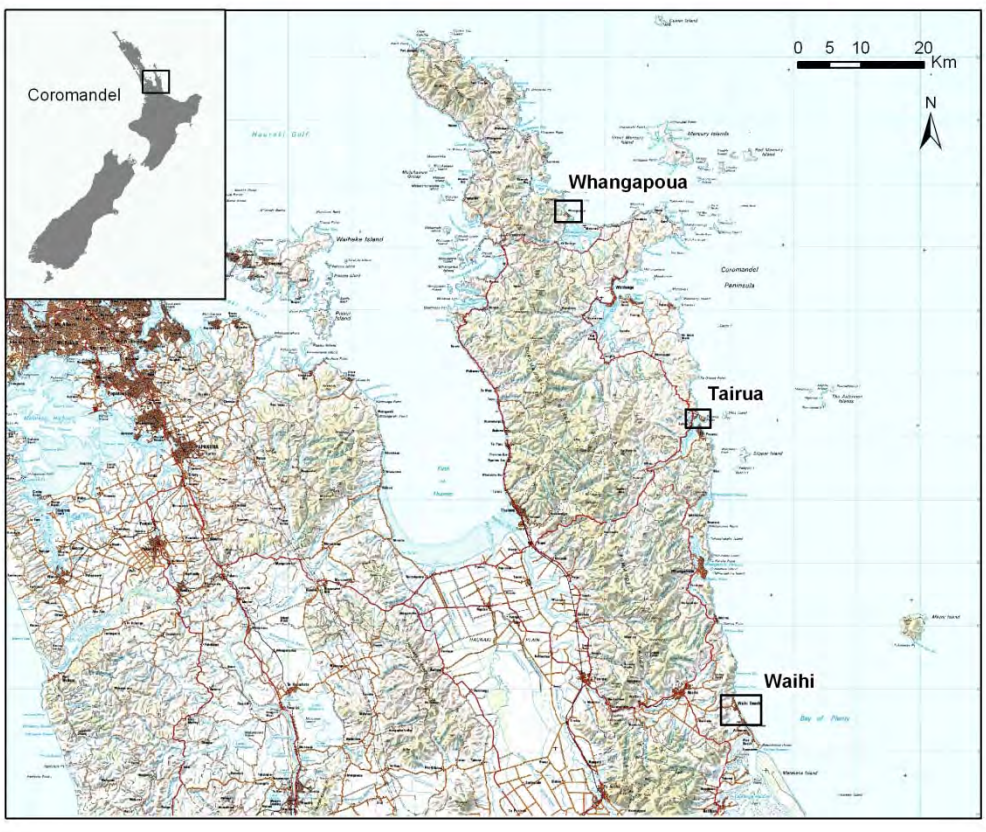

Figure 1.2 Location of study sites in the Coromandel peninsula

To carry out the research a questionnaire was developed in consultation with staff from Waikato Regional Council, GNS Science, NIWA and others working in the field of coastal management, to collect quantitative data. This questionnaire was delivered to community members in the Coromandel coastal communities of Tairua and Waihi Beach between January and March 2007. In order to gain a deeper understanding of community values and understanding about future coastal planning options, a series of

qualitative interviews with beachgoers was also undertaken at Tairua, Waihi Beach and Whangapoua in January 2007.

Following the completion of survey data collection, a basic data report (Becker *et al*., 2007) was produced, which presents the postal survey results in tabular and graph format (i.e. frequencies and percentages). A further report (Stewart *et al*. 2007) was also produced, containing a detailed analysis of the findings from the interviews with the beachgoers, and a preliminary analysis of data from the postal questionnaires. Comparative linkages were made between the two surveys (the postal questionnaire and the face-to-face interviews), and the findings were discussed in light of the study objectives.

This report presents a more in-depth analysis of the results from the postal questionnaire and links the results back into the wider coastal work programme. This includes identifying significant relationships and the nature of these relationships, identifying important themes from the open-ended questions, linking back with the qualitative interviews, and linking with other literature, research, and policy work where applicable. Results have also been interpreted in light of a new national direction on preparing for climate change in the coastal zone.

2 Study setting

2.1 Study locations

2.1.1 Whangapoua

Whangapoua Beach forms the northern part of the Whangapoua-Matarangi embayment. The embayment is 7 km long and bounded by rocky headlands to the north and south. A small headland (Raukawa) occurs in the central embayment at the entrance to a tidal inlet and Whangapoua Harbour. Whangapoua Beach is 1.6 km long. Like Tairua, it faces to the northeast and is exposed to ocean swell, although it is afforded some protection by Great Mercury Island offshore, and thus is not quite as steep and reflective as Tairua. The sand barrier is attached to the hinterland as the small estuary behind has largely in-filled and now exists as a small stream at the north end of the beach. As at Tairua, the barrier is tall (>10 m) protecting it from overwash. Erosion tends to be cyclic and overall the beach is in a state of dynamic equilibrium with the shoreline advancing and retreating over approximately 10 to 15 metres as conditions change. The catchment is large (107 km^2) and floods combined with spring tides raise water levels which inundate the estuary shores.

2.1.2 Tairua

Tairua Beach forms the northern part of the Tairua-Pauanui embayment. The embayment is 10 km long and bounded by rocky headlands to the north and south. A small headland (Paku) occurs in the central embayment at the entrance to a tidal inlet and Tairua Harbour. The Tairua catchment is large (280 km^2), and floods combined with spring tides raise water levels which inundate the estuary shores. Tairua Beach is 1.2 km long, steep, reflective and composed of shelly 0.4 mm medium sand. In contrast, Pauanui to the south is 2.7 km long, flatter, dissipative and composed of 0.2 mm fine sand. Offshore from the beaches the seabed is composed of very fine sand with coarse-grained rippled sands in patches to 50 to 60 m depth. Tairua Beach is more exposed to the north and ocean swells than Pauanui which faces more to the east and is partially sheltered by Shoe Island. Although the Tairua barrier is narrow (only 200 m wide) the dunes are high (>10 m) protecting it from overwash except in the largest seas at the southern end (where it overwashed in July 1978). Erosion tends to be cyclic, and overall the beach is in a state of dynamic equilibrium with the shoreline advancing and retreating over 10 to 15 metres as conditions change. Erosion has periodically threatened several properties at the southern end of the beach. There have been no engineering works undertaken to protect the properties, although sand has been scraped up in front of the affected properties and Dunecare programmes initiated to vegetate the dunes and build up the buffer of sand.

2.1.3 Waihi Beach

Waihi Beach lies at the northern end of a 9 km long stretch of sandy beach that extends south to the Bowentown Heads and the northern entrance to Tauranga Harbour. Waihi Beach faces to the northeast and is exposed to ocean swells. It is an intermediate state sandy beach, with finer sand and a flatter and wider profile than Tairua. The sand barrier is attached to the hinterland. The barrier is tall (>10 m), protecting it from overwash except at the northern end where the dunes are very low. Although erosion tends to be cyclic and overall the beach is in a state of dynamic equilibrium, there has been a long history (decades) of erosion at Waihi Beach

primarily due to properties being placed too close to the sea and there being insufficient dune area to accommodate the erosion and accretion cycles. There is local erosion where two streams discharge onto the beach and meander back and forth cutting into the dunes. To combat the erosion there have been various measures undertaken including building rock walls and training the streams. More recently, Dunecare programmes have been introduced to vegetate the dunes and build up the buffer of sand.

2.2 Comparative geomorphic settings

Whangapoua and Tairua (Figure 1.2) are situated on a steep and rocky coastline indented by numerous small embayments, pocket beaches and tidal inlets that front a relatively narrow continental shelf some 15 to 20 km in width. In contrast, Waihi Beach lies at the northern end of a long curved section of beaches extending south from the Coromandel Peninsula.

The geomorphic settings at Whangapoua, Tairua and Waihi Beach are sand barrier systems comprising dune ridges packed against the hinterland hills or separating estuarine water bodies from the sea. These barriers began to form approximately 6500 years ago, at about the time the sea rose to its present level. Since that time, sand coming ashore has built the barriers, dunes and beaches that we see today. The barriers built rapidly at first, but in the last thousand years sand supplies have dwindled. A consequence of this is that there is little new sand entering the system to buffer the barriers against erosion.

Tides on the coast are diurnal and microtidal, with spring ranges on the open coast of approximately 1.5 m. Tidal currents are generally weak except at inlets and about the islands, and generally play a minor role in sand transport. Waves are the major force moving sand about on the beaches, and on lee shores the wave climate is primarily mixed storm and swell waves. The prevailing wind is west to south westerly associated with the passage of mid-latitude anticyclones. Strong onshore-directed east and north-easterly winds occur during storm events. These occur approximately 10 to 20 times per year, and are typically occluded cyclones, Tasman Sea depressions and more rarely decaying tropical cyclones. Waves arrive principally from the north to east sector. Islands and headlands provide some local shelter from waves for the beaches. Mean significant wave height and period, derived from a 20-year hindcast using a 20-year WAM wave generation model, are of the order of 0.86 m and 5.8 sec respectively (Gorman *et al*. 2003). Storms, particularly tropical cyclones, generate large waves (maximum significant wave height and period 7.0 m and 12.7 sec respectively) and it is usually during such events that beach erosion takes place. Erosion on the shores is largely cyclic as sand is exchanged back and forth between the dunes, beach and nearshore bar systems.

2.3 Administration of the study areas

Whangapoua and Tairua are administered at a regional level by the Waikato Regional Council, and at the district level by Thames-Coromandel District Council (TCDC). Waihi Beach is administered by Environment Bay of Plenty (EBOP) at the regional level, and by Western Bay of Plenty District Council (WBoPDC) at the district level.

2.4 Approaches to coastal protection at the study locations

2.4.1 Whangapoua

At Whangapoua, a Beachcare group has been active since 2002 and has the following strategic aims:

- *restore and maintain sand grass cover on foredune;*
- *promote and undertake appropriate backdune planting of native shrubs and ground covers;*
- *appropriately manage pedestrian and vehicle access to the beach;*
- *encourage the development of a dune care ethic in the local and beach user communities through signage, information and participation in Beach Care events; and*
- *recognise the central car park as an area requiring special consideration.*

Prior to 2002, the foredunes along the central part of the beach were devoid of sand-binding plants (Coastline Consultants and Economos, 2006). The local coordinators at this site have since organised annual working bees to re-establish sand grasses on the seaward dune faces, and back dune plantings of native ground cover, trees and shrubs. This approach has reportedly been very successful at re-establishing native dune vegetation and enhancing natural dune repair. Elsewhere along this beach, beachfront property owners have generally planted their own frontages to stabilise the dunes. A feature of this community is the extent to which local property owners have taken responsibility for planting their own dunes, as well as undertaking considerable additional plantings outside of the annual working bees with appropriate plants.

2.4.2 Tairua

At Tairua's Ocean Beach, a Beachcare group has been active since 1994. The strategic aims of this group are to:

- *repair dune damage as necessary;*
- *restore and maintain sand grass cover on dune face;*
- *promote and undertake appropriate backdune planting of native shrubs and ground covers;*
- *appropriately manage pedestrian and vehicle access;*
- *encourage the development of a dune care ethic in the local and beach user communities, through signage, information and participation in Beach Care events; and*
- *recognise the Surf Club and northern car park as areas requiring special consideration.*

(Coastline Consultants and Economos, 2006.)

Particular issues for this beach identified by Coastline Consultants Ltd and Economos (2006) are an extensive cover of exotic species hampering the establishment of spinifex, and damage to the dunes caused by people not using the access ways provided. At the southern end of Ocean Beach, several properties have been threatened by erosion in the past. Recent plantings of sand grasses have helped stabilise the dunes in this area, but the unauthorised dumping of rocks along the base of the foredunes has been counterproductive as the sand at the ends of the rocks has been scoured out.

Jim Dahm (pers. comm.) has provided the following additional information (abridged slightly here) about the Tairua Beachcare group:

> *.. Tairua Beachcare was very active between 1995 and 2002 and during that period managed to restore a good cover of native sand grasses over the entire length of the beach – on what was previously a badly damaged dune. It was among our most active and well supported Beachcare groups. However, during 2003 there was very severe coastal erosion over the 250 metres south of the Surf Club. We don't know the return period of the erosion but available data suggests it may have been quite rare (probably 50 year return period or more). This erosion removed up to 15 metres width of dune along most of this area, including virtually all of the spinifex and pingao planted by the group at that end of the beach. This, despite the fact that the spinifex dune had advanced by nearly 10 metres in the 6-8 years the plantings survived. The storms cut the dune right back to a dense cover of exotic species (gazanias and arctotis) 12-15 metres further landward.*
>
> *The group would probably have been willing to replant the eroded dune. However, I had to advise that we could not supply spinifex for replanting unless we could completely remove the gazanias and arctotis right back to the front boundaries of the properties. Otherwise our planting would have simply been lost once again at some future date – wasting the community effort and not inconsiderable expense. Unfortunately, the removal of the exotics was quite strongly resisted by a few parties. We even lost one couple from Beachcare and had complaints to local politicians simply because the group hand-pulled a few gazanias to create small bare areas for spinifex. We had discussions on the issue over an extended period, but those opposed were immovable – they liked the flowers and could not accept that they had to go.*
>
> *The Beachcare group was able to do very little while this issue was going on and was reasonably frustrated. The dunes also looked awful compared to their previous state which was disappointing for the folk who had spent the previous 8 years restoring them. However, things finally changed after a major windstorm earlier this year [2007] which inundated local beachfront properties with sand, due in large part to the absence of effective sand trapping vegetation further seaward. That changed the community dynamics entirely – we were very quickly able to get universal support to completely remove the exotics and replace them with natives.*
>
> *[We] completely removed all the exotics in one go … This left us a huge area to plant – a project we would normally allow 2-4 years for rather than do in one hit. We put a small article in the local papers about the need, and the entire area was planted in only 3 days with input from all sorts of locals (the Beachcare group, the local boarders club, beachfront owners who brought families and friends down to help, gardening clubs etc). So the group has good support when it needs it.*
>
> *The outcome from my perspective is excellent – we now have owners who are very aware of the value of the native sand binders, widespread acceptance that these exotics have no place on dunes, were able to complete what would normally be very controversial work with complete community support, and have markedly increased support for Beachcare.*

2.4.3 Waihi Beach

Waihi Beach currently has a 'package' of coastal protection measures in place, including two sections of rock wall, training and reinforcing the banks of two creeks with sandbags, and a dune management scheme. According to Willem de Lange of Waikato University (pers. comm.):

> *... the first seawall was along Shaw Rd and was constructed in 1968 at a cost of $100,000. It was a wooden fence backed with boulders and clay, and fronted by gabion basket groynes. Over the next decade the boulders were continually topped up as the seawall deteriorated.*

The original boulders were locally-sourced ignimbrite and rhyolite, which made them both susceptible to weathering and easily washed away due to their relatively low density. This seawall was eventually replaced by another rock wall which extended further along the beach. There is another stretch of rock wall along another road (The Loop) where houses are particularly close to the beachfront.

The Coast Care programme at Waihi Beach has had considerable success in restoring dunes along stretches of the beach. At Brighton Reserve, a dilapidated seawall was removed in 1998 and the area replanted; by January 2005 plants were growing vigorously and the dunes had built up. A similar project was undertaken at Coronation Park, with an old seawall removed in 2003 and the dune face planted with functional native dune species. By October 2006, the rocks which had been left behind on the beach were covered with accreted sand trapped by the spinifex planted. This area has now accreted about 8 metres of sand, which is an average of some 2.6 metres of protective new dune per year (Greg Jenks, Environment BOP, pers. comm.).

At the northern end of Waihi Beach, the dunes had been depleted and damaged by the unrestricted beach access. The low, flattened beach profile made the town frontage very vulnerable to storm surges. Coast Care volunteers have created accessways, planted native dune plants and fenced these planted areas to protect them; by January 2004, the beach was wider, covered with white sand and the town protected by taller dunes (Jenks, 2007).

3 Methods

3.1 Sampling strategy and survey delivery details

Self-administered postal questionnaires and face-to-face interviews were used in this project. Postal questionnaires were used in Tairua and Waihi Beach only, and face-to-face interviews were carried out at all three locations with additional, more detailed interviews carried out at Whangapoua.

Bartley (1999) describes advantages and disadvantages of different techniques for social investigations. The key advantages of postal questionnaires are that:

- they are a cost-effective way to gather data from geographically-dispersed populations;
- they are less intrusive because people can complete them at their convenience;
- much larger sample sizes can be obtained; and
- in general, more complex issues can be covered in a printed questionnaire that people can read and complete at their leisure, in comparison to other survey methods such as telephone or face-to-face interviews. People are able to make considered responses to complex and interlinked questions.

Drawbacks of postal questionnaires are:

- their slowness;
- that no interviewer is present in person to clarify any confusion;
- the frequently low response rates; and
- the problem of respondent self-selection which introduces well-characterised demographic biases.

This latter is probably the main disadvantage of this survey method, and is difficult to overcome.

Face-to-face semi-structured interviews were also used in this study, with interviewers recording responses on interview log sheets. The key advantage of this method is that the ‘conversation’ between interviewer and interviewee can range freely beyond the structure provided. However, in practice we found that this approach had a number of drawbacks. Many people approached at the beach, particularly at Waihi Beach, were casual visitors without much knowledge or interest in local issues such as erosion control, and were simply unable to comment in any detail on many of the questions. Another problem was that people approached at the beach were, in general, in ‘holiday mode’ and were often preoccupied with watching children in the surf, and were unwilling to devote much attention to the topics of concern to this project. Approaching beachgoers is somewhat intrusive.

At Whangapoua a slightly different approach was used. In addition to a series of semi-structured interviews with beachgoers, we also carried out ‘key informant’ interviews. These interviewees were found using a ‘snowball’ approach; one knowledgeable local person was approached initially, and she provided a list of contacts and suggestions for other useful people to talk with in the local community. This approach worked very well as these ‘key people’ were well-informed and provided insightful comments.

3.1.1 Postal questionnaires

Postal questionnaires were hand-delivered to letterboxes in Tairua on 10 and 11 January 2007 (Appendix 1). As the number of surveys (500) delivered was quite large in relation to the size of the township, two areas were chosen for blanket coverage, with surveys going to every letterbox. These included the area behind Ocean Beach (Ocean Beach Rd) and Paku, and the area to the south of the bridge across the estuary. The remaining surveys were delivered to the central part of Tairua, starting at Manaia Rd, which runs along the estuary shoreline, and working back inland. At each property, GPS coordinates were recorded. Addresses in Tairua from which completed surveys were received are shown in Figure 2.1.

Due to time constraints during the planning and consultation stages of this project, just before the Christmas holiday break, we were unable to finalise the questionnaire for Waihi Beach before our field visit in early January. So during our field visit, GPS locations and addresses were recorded for 550 properties in Waihi Beach. We covered an area between the headland at the northern end of the beach and Glen Isla place (adjacent to Three Mile Creek reserve) at the southern end, and collected addresses for every property starting at the coast and working inland. Questionnaires were then mailed to these addresses in late January (the "mailed sample"). Addresses in Waihi Beach from which completed surveys were received are shown in Figure 2.2.

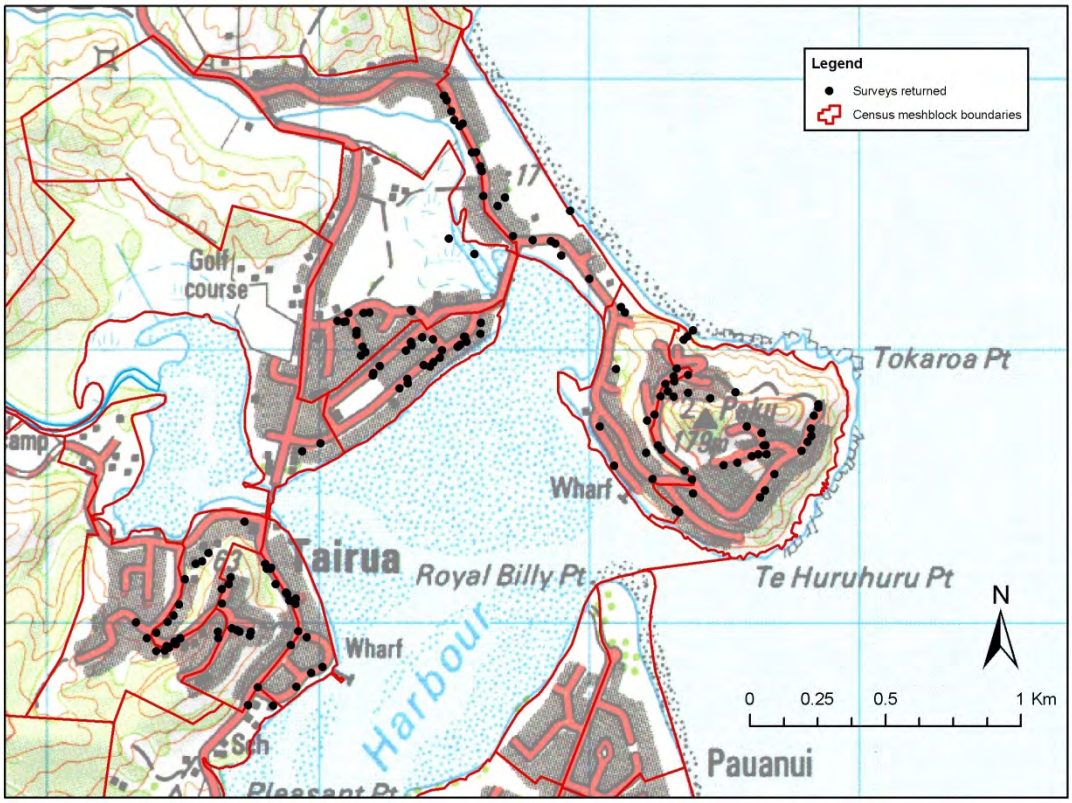

Figure 2.1 Approximate locations of where surveys were returned from in Tairua.

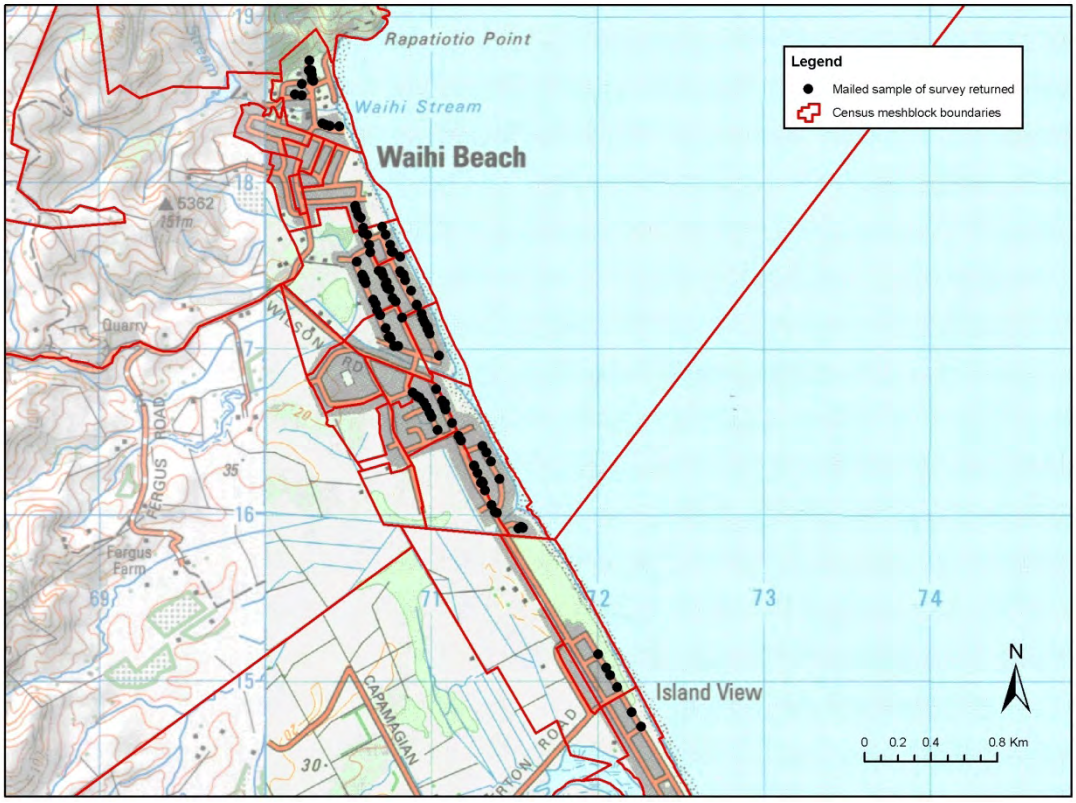

Figure 2.2 Approximate locations of where mailed surveys were returned from in Waihi Beach.

Unfortunately many of the front-row properties and also some further back did not have letterboxes, presumably because they are holiday homes. As a result, difficulties were experienced in successfully posting out questionnaires to this database, and a high number (283) were returned to sender. For reasons that are not well-understood, it is quite common to have some proportion of delivery failure rate when using an address database, even when addresses are known to be valid.

To compensate for the high initial delivery failure rate, 227 copies of the unopened questionnaires were repackaged with another cover letter, and sent to key volunteers at Waihi Beach in February and March 2007. These volunteers distributed the additional surveys to local people within their social networks who had not already received one, and also by delivering them to properties without letterboxes along Shaw Road and The Loop ("interested parties" sample). The overall return rates for Waihi Beach and Tairua, as a proportion of surveys successfully delivered, are shown in Table 2.1.

The return rates obtained in this survey (35% for Tairua and 36% for Waihi Beach) are typical for voluntary postal surveys of this type. They are very similar to the return rates obtained for the 2003 National Coastal Survey for Coromandel beaches (37%, Stewart *et al.*, 2005). The margins of error for both the Tairua and the Waihi Beach samples are ±6 per cent at the 95% confidence level.

Table 3.1 Location, delivery dates and return rates for postal questionnaires

Location	Date delivered	Number delivered	Number returned	Return rate
Tairua	10-11 January 2007	500	173	35%
Waihi Beach[1]	Late January 2007	267	127	48%
Waihi Beach[2]	Feb - March 2007	227	52	23%
Waihi Beach total	Jan-March 2007	494	179	36%

1 Of the 550 questionnaires originally mailed out to an address database in late January 2007, only 267 were successfully delivered.

2. To increase the sample size, a further 227 questionnaires were distributed by local volunteers and delivered to properties without letterboxes during February 2007.

3.1.2 Face-to-face interviews

Interviews were undertaken by two interviewers on 8 January at Waihi Beach, on 10 January in Tairua, and on 11 and 12 January in Whangapoua. People were approached randomly on the beach, and asked if they would be willing to participate; only a small proportion declined (5-10%). Their responses were recorded on interview log sheets. Demographic information was not recorded. The total numbers of semi-structured interviews conducted were: 29 at Waihi Beach, 30 at Tairua and 19 at Whangapoua. Five 'key informants' were also interviewed in Whangapoua. The same log sheets were used, but conversations ranged much more freely and widely, and most of the interviews took an hour or longer.

The findings from these interviews have been presented and discussed fully elsewhere (Stewart *et al*. 2007).

3.2 Data analysis and reporting

3.2.1 Initial analysis and reporting, 2007

On receipt of the completed postal questionnaires, data was entered into a SPSS statistical package. Initial analysis included the calculation of descriptive statistics (percentages, means and standard deviations) for individual questions for the total samples from Tairua and Waihi Beach. For Waihi Beach, descriptive statistics were also calculated for the two sub-groups of responses from the initial postal delivery to all addresses and of responses from the targeted delivery by volunteers.

A recommendation that arose from the previous report on perceptions of coastal hazards in Coromandel coastal communities was that responses be broken down with respect to proximity to the beachfront (Stewart *et al*., 2005). For this survey, several categories of location relative to the beachfront were created for the survey respondents. These were: houses directly on the beachfront (beach or shore front); houses one row back (first row); houses two rows back (second row); and everything else further back (further back).

In Tairua no responses were received from beach front properties, but five per cent were received from the estuary front. Nearly a third of respondents (30%) were from the first row, 29 per cent were from the second row and 36 per cent were further back.

In Waihi Beach, 11 per cent of respondents were from the beach or shore front, 13 per cent were from the first row, 6 per cent were from the second row and 46 per cent were further back. As some surveys were sent to interested parties for distribution, we were unable to determine a relative property location for nearly a quarter of respondents from Waihi Beach.

Interview log sheets were collated and analysed individually rather than by applying a statistical computer package. As the level of detail provided was variable from one interviewee to the next, the data was treated as qualitative or, where warranted, as semi-quantitative.

The initial data and results from the postal questionnaire are reported in Becker *et al*. (2007) while results from the interviews can be found in the report by Stewart *et al*., (2007).

3.2.2 Detailed analysis and reporting, 2008

For this report, a more detailed analysis of the survey data has been undertaken to determine if any relationships exist between people's beliefs, attitudes and intended or actual behaviours, in the context of coastal management and the need for a fundamental paradigm shift (see section 1.1 above). In addition to the descriptive statistics already undertaken, cross-tabulations and chi-square tests were carried out. These analyses were undertaken on only those questions that had sub-groups of sufficient respondent size.

Comparison of the results from the mailed sample and interested parties sample from Waihi Beach showed that responses were virtually identical, so these sub-samples were combined into one total Waihi Beach sample for the detailed analysis.

3.2.3 Significance of results reported

The following thresholds were set for determining significant differences:

- As the margin of error is approximately plus or minus six per cent for both samples, differences greater than or equal to this are considered significant.
- Response categories containing very small numbers of respondents (ten respondents or less summed across all column percent values) were excluded from comparisons. For instance, it was generally not possible to compare responses on the basis of ethnicity because the whole sample was predominantly (almost 90%) comprised of New Zealand Europeans and thus there were insufficient numbers in any other category to allow comparisons to be made.

The full set of tables is not included in this report as the tables are in a format that is too large to print effectively. They are held by the Waikato Regional Council as Microsoft Excel files and are available on request. A full index list of all tables is shown in Appendix 2.[1] For this report, tables showing selected features of the data relevant to the discussion and analysis have been reproduced. Results presented in the following section are all statistically significant (i.e. they refer to differences of greater than the margin of error for the whole sample at each location).

[1] The full version of these tables is contained in DOCS # 1399288.

3.3 Sample composition

The following paragraphs briefly outline characteristics of the sample of people who participated in the postal survey.

3.3.1 Demographic characteristics

The demographic characteristics of the postal survey respondents are listed in Table 3.2 and were also discussed in the data report (Becker *et al*. 2007). The samples of respondents from Tairua and Waihi Beach were very similar with respect to gender, ethnicity, income and educational achievements, but minor differences were noted with respect to age, living situation and employment status. For instance,

- respondents in the Tairua sample were more likely (50%) to live in families without children compared to Waihi Beach respondents (32%);
- the age structures of the two samples were slightly different with the Waihi Beach sample slightly skewed towards older respondents compared to the Tairua sample;
- almost half (46%) of Tairua respondents reported that they are not in paid work compared to 36 per cent of Waihi Beach respondents.

The composition of these samples is broadly similar to the sample composition reported in our 2003 study of coastal communities across New Zealand (Stewart *et al*. 2005), which also included samples drawn from Cooks Beach, Whangamata and Whitianga. These samples were found to contain consistent biases in composition relative to the general population in these areas, derived from census data; such biases are known to be a feature of voluntary postal surveys (Stewart *et al*., 2004; Stewart *et al*. 2005; NZIER, 2004). These biases, which also appear to be present in the current study, include over-representation by: New Zealand Europeans, older people (particularly those aged 60 and over), and respondents with higher levels of qualifications and higher household incomes. Males were also slightly over-represented in the 2003 study of coastal communities drawn from a wide range of locations around the New Zealand coastline (Johnston *et al*., 2003; Stewart *et al*., 2005).

With respect to age as a variable, it must be noted that the age distribution of both samples is heavily skewed towards older respondents relative to the general population of New Zealand. In this study, just 15 per cent of the sample at Tairua compared with 42 per cent of its population and 22 per cent of the sample at Waihi Beach compared with 51 per cent of its population in March 2006 were aged 45 years or less (Table 4.12). In 2006, the median age of the New Zealand population was 36 years whereas the average age of Tairua residents was 47 years and the average age of Waihi Beach residents was 40 years (refer to www.stats.govt.nz). Therefore the comparison with respect to age is a partial one as it does not adequately cover younger age ranges.

Table 3.2 Summary of demographic characteristics of postal survey respondents

		Tairua (n=173)	**Waihi Beach (n=179)**
		(valid %)	(valid %)
Gender	Female	43	44
	Male	57	56
Living situation	Family with children	33	43

	Family without children	50	32
	Alone	13	16
	With non-family	4	3
	Other	0	6
Ethnicity	New Zealand European	93	91
	New Zealand Maori	1	4
	Pacific Island	0	0
	Chinese	0	0
	Indian	0	0
	Other	6	5
Age	18-26	2	2
	27-36	6	12
	37-46	26	21
	47-56	29	17
	57-66	22	25
	67-76	7	13
	77-86	7	10
	87+	1	1
Employment status	Employed full time	24	28
	Employed part time	12	13
	Not in paid work (eg retired)	46	36
	Self-employed	18	23
Household income (gross)	Less than $20,000	15	18
	$20,000 - $50,000	26	31
	$50,000 - $90,000	32	23
	$90,000 - $150,000	13	15
	>$150,000	13	13
Educational level	No school qualifications	8	8
	Secondary school qualifications	25	26
	Trade or professional certificate	37	36
	University undergraduate	21	23
	University postgraduate	10	7

3.3.2 Property ownership and resident status

The property ownership status of the postal survey respondents is shown in Table 3.3. Approximately 90 percent of respondents in both samples own property at Tairua or Waihi Beach, with the proportion of absentee owners higher in the Tairua sample.

Table 3.3 Property ownership[1] status of Tairua and Waihi Beach postal survey respondents

	Tairua (n=173)	Waihi Beach (n=179)
Permanent resident, own the property[1]	56%	67%
Permanent resident, renting the property	8%	11%
Visitor, own the property (eg holiday home or bach)	35%	22%
Visitor, don't own the	1%	0%

property

1 The property to which the questionnaire was delivered

From Table 3.3, it can be seen that the numbers of survey respondents who do not own coastal property are small in both samples, and therefore comparisons between property-owning and non-property-owning respondents are unreliable. It is, however, possible to make comparisons on the basis of length of property ownership (Table 3.4).

Table 3.4 Length of property[1] ownership of Tairua and Waihi Beach postal survey respondents[2]

	Tairua (n=156)	**Waihi Beach** (n=158)
Less than 1 year	6%	6%
Between 1 and 5 years	19%	13%
Between 5 and 10 years	22%	22%
More than 10 years	52%	59%

1 The property to which the questionnaire was delivered

2 Only respondents who indicated they own property at the study locations were included in this table

4 Results

Four main aspects of the data set were investigated in more detail for this report, and are presented and discussed in this section. They are: 'valued attributes' of the coast, perceptions of coastal processes, management preferences and views on how erosion control measures should be funded.

4.1 Valued attributes of the coast and its management

Postal survey respondents were asked to consider a list of 14 'valued attributes' of the coast and its management, and to indicate how important each one was to them, using a scale of 'very important' to 'not important'. The per cent of respondents at each location rating each attribute as 'very important' are shown in Figure 4.1.

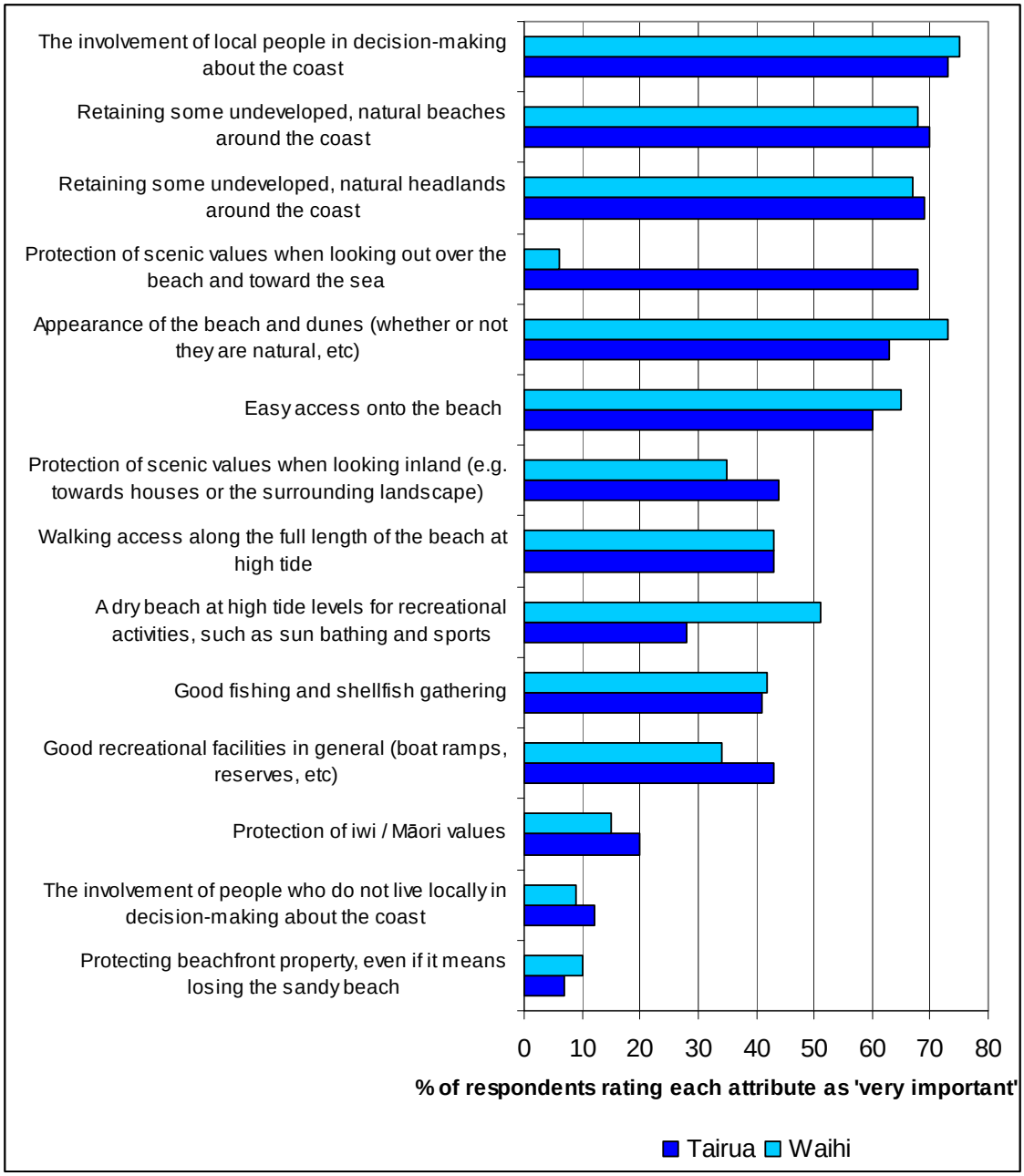

Figure 4.1 Respondents' ratings on the importance of a range of coastal attributes

The attributes that stand out as being the most highly-valued (ranked as 'very important') are:

- the involvement of local people in decision-making about the coast;
- retaining some undeveloped, natural beaches around the coast;
- retaining some undeveloped, natural headlands around the coast;
- protection of scenic values when looking out to sea;
- appearance of the beach and dunes (whether natural); and
- easy access onto the beach.

The least highly-valued attributes are:

- protecting beachfront property, even if means losing the sandy beach; and
- the involvement of people who do not live locally in decision-making about the coast..

The rest of this section explores factors that may influence people's values about the coast, such as differences between residents and visitors, demographic variables, length of property ownership, perceptions of coastal processes and preferred options for managing coastal erosion.

4.1.1 Differences in views between residents and absentee owners

The property ownership and residential status of the postal survey respondents is shown in Table 3.3 above. The percentages of permanent residents in each sample are 64 per cent for Tairua and 78 per cent for Waihi Beach. This difference is probably due to the fact that all the surveys were delivered to Tairua during the peak summer holiday period (early to mid January 2007) whereas the delivery of questionnaires to Waihi Beach addresses was spread out over January and February 2007.

At Waihi Beach, residents are consistently more likely than visitors to consider the listed attributes as very important (Table 4.1). The two exceptions are the attributes of 'the involvement of people who do not live locally in decision-making about the coast' and 'protecting beachfront property, even if it means losing the sandy beach'. The distribution of responses for the latter statement is shown in Figure 4.2

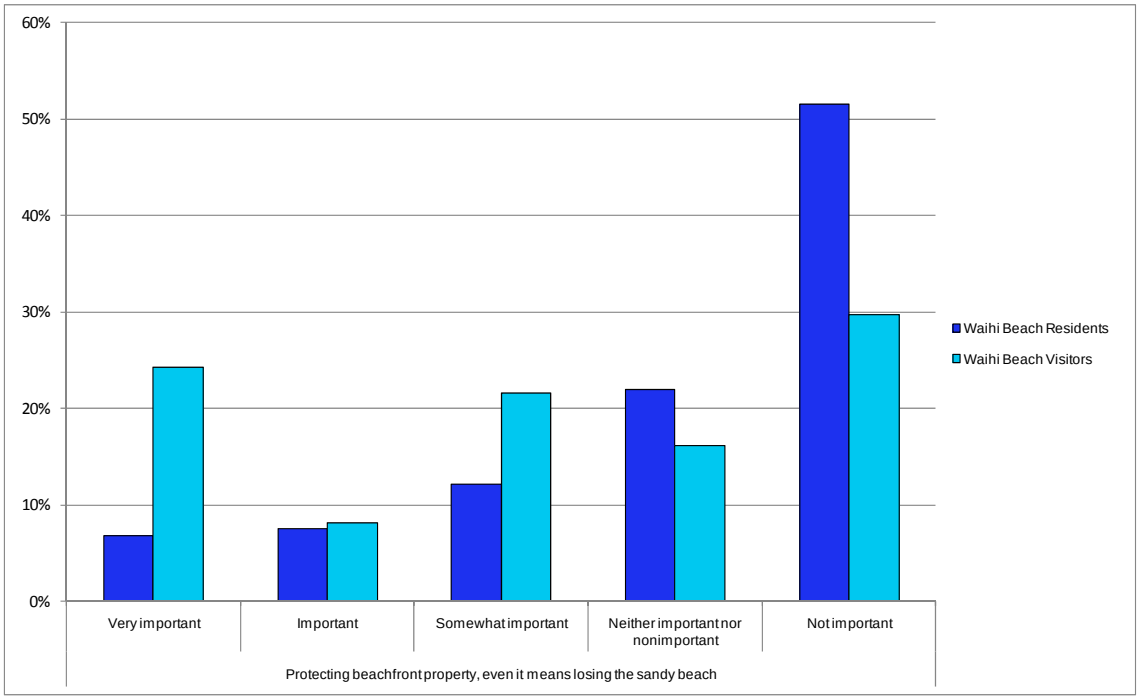

Figure 4.2 The importance of the attribute 'protecting beachfront property, even if it means losing the sandy beach' to Waihi Beach residents and visitors

Table 4.1 Waihi Beach respondents' views on importance of stated attributes: comparison between residents and visitors

	Per cent of Waihi Beach respondents considering listed attribute as 'very important'	
	Residents (n=138)	Visitors (n=39)
The involvement of local people in decision-making about the coast	81%	54%
Appearance of the beach and dunes (whether or not they are natural, etc)	77%	62%
Retaining some undeveloped, natural beaches around the coast	73%	53%
Retaining some undeveloped, natural headlands around the coast	71%	53%
Easy access onto the beach	70%	51%
Protection of scenic values when looking out over the beach and toward the sea	64%	51%
A dry beach at high tide levels for recreational activities, such as sun bathing and sports	56%	34%
Walking access along the full length of the beach at high tide	47%	31%
Good fishing and shellfish gathering	46%	28%
Protection of scenic values when looking inland (e.g. towards houses or the surrounding landscape)	40%	21%
Good recreational facilities in general (boat ramps, reserves, etc)	38%	21%
Protection of iwi / Māori values	17%	8%
The involvement of people who do not live locally in decision-making about the coast	8%	15%
Protecting beachfront property, even if it means losing the sandy beach	7%	24%

Marked differences between the extent to which coastal attributes are valued by residents and visitors are an obvious feature of the sample of respondents from Waihi Beach. However, in the Tairua sample, differences between residents and visitors were much less pronounced. This is perhaps due to the fact that feelings about coastal protection are more intensely held at Waihi Beach, particularly with regard to the seawalls. This can be clearly seen with respect to the attributes 'a dry beach at high tide levels', 'walking access along the full length of the beach at high tide' and 'protecting beachfront property, even if it means losing the sandy beach'. This finding implies that there may be some tension in the extent to which different attributes are held as important by residents and visitors. The distribution of responses in Figure 4.2 to the attribute of 'protecting beachfront property, even if it means losing the sandy beach' illustrates that residents view this attribute considerably more negatively than do visitors. A possible explanation is that residents have more exposure to the negative consequences of loss of the high tide beach than do visitors. Alternatively, the sample of visitors (at Waihi Beach, all in this category were absentee property owners) may have a greater predominance of beachfront property owners.

There are also consistent differences in how residents and visitors view the roles of both local and non-local people in decision-making at both locations (Table 4.2). In particular, visitors (i.e. absentee property owners) are considerably more likely than residents to see a role in decision-making for 'people who do not live locally'.

Table 4.2 Views of visitors and residents on who should be involved with coastal decision-making

	Percentage of respondents considering listed attribute as 'very important'			
	Tairua		Waihi Beach	
	Residents (n=111)	Visitors (n=62)	Residents (n=138)	Visitors (n=39)
The involvement of local people in decision-making about the coast	77%	66%	81%	54%
The involvement of people who do not live locally in decision-making about the coast	6%	23%	8%	15%

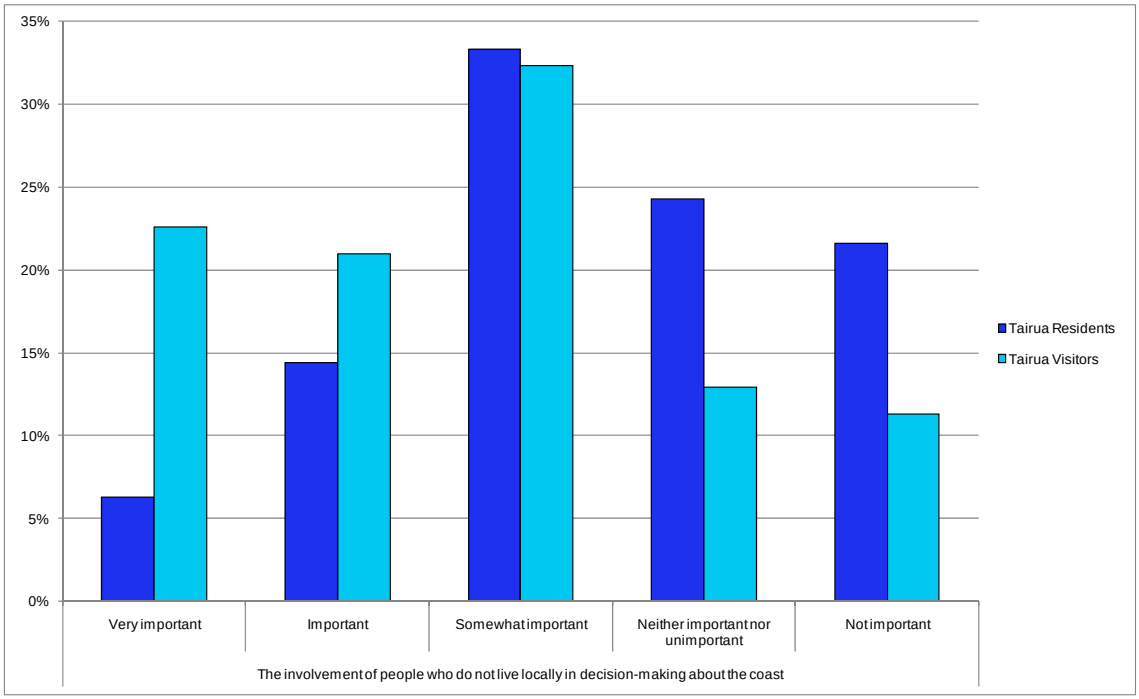

Figure 4.3 The importance of the attribute 'the involvement of people who do not live locally in decision-making about the coast' to Tairua residents and visitors

This finding suggests some tension in relation to the level of involvement of non-local people, particularly absentee property owners, in decisions about coastal management. As seen above, the views of residents and non-residents may not necessarily coincide about who should have input into coastal issues.

4.1.2 Influence of demographic variables

The influence of demographic factors (gender, age, living situation, level of education, income and employment status) on respondents' values was analysed. In general, few clear and consistent trends with respect to any of these variables are noted. Slight differences are noted with respect to gender (Table 4.3), with women more likely to consider several of the stated attributes as 'very important'. Significant differences (that is, greater than the margin of error of ±6%) are found with respect to the statements

shown in italics on Table 4.3. However, these differences are minor in the sense that the overall profiles of valued attributes are generally very similar for men and women.

Table 4.3 The effect of gender on the importance of stated attributes

	Percentage of all respondents considering listed attribute as 'very important'	
	Male	Female
	(n=196)	(n=150)
The involvement of local people in decision-making about the coast	*71%*	*79%*
Appearance of the beach and dunes (whether or not they are natural, etc)	68%	69%
Retaining some undeveloped, natural beaches around the coast	*64%*	*75%*
Protection of scenic values when looking out over the beach and toward the sea	*64%*	*71%*
Retaining some undeveloped, natural headlands around the coast	*63%*	*74%*
Easy access onto the beach	61%	64%
Good fishing and shellfish gathering	43%	39%
Walking access along the full length of the beach at high tide	42%	44%
Good recreational facilities in general (boat ramps, reserves, etc)	41%	39%
A dry beach at high tide levels for recreational activities, such as sun bathing and sports	38%	42%
Protection of scenic values when looking inland (e.g. towards houses or the surrounding landscape)	*34%*	*47%*
Protection of iwi / Māori values	*12%*	*24%*
Protecting beachfront property, even if it means losing the sandy beach	11%	6%
The involvement of people who do not live locally in decision-making about the coast	10%	12%

4.1.3 Significant relationships between selected pairs of valued attributes

Selected pairs of valued attributes were investigated to determine any relationships between patterns of responses to them. The purpose of this is to determine whether respondents appear to perceive any conflict between these pairs of values or whether they are able to hold that both of them are 'important'.

The first pair of attributes investigated is 'easy access to the beach' and 'retaining some natural, undeveloped beaches around the coast'. Tables 4.4 and 4.5 show a cross-tabulation of responses for these two statements for Tairua and Waihi Beach respondents respectively. While comparisons are hindered by the small numbers in some response categories, results suggest that respondents consider that not only is it important to value both attributes, but that they are not in conflict. For instance, 74 per cent of the Tairua respondents who rated 'easy access to the beach' as very important

also rated 'retaining some natural, undeveloped beaches around the coast' as 'very important'.

Table 4.4 Importance of valued attributes 'retaining some natural, undeveloped beaches around the coast' and 'easy access to the beach' to Tairua respondents (n=173)

		'Easy access to the beach'				
		Very important (n=101)	Important (n=47)	Somewhat important (n=19)	Neither (n=4)	Not important (n=2)
'Retaining some natural, undeveloped beaches around the coast'	Very important	74%	55%	79%	75%	100%
	Important	17%	30%	16%	25%	0%
	Somewhat important	6%	11%	5%	0%	0%
	Neither important nor not important	1%	2%	0%	0%	0%
	Not important	2%	2%	0%	0%	0%

Table 4.5 Importance of valued attributes 'retaining some natural, undeveloped beaches around the coast' and 'easy access to the beach' to Waihi Beach respondents (n=179)

		'Easy access to the beach'				
		Very important (n=113)	Important (n=34)	Somewhat important (n=19)	Neither (n=7)	Not important (n=1)
'Retaining some natural, undeveloped beaches around the coast'	Very important	74%	56%	68%	43%	100%
	Important	16%	29%	16%	0%	0%
	Somewhat important	6%	15%	11%	43%	0%
	Neither important nor not important	2%	0%	0%	0%	0%
	Not important	3%	0%	5%	14%	0%

The second pair of statements examined is 'walking access along the full length of the beach at high tide' and 'protecting beachfront property, even if it means losing the sandy beach'. In this case, different patterns of responses are noted for Tairua (Table 4.6) and Waihi Beach (Table 4.7). For Tairua, no clear trends are observable. It is important to note that the high value of 69 per cent of respondents who consider that both attributes are very important is a group of only nine people (5% of the total sample of 173 respondents). While the statements about attributes are generic rather than referring to Tairua's Ocean Beach, it is probably relevant to note here that although this beach did suffer storm damage to the dunes in 2003, at the time of the survey in January 2007 the beach was wide at all tides (Figure 4.4). Thus concern about losing the beach due to coastal protection measures such as seawalls may seem hypothetical to people in Tairua.

Figure 4.4 Ocean Beach, Tairua, January 2007

In contrast, for Waihi Beach (Table 4.7), the distribution of responses suggests an inverse relationship between these attributes, namely holding one of them as very important indicates that is more likely for the other attribute to be regarded as 'not important'. In this case, the largest single group of respondents (50 respondents, or 30% of the total sample of 169 respondents who answered these questions) consider that 'walking access along the full length of the beach at high tide' is very important and that 'protecting beachfront property, even if it means losing the sandy beach' is not important. Conversely, the group which places a higher importance on protecting beachfront property is less likely to consider walking access along the beach at all tides as important. This finding suggests that the valued attribute of 'protecting beachfront property' does have the potential to come into conflict with other values.

Table 4.6 Importance of valued attributes 'Protecting beachfront property, even if it means losing the sandy beach' and 'Walking access along the full length of the beach at high tide' to Tairua respondents (n=173)

		'Protecting beachfront property, even if it means losing the sandy beach'				
		Very important (n=13)	Important (n=31)	Somewhat important (n=34)	Neither (n=42)	Not important (n=53)
'Walking access along the full length of the beach at high tide'	Very important	69%	36%	47%	29%	47%
	Important	23%	42%	18%	38%	25%
	Somewhat important	0%	23%	27%	34%	11%
	Neither important nor nonimportant	8%	0%	6%	10%	11%
	Not important	0%	0%	3%	0%	6%

Table 4.7 Importance of valued attributes 'Protecting beachfront property, even if it means losing the sandy beach' and 'Walking access along the full length of the beach at high tide' to Waihi Beach respondents (n=169)

		'Protecting beachfront property, even if it means losing the sandy beach'				
		Very important (n=18)	Important (n=13)	Somewhat important (n=24)	Neither (n=35)	Not important (n=79)
'Walking access along the full length of the beach at high tide'	Very important	11%	31%	21%	37%	63%
	Important	0%	31%	42%	29%	19%
	Somewhat important	28%	15%	21%	29%	6%
	Neither important nor not important	39%	15%	8%	0%	4%
	Not important	22%	8%	8%	6%	8%

4.1.4 Management preferences

4.1.4.1 Management preferences in general

Respondents were asked which forms of coastal management they approved in general. They were free to choose as many options as they wanted from the list provided, rather than being asked to choose one in particular (Figure 4.5).

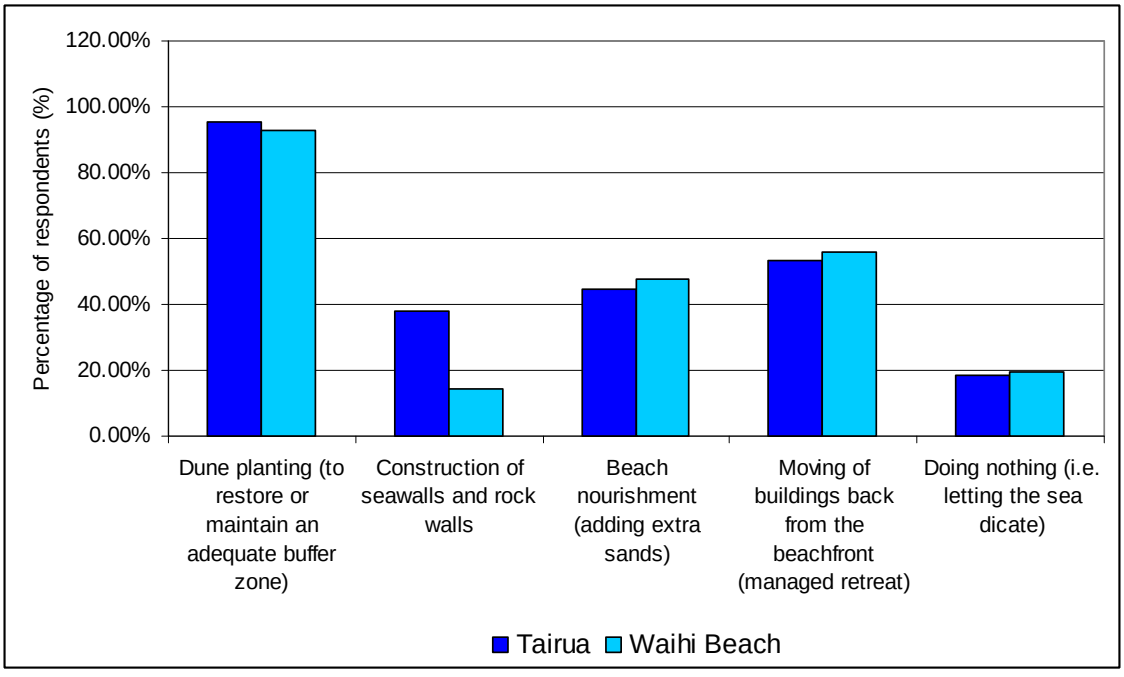

Figure 4.5 Forms of erosion management approved *in general* by survey respondents

These management preferences were cross-tabulated against the proportions of respondents that selected 'very important' for each of the stated attributes for Waihi Beach (Table 4.8) and Tairua.

Table 4.8 Percentages of Waihi Beach respondents considering each attribute as very important against general management preferences

	'In general, which forms of coastal erosion management do you approve of?' (tick all that apply)

	Dune planting	Seawalls/ rock walls	Beach nourishment	Managed retreat	Doing nothing
	(n=163)	(n=24)	(n=83)	(n=99)	(n=35)
Appearance of the beach and dunes (whether natural etc)	74%	33%	76%	78%	74%
Good recreational facilities in general (eg boat ramps, reserves)	33%	23%	33%	33%	29%
A dry beach at high tide levels for recreational activities such as sunbathing and sports	52%	12%	52%	62%	49%
Easy access onto the beach	67%	58%	68%	66%	66%
Walking access along the full length of the beach at high tide	45%	12%	49%	53%	32%
Protection of iwi/Maori values	15%	4%	12%	19%	12%
Retaining some undeveloped, natural beaches around the coast	68%	46%	63%	75%	79%
Retaining some undeveloped, natural headlands around the coast	67%	46%	61%	74%	77%
Protection of scenic values when looking out over the beach and toward the sea	62%	32%	63%	68%	62%
Protection of scenic values when looking inland	36%	8%	37%	43%	35%
The involvement of local people in decision-making about the coast	74%	46%	71%	81%	75%
The involvement of people who do not live locally in decision-making about the coast	10%	4%	10%	7%	15%
Protecting beachfront property even if it means losing the sandy beach	10%	58%	15%	1%	0%
Protecting beachfront property even if it means losing the sandy beach	48%*	4%*	48%*	63%*	58%*

Good fishing and shellfish gathering	42%	35%	36%	44%	47%

* the asterisked data are proportions of respondents rating this value as not important.

This table shows a clear difference between the respondents who support the construction of seawalls and rock walls for managing coastal erosion, and respondents supporting other options. This difference is apparent for most of the values, and not surprisingly, is most pronounced for the value 'protecting beachfront property, even if it means losing the sandy beach', where 58 per cent of the group of those favouring seawall and rock walls construction considered this value 'very important' compared to proportions in the range of 0-15 per cent of the other groups.

Another difference is with respect to the valued feature 'a dry beach at high tide levels for recreational activities such as sunbathing and sports' where just 12 per cent of the seawall/rockwalls group considered this value as 'very important', compared to 52 per cent of people in favour of dune planting and beach nourishment, 49% of people who favour 'doing nothing', and 62 per cent of people in favour of managed retreat. The sea/rockwalls group also places less value on attributes relating to the natural character of the coast and the protection of scenic values.

While views on the importance of various coastal attributes are clearly different between the group of respondents who approve of seawalls and other respondents, it is important to bear in mind that the number of people in this group is relatively small (15% of the Waihi Beach sample, or 26 respondents).

While this distribution is very clear for the Waihi Beach sample, it is much weaker for the Tairua sample (and therefore we do not present the relevant table here). A possible explanation is that seawalls and rock walls are currently a hypothetical option at Tairua's Ocean Beach, but are very much part of the current management approach at Waihi Beach and therefore residents' views are informed by their direct experiences.

4.1.5 Open-ended responses

Respondents were also invited to comment on what they valued about the coast. In general, the suggestions received are variations on the list of values already provided. For instance, one respondent suggests 'dog exercise areas', which could be considered to come under the heading of 'good recreational facilities in general'. However, some additional ideas were received. The most commonly-mentioned of these are the related themes of clean water and clean beaches, with associated ideas being the absence of litter and pollution. These ideas also emerged strongly from our related study of Coromandel beachgoers in which we interviewed beachgoers at Tairua, Waihi Beach and Whangapoua. Clean beaches and good water quality were important at all three locations.

The most commonly-mentioned responses are the idea of 'naturalness' being of vital importance at the coast (46 responses) and freedom of access (34 responses). Although most respondents consider that these values can be held as 'important' simultaneously (see Section 4.1.3), some comments do suggest a tension between natural character on one hand and ease of access on the other:

- *'Keeping a difficult but necessary balance between keeping coastal areas accessible for the public, but not at risk to the environment.'*

- *'The opportunity to enjoy the natural look i.e. development is limited or hidden.'*
- *'Access onto the beach, the surrounding area around the beach and headlands not to be overdeveloped … some beaches to be left natural.'*
- *'Accessible but not overcrowded.'*
- *'Enjoying our natural assets but not developing them to the point of taking away natural beauty and sometimes isolation.'*

Dahm (2003) noted that overseas tourists may not perceive New Zealand as a beach resort destination because of its 'cold' climate, and instead value the beaches here as 'remote, isolated, rugged wilderness-type beaches' rather than 'lay back, relax and take it easy' beaches. Thus, overseas visitors' valued attributes would appear to be aligned well with those of local residents.

4.1.6 Key findings for 'what respondents value about the coast and its management'

Overall, it is clear that the natural, unspoiled character of the coast is of central importance to the Coromandel coastal communities surveyed. Good access to the coast is also of major importance.

Separating the samples at each location into permanent residents and visitors (i.e. absentee property owners) suggests that there may be some tension in relation to the level of involvement of non-local people, particularly absentee property owners, in decisions about coastal management. Also, the views of residents and non-residents do not necessarily coincide in what they value about the coast.

There are differences in the importance of some valued attributes between men and women, otherwise little difference was found with respect to demographic variables.

A limited investigation into compatibility between values was undertaken. No evidence is found for conflict between 'easy access to the beach' and 'retaining some undeveloped, natural beaches around the coast'. However, there is conflict between 'walking access along the full length of the beach at high tide' and 'protecting beachfront property, even if it means losing the sandy beach'. This is unsurprising as these values are, by definition, in conflict.

There is a clear relationship between respondents' general views on erosion control and values held about the coast. Respondents who favour the construction of seawalls and rockwalls place a high level of importance on protecting beachfront property, but relatively low importance on other values such as maintaining a dry beach at high tide, retaining natural beaches and headlands and preserving the natural character and scenic value of the beach and dune system. However, whilst their views are strongly differentiated from those of the other respondents, this group is generally a small subset of all respondents.

In summary, the main differentiations within the overall sample of respondents with respect to their views on what is important about the coast and its management are between residents and visitors (particularly at Waihi Beach, but less so at Tairua), between men and women, and between respondents who favour the construction of seawalls and rockwalls (i.e. the 'holding the line' approach to coastal management) and respondents favouring other solutions.

The values held as most important by respondents are in general compatible with a paradigm shift away from 'taming natural coastal processes' towards 'living with natural coastal processes'. These values include retaining the natural character of the coast, promoting natural-looking beaches and dunes and protecting scenic values. Subgroups within the overall sample who place less importance on these values are visitors to Waihi Beach, men, and those who favour the construction of hard defences as an approach to coastal management. These subgroups are generally quite small in number, apart from men, who comprise 57 per cent of the overall sample.

4.2 Perceptions of coastal processes

Respondents were presented with five statements about coastal processes and options for managing coastal erosion, and asked for their level of agreement or disagreement with each statement on a five-point scale from 'strongly agree' to 'strongly disagree'. The statements are:

- *"We must accept that erosion is a natural process at the coast"*
- *"Inappropriate development in coastal areas can put houses at risk from erosion"*
- *"The width of the dune changes during the year"*
- *"Once a dune is destroyed there is no way to bring it back"*
- *"There is a range of methods available to stop coastal erosion indefinitely"*

These statements probe attitudes underlying the acceptance of different approaches to coastal management, such as 'learning to live with coastal erosion' and the acceptability of managed retreat as a strategy, compared with the belief that erosion can be controlled or stopped, which underpins the 'holding the line' approach.

In this section, each of these statements is examined to investigate the overall attitude towards it. The results of a cross-tabulation analysis of the responses to the statements compared with a range of variables are then presented and discussed.

4.2.1 'We must accept that erosion is a natural process at the coast'

Approximately half of all respondents (52% in the Tairua sample and 47% in the Waihi Beach sample) 'strongly agree' with this proposition (Figure 4.6). Considering the percentages in the 'strongly agree' and 'agree' categories combined, 85 per cent of Tairua respondents and 69 per cent of Waihi Beach respondents hold this attitude. Thus there is a strong indication that Tairua respondents, and to a lesser extent Waihi Beach respondents, are prepared to accept coastal erosion as being a natural coastal process. However, there is some differentiation within the overall sample, which will be discussed in the following sections.

4.2.1.1 Whether residents or visitors

At both locations, residents are more likely than visitors[2] to strongly agree with the statement that 'we must accept that erosion is a natural process at the coast'. At

[2] That is, absentee property owners.

Tairua, 55 per cent of residents and 47 per cent of visitors strongly agree with the statement, and at Waihi Beach, 50 per cent of residents and 35 per cent of visitors strongly agree.

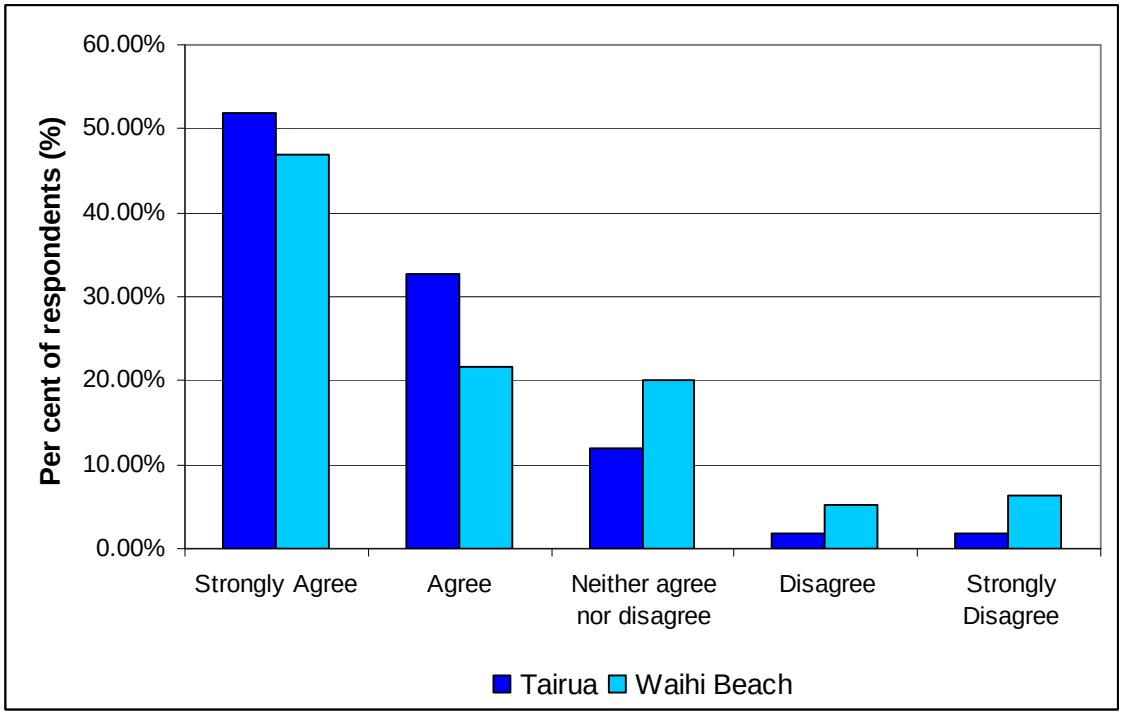

Figure 4.6 Respondents' attitudes towards statement that *"We must accept that erosion is a natural process at the coast"*

4.2.1.2 Proximity of respondents' property to beachfront

Responses to the statement 'we must accept that erosion is a natural process at the coast' when analysed against proximity of respondents' property to the beachfront (Table 4.9) indicate that there is little difference in attitude to this statement at Tairua. At Waihi Beach, respondents living further than two rows back were more likely (58%) to strongly agree with this statement, but there is no consistent trend apparent among respondents living closer to the beachfront.

Table 4.9 Proximity to beachfront against acceptance of statement that '*We must accept that coastal erosion is a natural process at the coast'*

	Proximity of respondent's property to the beachfront				
	Beachfront	First row	Second row	Further back	Overall sample
Tairua	n=8	n=52	n=48	n=60	n=168
% of respondents who 'strongly agree' with statement	50%	50%	56%	50%	52%
Waihi Beach	n=19	n=25	n=10	n=76	n=130
% of respondents who 'strongly agree' with statement	42%	40%	30%	58%	47%

4.2.1.3 Length of property ownership

At both locations, respondents who have owned their property at the coast for longer are more likely to strongly agree with the statement about erosion being a natural process (Table 4.10).

Table 4.10 Length of property ownership against acceptance of statement that '*We must accept that coastal erosion is a natural process at the coast'*

	Length of property ownership			
	Less than 5 years	5-10 years	Over 10 years	Overall sample
Tairua	n=39	n=34	n=78	n=168*
% of respondents who 'strongly agree' with statement	41%	56%	54%	52%
Waihi Beach	n=30	n=34	n=90	n=175*
% of respondents who 'strongly agree' with statement	40%	44%	48%	47%

*Includes responses that did not answer question about length of property ownership

In her review of coastal literature, Dahm (2003) notes that perceptions of coastal processes can vary with time and experience. She notes an example of a pair of traditional maritime settlements on the East Coast of the United States where residents showed a realistic appreciation of the coastal erosion hazard and that they tended to view it as a continuous, natural process with which they must live. This level of understanding was attributed to the depth of relationship between these residents and their environment.

4.2.1.4 Respondents' personal experiences of erosion

At Tairua, respondents who indicated that they had personally experienced coastal erosion in the past are more likely to strongly agree with the statement that 'we must accept that coastal erosion is a natural process at the coast' (Table 4.11). No difference with respect to this variable is seen in the sample of Waihi Beach respondents.

Table 4.11 Personal experiences of erosion against acceptance of statement that '*We must accept that coastal erosion is a natural process at the coast'*

	Whether respondents have personally experienced coastal erosion in the past		
	Yes	No	Overall sample
Tairua	n=30	n=138	n=168
% of respondents who 'strongly agree' with statement	67%	49%	52%
Waihi Beach	n=41	n=134	n=175
% of respondents who 'strongly agree' with statement	49%	46%	47%

4.2.1.5 Age

At Tairua, a trend is observed with respect to age, with increasing age associated with a greater level of acceptance that coastal erosion is a natural process (Table 4.12). At

Waihi Beach a different trend is observed, with both younger (aged 45 or under) and older (aged 65 and over) respondents less likely to strongly agree with the statement.

Table 4.12 Respondents' age against acceptance of statement that '*We must accept that coastal erosion is a natural process at the coast'*

	Age categories[1]				
	18-45	46-55	56-65	65+	Overall sample[2]
Tairua	n=25	n=36	n=47	n=51	n=168
% of respondents who 'strongly agree' with statement	36%	56%	50%	61%	52%
Waihi Beach	n=39	n=42	n=28	n=52	n=175
% of respondents who 'strongly agree' with statement	41%	57%	54%	42%	47%

1 At time of survey (January 2007)
2 Includes responses that did not indicate age

4.2.1.6 Gender

At Tairua, men were more likely than women to strongly agree that 'we must accept that coastal erosion is a natural process at the coast' (Table 4.13). This difference was not seen at Waihi Beach.

Table 4.13 Gender against acceptance of statement that '*We must accept that coastal erosion is a natural process at the coast'*

	Gender		
	Male	Female	Overall sample[1]
Tairua	n=95	n=69	n=168
% of respondents who 'strongly agree' with statement	58%	45%	52%
Waihi Beach	n=97	n=76	n=175
% of respondents who 'strongly agree' with statement	45%	49%	47%

1 includes responses that did not indicate gender

4.2.1.7 Respondents' involvement with environmental projects

Respondents were asked whether they had any experience with environmental matters, such as activities, groups or employment related to the environment. Cross-tabulating this variable with their level of agreement with the statement about erosion being a natural process shows a difference between those reporting 'environmental experience' and others (Table 4.14). Respondents reporting 'environmental experience' are more likely to strongly agree with the statement.

Table 4.14 Respondents' environmental experience against acceptance of the statement *'We must accept that coastal erosion is a natural process at the coast'*

	Whether respondents have 'environmental experience'		
	Yes	No	Overall sample
Tairua	n=63	n=105	n=168
% of respondents who 'strongly agree' with statement	59%	48%	52%
Waihi Beach	n=74	n=97	n=171
% of respondents who 'strongly agree' with statement	53%	43%	47%

4.2.1.8 Respondents' management preferences

There is a strong relationship, consistent at both locations, between respondents' approved forms of coastal management and how strongly they agree with the statement about erosion being a natural process (Table 4.15). Respondents who

favour ‘doing nothing’ (which is elaborated on further in the questionnaire as ‘letting the sea dictate’) are substantially more likely to strongly agree that ‘we must accept that coastal erosion is a natural process at the coast’. At Waihi Beach, and to a lesser extent at Tairua, respondents favouring managed retreat are also are more likely to strongly agree with the statement.

Conversely, respondents favouring the building of hard defences (seawalls and rock walls) are less likely to strongly agree with the statement, particularly at Waihi Beach.

Table 4.15 Respondents’ environmental experience against acceptance of the statement *‘We must accept that coastal erosion is a natural process at the coast’*

	Forms of coastal management approved of by respondent					
	Dune planting	Seawall or rock wall	Beach nourishment	Managed retreat	Do nothing	Overall sample
Tairua	n=160	n=64	n=76	n=89	n=32	n=168*
% of respondents who ‘strongly agree’ with statement	51%	44%	53%	58%	78%	52%
Waihi Beach	n=164	n=24	n=84	n=99	n=35	n=175*
% of respondents who ‘strongly agree’ with statement	45%	21%	37%	51%	83%	47%

* Respondents were free to choose more than one option so category numbers do not sum to overall sample number

4.2.1.9 Summary

Considering the overall groups of respondents, there is a reasonably high level of agreement with the statement that ‘we must accept that coastal erosion is a natural process at the coast’, with 52 per cent of Tairua and 47 per cent of Waihi Beach respondents strongly agreeing with this statement and less than 10 per cent of respondents at both locations either disagreeing or strongly disagreeing.

Referring back to one of the central elements of Environment Waikato’s management strategy (Dahm, 1999), ‘to promote sustainable management of coastal erosion by encouraging coastal communities to accept and live with coastal erosion where this is practical and appropriate’, the findings of this study clearly indicate a reasonably high level of support among survey respondents for accepting coastal erosion as being a natural process. However, this finding should not be extrapolated to further imply that respondents are also willing to live with coastal erosion; this is a separate concept.

‘Living with’ coastal erosion was not canvassed directly by the questionnaire, thus caution must be used in drawing conclusions about the extent to which the findings imply respondents’ willingness to not only accept but live with coastal erosion. However, respondents’ management preferences appear to reflect their philosophical approach towards erosion. The strong relationship (Table 4.15) between acceptance of erosion as a natural coastal process and the preference for ‘living with nature’ management solutions (such as ‘doing nothing’ and managed retreat) implies that the concepts of accepting and living with coastal erosion may be linked, at least for a proportion of survey respondents.

Other, more minor, differences were found. Categories of respondents more likely to strongly agree with the statement were:

- residents;
- people who have owned coastal property for longer;
- older respondents (at Tairua only);
- people with personal experience of erosion (at Tairua only);
- men (at Tairua only); and
- people reporting 'environmental experience'.

These findings tentatively suggest that the direct, day to day experience of living at the coast may be a factor in willingness to consider coastal erosion a natural coastal process.

This concept is supported by Dahm's (2003) review of the coastal literature. She notes that 'time and community experience' can influence perceptions of coastal processes. In a study of two beach communities in North Carolina, the high level of awareness of the coastal erosion hazard and the view of erosion as a continuous, natural process with which residents must cope was attributed to the traditional maritime orientation of the two communities and their reliance on the ocean and the foreshore for their livelihood (Ives and Furuseth, 1988).

In contrast, Dahm (2003) also noted that while beach users place a very high value on 'naturalness' as a valued attribute of the beach, this may not necessarily also entail an acceptance of natural processes. She referred to a study of English beach users (Tunstall and Penning-Rowsell, 1998) which identified an innate conservatism in attitudes towards the beach, manifested as a desire to 'keep things the way they have always been'. At all locations investigated, beach visitors were resistant to allowing erosional changes to the beach to happen, wishing instead to keep familiar features the way they had always known them and maintain the status quo. The authors noted that this was somewhat ironic given that the study locations (English beach resorts) are actively managed rather than having a high degree of natural character. It is relevant to note here that the focus of their study was on beach users rather than coastal residents. This tends to reinforce the view that in comparison well-established beach communities are likely to have time to have developed a realistic appreciation of the role of coastal erosion as a natural process.

4.2.2 'Inappropriate development in coastal areas can put houses at risk from erosion'

Overall levels of agreement with this statement for both areas are shown in Figure 4.7.

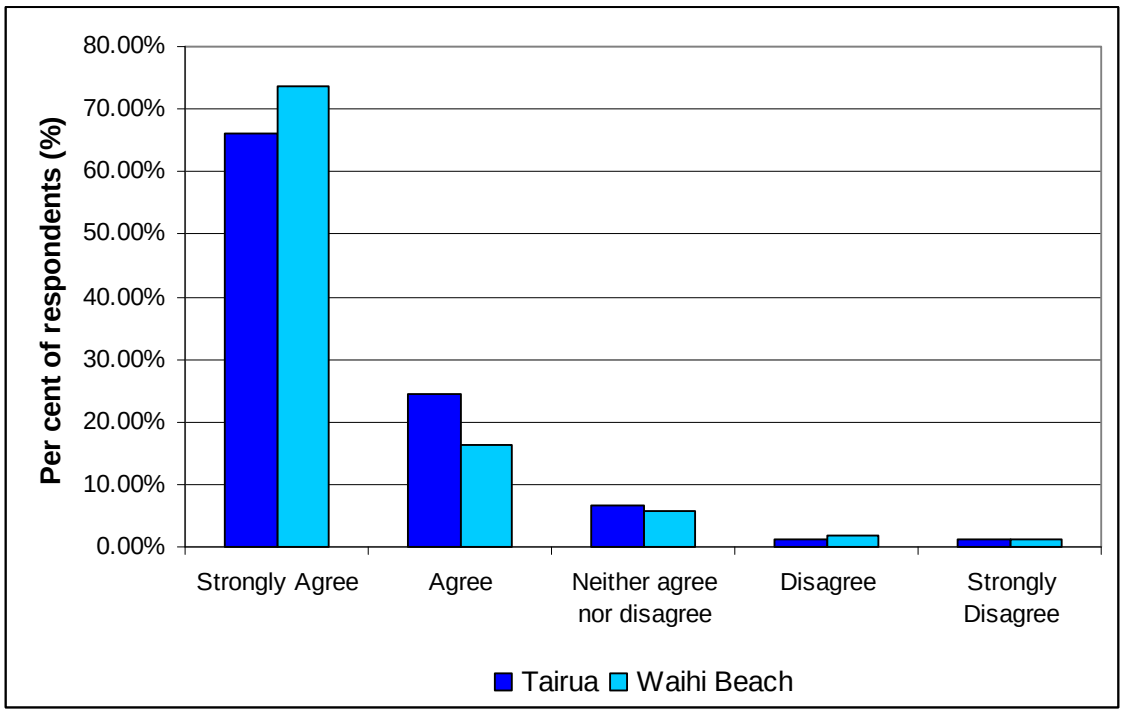

Figure 4.7 Respondents' attitudes towards statement that *"Inappropriate development in coastal areas can put houses at risk from erosion"*

Clearly most respondents are in agreement with the statement 'inappropriate development in coastal areas can put houses at risk from erosion' (90% either 'strongly agree' or 'agree' at both locations). The wording of the statement (with the word 'inappropriate') tends to lead people towards this answer. Conversely, only a very small proportion of respondents (four individuals at Tairua and five at Waihi Beach) disagree or strongly disagree with the statement.

Generally, few consistent differences are found between groups in their attitudes towards this statement, and overall it is clear that there is a high level of agreement with this statement.

4.2.3 'The width of the dune changes during the year'

Responses to this statement are shown in Figure 4.8.

This statement was intended as a straightforward knowledge question about dune processes. The results indicate that the majority of respondents (77% of Tairua and 65% of Waihi Beach respondents) accept that this statement is true (as indicated by either 'strongly agree' or 'agree' responses). The percentage of respondents 'strongly agreeing' appears to indicate how certain respondents are of their answers. However, it is also arguable that the percentages 'strongly agreeing' and 'agreeing' indicates the level of respondents' knowledge on this issue. Tables setting out the analysis for agreement with this statement against variables such as demographic factors and responses to other questions have not been reproduced in this report. However, a brief summary of factors influencing the proportion of respondents 'strongly agreeing' with the statement is provided. Readers are referred to the set of tables in Excel format (listed in Appendix Two) for full details.

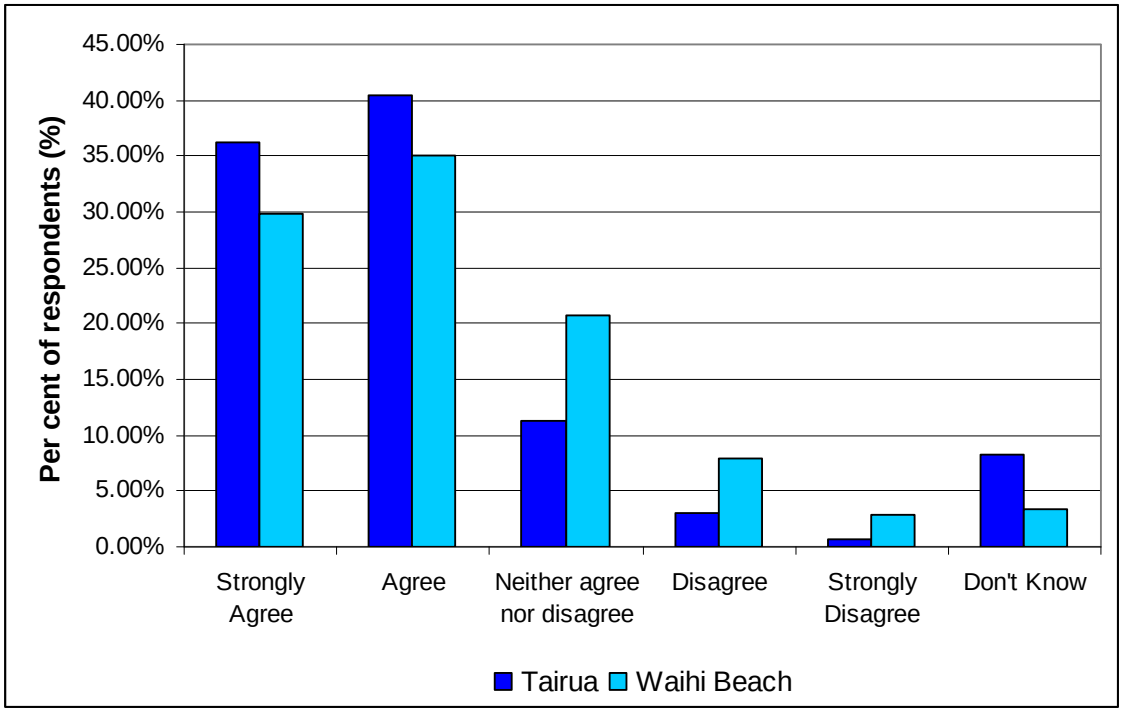

Figure 4.8 Respondents' attitudes towards statement that *"The width of the dune changes during the year"*

Groups of respondents more likely to strongly agree with the statement 'the width of the dune changes during the year' are:

- Those favouring 'doing nothing' as a management approach to coastal erosion (47% of respondents at Tairua strongly agree, compared to 36% for the whole sample, and 47% of respondents at Waihi Beach strongly agree, compared to 30% for the whole sample).
- Visitors (at Tairua, 42% of visitors strongly agree compared to 33% of residents, and at Waihi Beach, 39% of visitors strongly agree compared to 27% of residents).
- Those who have owned their property for longer than 10 years (at Tairua, 44% of this group strongly agree with the statement compared to 26% of those who have owned their property for less than 10 years; no such difference is seen within the Waihi Beach sample).
- Those who live closer to the beachfront (at Tairua, 47% of the group with beachfront or first-row properties strongly agree, compared to 30% of those living further back; at Waihi Beach, 42% of respondents with beachfront properties strongly agree compared to lower proportions ranging from 16-30% further back).
- Those who claim personal experience of erosion (at Tairua, 53% of respondents in this category strongly agree compared to 33% who do not claim personal experience of erosion; at Waihi Beach, the percentages are 40% and 27% respectively).
- Those who perceive a severe erosion threat to the local beach (at Tairua, 68% of those perceiving the current erosion threat to Tairua's Ocean Beach to be severe strongly agree with the statement compared to 31% of respondents who perceive a lower level of threat; at Waihi Beach, this trend is less strong with percentages of 36% and 29% respectively).
- Males (at Tairua only, where 40% of males strongly agree compared to 33% of females).

- Those claiming 'environmental experience' (at Tairua, 44% of those claiming environmental experience strongly agree compared to 32% who do not claim environmental experience; at Waihi Beach the percentages are 37% and 25% respectively).

The overall picture emerging from this set of factors is that direct experience appears to be important in influencing respondents' knowledge about sand dune processes. That visitors appear to be more certain in their knowledge than residents is surprising at first glance, but 'visitors' in this study are almost all absentee property owners as opposed to casual visitors, and may well take a close and informed interest in coastal issues.

4.2.4 *'Once a dune is destroyed there's no way to bring it back'*

Responses to the statement 'once a dune is destroyed there's no way to bring it back' are shown in Figure 4.9. This is, also, a knowledge question so the the same comments apply as for the previous statement.

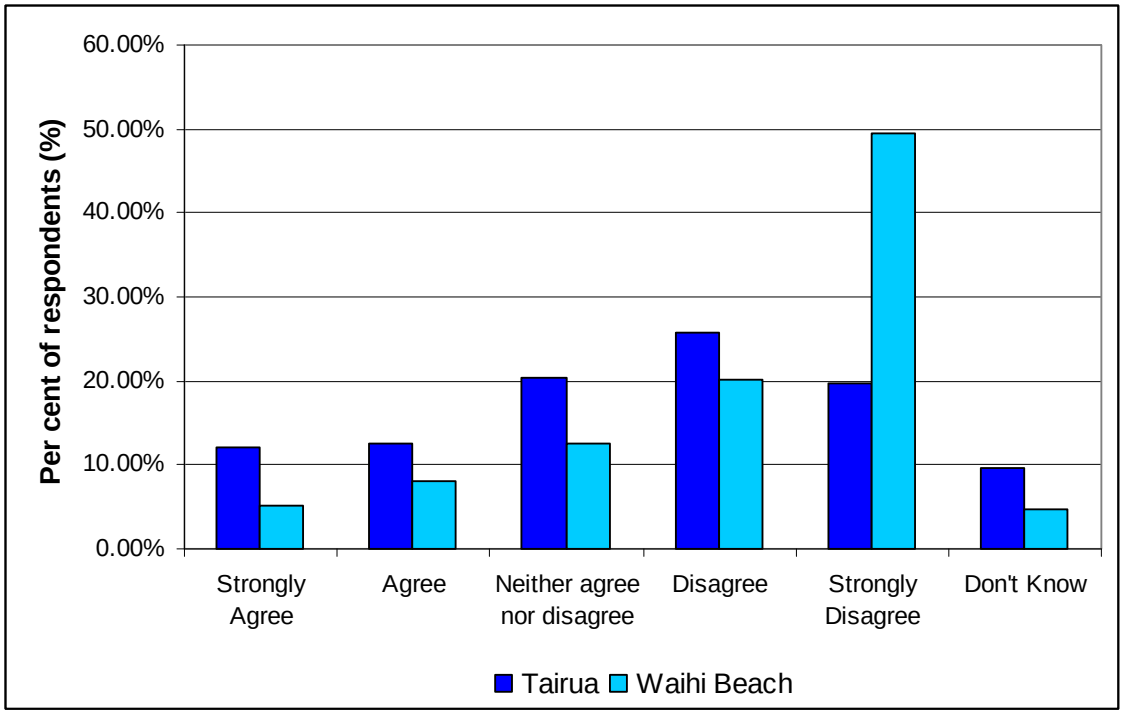

Figure 4.9 Respondents' attitudes towards statement that *"Once a dune is destroyed there's no way to bring it back"*

There is an obvious difference in the pattern of responses at the two locations, with a much greater percentage of Waihi respondents strongly disagreeing with the statement (49%, compared to 20% of Tairua respondents). As noted in our earlier report (Stewart et al., 2007), this may be due to the recent, visible successes at Waihi Beach in restoring dunes along stretches of the beach where previously there had been seawalls (for instance, at Brighton Reserve and Coronation Park). It should also be noted that when the survey was conducted (in January 2007), the dunes at Tairua were at something of a low ebb, but successful community planting initiatives have been carried out since then. Thus, the data reported here should be regarded as a snapshot at a particular point in time.

The same approach to data analysis has been taken as for the previous statement, although responses at the 'strongly disagree' end of the scale have been used as responses tended towards this end of the scale.

Groups of respondents more likely to strongly disagree with the statement 'once a dune is destroyed there's no way to bring it back' are:

- Waihi Beach respondents (see Figure 4.19 and discussion above).
- Those favouring seawalls (and to a lesser extent, beach nourishment) as approaches to coastal erosion management, at Waihi Beach only (percentages strongly disagreeing for each management option were: dune planting 51%, seawall and rock wall construction 68%, beach nourishment 59%, managed retreat 47% and doing nothing 41%).
- Those who claim personal experience of erosion (at Tairua, 30% of respondents in this category strongly disagree compared to 18% who do not claim personal experience of erosion; at Waihi Beach, the percentages are 55% and 48% respectively).
- Those who perceive a severe erosion threat to the local beach, at Waihi Beach only (67% of those perceiving the current erosion threat to Waihi Beach to be severe strongly disagree with the statement compared to 47% of respondents who perceive a lower level of threat).
- Those claiming 'environmental experience' (at Tairua, 25% of those claiming environmental experience strongly agree compared to 16% who do not claim environmental experience; at Waihi Beach the percentages are 60% and 42% respectively).

As for the previous knowledge question, 'experience' appears to be a contributing factor in respondents' knowledge. The most obvious way in which this is manifested is described above; namely, where sand dunes at Waihi Beach have been successfully restored to areas that were previously protected with seawalls.

4.2.5 'There is a range of methods available to stop coastal erosion indefinitely'

The final question in this set is intended to gauge respondents' attitudes towards the feasibility of 'stopping erosion', which in turn is thought to underpin support for 'holding the line' approaches to coastal management. However, it is important to make the distinction that even if respondents are inclined to believe that erosion *can* be stopped, this does not necessarily imply that they believe it *should* be stopped.

Overall responses to the statement are shown in Figure 4.10. The responses are the most evenly-distributed across categories of all the statements canvassed in this survey. Quite a different pattern of responses is found for the two locations, with Waihi Beach respondents much more inclined to strongly agree with the statement (34% strongly agree, compared to 12% of Tairua respondents). For the Tairua respondents, the most common response is in the middle of the scale.

Because responses are more evenly distributed across the available categories, influences on both ends of the scale ('strongly agree' and 'strongly disagree') have been considered.

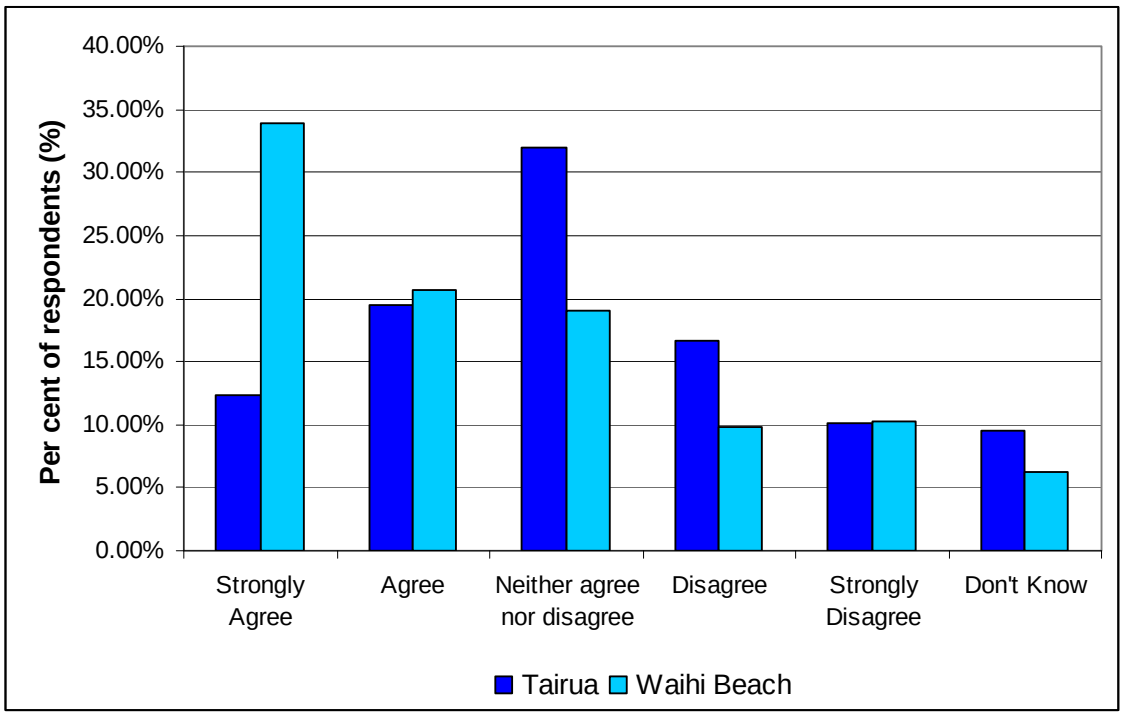

Figure 4.10 Respondents' attitudes towards statement that *"There is a range of methods available to stop coastal erosion indefinitely"*

4.2.5.1 Management preferences

A clear and emphatic relationship, consistent at both locations, is found between respondents' management preferences and their level of agreement with the statement that 'there is a range of methods available to stop coastal erosion indefinitely' (Table 4.16). At both locations, respondents who approve of the construction of hard defences (seawalls or rock walls) are more likely to strongly agree with the statement, and less likely to strongly disagree with the statement.

Conversely, the group of respondents who favour the 'do nothing' approach are less likely to strongly agree and more likely to strongly disagree with the statement.

4.2.5.2 Length of property ownership

With respect to length of property ownership, no relationship is found at Tairua on the percentage strongly agreeing with the statement (Table 4.17). At Waihi Beach, respondents who have owned their property for less than five years are less likely to strongly agree (23%) with the statement than those who have owned their property for longer. However, this trend is not consistent over a longer period of ownership, as the percentages strongly agreeing are 44 per cent among those who have owned their property for between five and 10 years, and 33 per cent among those who have owned their property for longer than 10 years.

A clearer trend is observed with respect to proportions strongly disagreeing with the statement. Respondents who have owned property for longer are more likely to strongly disagree with the statement.

Overall, length of property ownership could be described as being a minor influence on respondents' views on the statement that 'There is a range of methods available to stop coastal erosion indefinitely'.

Table 4.16 Respondents' management preferences against acceptance of the statement *'There is a range of methods available to stop coastal erosion indefinitely.'*

	Forms of coastal management approved of by respondent					
	Dune planting	Seawall or rock wall	Beach nourishment	Managed retreat	Do nothing	Overall sample
Tairua	n=161	n=66	n=76	n=91	n=32	n=168*
% of respondents who 'strongly agree' with statement	12%	22%	17%	10%	6%	12%
% of respondents who 'strongly disagree' with statement	9%	3%	8%	12%	28%	10%
Waihi Beach	n=151	n=25	n=79	n=89	n=32	n=175*
% of respondents who 'strongly agree' with statement	36%	52%	41%	36%	19%	34%
% of respondents who 'strongly disagree' with statement	10%	0%	10%	11%	31%	10%

* Respondents were free to choose more than one option so category numbers do not sum to overall sample number

Table 4.17 Length of property ownership against acceptance of statement that '*There is a range of methods available to stop coastal erosion indefinitely.'*

	Length of property ownership			
	Less than 5 years	5-10 years	Over 10 years	Overall sample
Tairua	n=39	n=35	n=78	n=168*
% of respondents who 'strongly agree' with statement	13%	9%	13%	12%
% of respondents who 'strongly disagree' with statement	3%	6%	17%	10%
Waihi Beach	n=30	n=34	n=89	n=174*
% of respondents who 'strongly agree' with statement	23%	44%	33%	34%
% of respondents who 'strongly disagree' with statement	3%	9%	14%	10%

*Includes responses that did not answer question about length of property ownership

4.2.5.3 Personal experience of erosion

A contradictory pattern of responses is found when levels of agreement with the statement are cross-tabulated with respondents' self-reported personal experience of erosion (Table 4.18). Respondents who claim to have personally experienced coastal erosion in the past are more likely (at Waihi Beach only) to strongly agree with the statement; the difference at Tairua is not significant. At both locations, respondents who claim to have personally experienced coastal erosion are also more likely to strongly disagree with the statement. Overall, personal experience of erosion does not consistently influence respondents' views on the statement.

Table 4.18 Proximity to beachfront against acceptance of statement that '*There is a range of methods available to stop coastal erosion indefinitely.'*

	Whether respondents have personally experienced coastal erosion in the past		
	Yes	No	Overall sample
Tairua	n=30	n=139	n=169
% of respondents who 'strongly agree' with statement	17%	12%	12%
% of respondents who 'strongly disagree' with statement	20%	8%	10%
Waihi Beach	n=40	n=134	n=174
% of respondents who 'strongly agree' with statement	43%	31%	34%
% of respondents who 'strongly disagree' with statement	15%	9%	10%

4.2.5.4 Gender

At both locations men are more likely than women to strongly agree with the statement (Table 4.19). This is more marked at Waihi Beach. At Tairua, men are also slightly more likely to strongly disagree with it.

Table 4.19 Gender against acceptance of statement that '*There is a range of methods available to stop coastal erosion indefinitely.'*

	Gender		
	Male	Female	Overall sample
Tairua	n=94	n=71	n=169*
% of respondents who 'strongly agree' with statement	16%	7%	12%
% of respondents who 'strongly disagree' with statement	14%	6%	10%
Waihi Beach	n=98	n=75	n=174*
% of respondents who 'strongly agree' with statement	40%	27%	34%
% of respondents who 'strongly disagree' with statement	11%	9%	10%

*includes responses that did not indicate gender

4.2.5.5 Respondents' involvement with environmental projects

As in Section 4.2.1.7, respondents' self-reported experience with environmental matters such as activities, groups or employment related to the environment is cross-tabulated with their level of agreement with the statement (Table 4.20). The only clear difference is that at Waihi Beach, respondents who report having 'environmental experience' are more likely to strongly agree with the statement.

Table 4.20 Respondents' environmental experience against acceptance of the statement *'There is a range of methods available to stop coastal erosion indefinitely.'*

	Whether respondents have 'environmental experience'		
	Yes	No	Overall sample
Tairua	n=62	n=107	n=169
% of respondents who 'strongly agree' with statement	11%	13%	12%
% of respondents who 'strongly disagree' with statement	13%	8%	10%
Waihi Beach	n=74	n=96	n=170
% of respondents who 'strongly agree' with statement	41%	28%	34%
% of respondents who 'strongly disagree' with statement	12%	9%	10%

4.2.5.6 Perceptions of erosion threat

Respondents were asked to indicate how much of a threat to the local beach they consider coastal erosion to be at the two study locations (Table 4.21). A relationship was found at both locations with respondents perceiving a severe threat more likely to strongly agree with the statement. The difference is emphatic at Waihi Beach.

Table 4.21 Respondents' perceptions of erosion threat to the local beach against acceptance of the statement *'There is a range of methods available to stop coastal erosion indefinitely.'*

	Respondents' ratings of the level of erosion threat to the study locality				
	A severe threat	A moderate threat	A minor threat	Not a threat	Overall sample
Tairua	n=26	n=101	n=34	n=7*	n=169
% of respondents who 'strongly agree' with statement	19%	14%	6%	-	12%
% of respondents who 'strongly disagree' with statement	4%	7%	15%	-	10%
Waihi Beach	n=26	n=97	n=41	n=9	n=174
% of respondents who 'strongly agree' with statement	62%	31%	22%	-	34%
% of respondents who 'strongly disagree' with statement	4%	8%	15%	-	10%

*sample size too small

The converse trend is also noted, with respondents who perceive the erosion threat to the local beach as being minor more likely to strongly disagree with the statement.

Respondents were also asked to estimate the time scale on which they considered coastal erosion likely to affect the property to which the questionnaire was delivered (Table 4.22). Results are shown for Waihi Beach only, as there is insufficient numbers in two of the four categories for Tairua to permit a comparison.

Table 4.22 Respondents' estimation of the time scale on which erosion will affect their property against acceptance of the statement *'There is a range of methods available to stop coastal erosion indefinitely.'*

	Respondents' estimation of the time scale on which erosion will affect their own property				
	Already affects this property	Within 10 years	Within 50 years	Not within 50 years	Overall sample
Waihi Beach	N=15	n=12	n=46	n=101	n=174
% of respondents who 'strongly agree' with statement	73%	50%	28%	29%	34%
% of respondents who 'strongly disagree' with statement	0%	8%	4%	15%	10%

A similar trend to Table 4.18 was noted. A relationship is observable between respondents' estimation of erosion threat and how likely they are to strongly agree with the statement. The converse trend is also noted for the likelihood of strongly disagreeing with the statement.

4.2.5.7 Summary

The statement examined in this section is that 'There is a range of methods available to stop coastal erosion indefinitely'. Attitudes towards this statement reflect respondents' views on whether erosion can be stopped, rather than whether it should be stopped. Responses to this statement are the most mixed of the five statements, but overall respondents are inclined to agree with the proposition that a range of methods exists to stop coastal erosion indefinitely. However, at Tairua, the most common response is in the middle of the scale, indicating that these respondents are undecided.

The most obvious overall feature of responses to this statement (Figure 4.10) is that Waihi Beach respondents are more likely than Tairua respondents to consider that methods exist to stop coastal erosion. Explanations for this difference are speculative, but it may be simply that erosion (and methods to address it, such as rock walls and sand dune buffer zones) is much more visible along the Waihi Beach shoreline.

Strong relationships are found between attitudes towards this statement and two variables: respondents' management preferences and their perceptions of the severity of the erosion threat.

With respect to management preferences, respondents who favour the construction of hard defences (seawalls and rock walls) as a solution to coastal erosion issues are more in agreement with the statement (that is, more likely to consider that methods exist to stop erosion). Conversely, respondents who favour the management approach of 'doing nothing (i.e. letting the sea dictate) are more likely to strongly disagree with the statement, implying that they do not believe that erosion can be stopped.

As noted in Section 4.2.1.8, respondents' management preferences reflect their philosophical approach, and the relationship observed suggests a link between views on whether erosion can be stopped and should be stopped. For example, there is

consistency between a preference for ‘doing nothing’ as an approach to coastal erosion and a belief that erosion cannot be stopped.

However, more caution should be expressed about drawing a generalised link between the inverse views – that erosion can and should be stopped – as people may well believe that methods do exist to halt erosion without necessarily believing that these methods ought to be applied. To progress understanding of this issue, it would be necessary to also consider factors such as costs, success of interventions, and an awareness of some of the tradeoffs involved (for instance, the effects of a seawall on the sandy beach in front of it).

The perceived severity of the erosion threat is also found to influence attitudes towards the statement. Those who perceive a more severe erosion threat to the local beach are more likely to believe that methods exist to stop erosion. This is also true when respondents are asked to estimate the timescale on which coastal erosion would be likely to threaten their own coastal property. Those who perceive a more immediate threat are more likely to believe that methods exist to stop erosion.

Other, but more minor and inconsistent, influences on respondents’ views on whether erosion could be stopped, include:

- length of property ownership (those who have owned coastal property for longer are more likely to disagree that methods exist to stop erosion);
- gender (males are more likely to agree that methods exist to stop erosion);
- environmental experience (those claiming environmental experience are more likely to agree that methods exist to stop erosion, but at Waihi Beach only)
- experience of erosion (a contradictory trend is seen at Waihi Beach, with those who claim personal experience of erosion more likely both to agree and to disagree that methods exist to stop erosion).

Respondents’ views on options for management of coastal erosion are presented and discussed in the following section.

4.3 Respondents’ preferences for different coastal erosion management options

Respondents were asked to state their level of approval for five forms of coastal management. They were free to choose as many options from the list as applicable. The overall results for this question, first reported in Stewart *et al*. (2007), are repeated here (Figure 4.11). Over 90 per cent of respondents at both Tairua and Waihi Beach are in favour of dune planting. Over half of the respondents also approve of managed retreat. This is different from results in other studies in the international literature (summarised by Dahm, 2003) which suggest that this option is generally seen as a last resort.

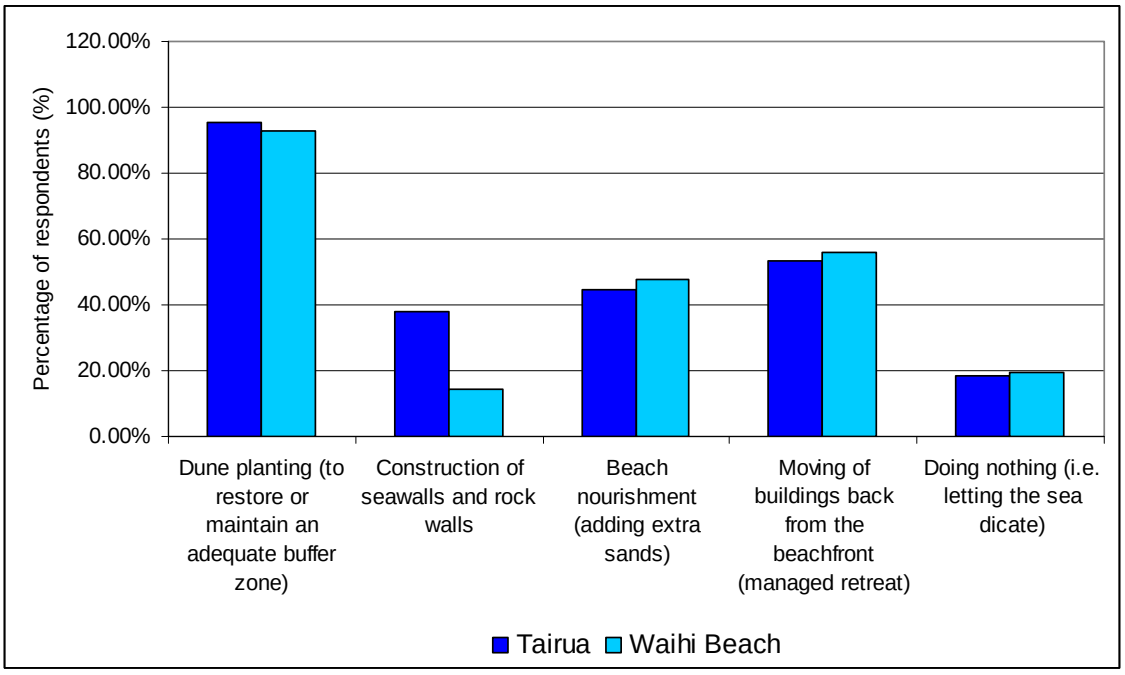

Figure 4.11 Forms of erosion management approved of *in general* by survey respondents

The major difference between the views of respondents at Tairua and Waihi Beach is in their approval of seawall and rock wall construction; this option is clearly less favoured at Waihi Beach.

Respondents were also asked for their views on which of these options they consider to be the best long-term approach (for a time scale of 50 to 100 years). Many respondents declined to choose just one option, and indicated that they consider a combination of approaches to be preferable. As one respondent expresses it,

'It's not possible to be categorical about solutions; it's just a sensible mix'.

The following sections examine relationships between respondents' management preferences and other factors.

4.3.1 Residents compared with visitors

There is no difference between residents and property-owning visitors in the Tairua sample with respect to their erosion management preferences. However, at Waihi Beach, marked differences in preferences are seen (Table 4.23). Visitors are more strongly in favour of the construction of hard defences and beach nourishment, and less in favour of managed retreat, than residents.

Table 4.23 Proportions of residents and visitors approving of different coastal management options

	Proportion approving of each management option		
	Residents	Visitors	Overall sample
Tairua	n=109	n=62	n=171
Dune planting	95%	97%	95%
Construction of seawalls/rockwalls	39%	36%	38%

Beach nourishment	46%	42%	44%
Managed retreat	51%	57%	53%
Do nothing	19%	18%	19%
Waihi Beach	n=138	n=41	n=179
Dune planting	91%	100%	93%
Construction of seawalls/rockwalls	9%	32%	15%
Beach nourishment	44%	61%	48%
Managed retreat	62%	34%	56%
Do nothing	19%	22%	20%

4.3.2 Proximity to beachfront

With respect to proximity of respondents to the beachfront, there is no effect on levels of approval of dune management, which are universally high (Table 4.24). For seawall and rock wall construction, a minor effect of proximity is seen at Waihi Beach only, with respondents living more than two rows back slightly less likely to favour this option than respondents living closer. Effects with respect to proximity are seen at both locations for the management options of managed retreat and doing nothing; there is a general, though weak and inconsistent, tendency for these options to be more favoured with increasing distance back from the beachfront. It should be kept in mind that the sample sizes in some categories were small.

Table 4.24 The influence of proximity of respondents' property to the beachfront on their approval of different coastal management options

	Proportion approving of each management option				
	Beachfront	First row	Second row	Further back	Overall sample
Tairua	n=9	n=52	n=48	n=62	N=171
Dune planting	89%	98%	96%	94%	95%
Construction of seawalls/rockwalls	33%	33%	48%	36%	38%
Beach nourishment	56%	37%	52%	44%	44%
Managed retreat	33%	48%	63%	53%	53%
Do nothing	0%	21%	21%	18%	19%
Waihi Beach	n=19	n=26	n=10	n=78	N=133
Dune planting	95%	92%	100%	92%	93%
Construction of seawalls/rockwalls	16%	12%	20%	9%	11%
Beach nourishment	37%	58%	50%	44%	46%
Managed retreat	37%	69%	50%	56%	56%
Do nothing	11%	15%	20%	21%	18%

4.3.3 Gender

There are some marked but contradictory differences in management preferences with respect to gender. No differences are seen with respect to approval of dune planting. At Tairua, women are slightly more in favour of the construction of seawalls and rockwalls, but at Waihi the opposite trend is seen, with men more in favour of this option. Men are more in favour of beach nourishment at both locations and more in favour of doing nothing at Waihi Beach only. Women are more in favour of managed retreat at both locations.

Table 4.25 Proportions of men and women approving of different coastal management options

	Percentage approving of each management option		
	Men	Women	Overall sample
Tairua	n=95	n=72	n=171*
Dune planting	95%	96%	95%
Construction of seawalls/rockwalls	32%	44%	38%
Beach nourishment	54%	32%	44%
Managed retreat	45%	63%	53%
Do nothing	25%	8%	19%
Waihi Beach	n=99	n=78	n=179*
Dune planting	93%	92%	93%
Construction of seawalls/rockwalls	19%	9%	15%
Beach nourishment	52%	42%	48%
Managed retreat	50%	64%	56%
Do nothing	17%	22%	20%

*Includes responses from those who did not indicate gender

The only consistent differences with respect to gender are that men approve of beach nourishment more than women do, and women approve of managed retreat more than men do. However, overall it appears that there is not a consistent influence of gender in dictating preferred management options.

4.3.4 Environmental experience

Some differences in management preferences were noted between respondents claiming and not claiming 'environmental experience' (Table 4.26) but none are consistent for both locations. With respect to favouring seawall and rock wall construction, Tairua respondents claiming environmental experience are less likely to favour seawalls and rockwalls, but the converse is true at Waihi Beach. For the more nature-centric management approaches of managed retreat and doing nothing, there is a tendency for respondents with environmental experience to be more in favour of these options though this tendency is not consistent.

Table 4.26 Influence of 'environmental experience' on approval of different coastal management options

	Proportion approving of each management option		
	Respondents with	Respondents without	Overall

	environmental experience	environmental experience	sample
Tairua	n=63	n=108	n=171
Dune planting	91%	98%	95%
Construction of seawalls/rockwalls	32%	42%	38%
Beach nourishment	41%	46%	44%
Managed retreat	56%	52%	53%
Do nothing	32%	11%	19%
Waihi Beach	n=75	n=100	n=175
Dune planting	93%	92%	93%
Construction of seawalls/rockwalls	20%	10%	14%
Beach nourishment	52%	44%	47%
Managed retreat	61%	51%	55%
Do nothing	21%	19%	20%

4.3.5 Perceptions of coastal processes

4.3.5.1 Respondents' level of agreement with the statement '*We must accept that coastal erosion is a natural process at the coast'*

Respondents' management preferences are cross-tabulated with the statement that '*we must accept that coastal erosion is a natural process at the coast'*. Support for dune management is independent of attitudes towards this question: even the small group of respondents who strongly disagree with the statement are still 100% in favour of dune planting as a coastal management option (Table 4.27).

Strong and consistent trends are found for the other management options at Waihi Beach. Increasing levels of agreement with the statement are associated with a decreasing level of support for seawalls and beach nourishment, and increasing levels of support for managed retreat and doing nothing. At Tairua, these trends are also seen for managed retreat and doing nothing, but not for seawalls or beach nourishment. These findings imply an association between accepting that erosion is a natural process and favouring nature-centric approaches to coastal management.

Table 4.27 Level of agreement with statement '*We must accept that coastal erosion is a natural process at the coast*' compared with approval of different coastal management options

	Proportion approving of each management option, against level of agreement with statement					
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Overall sample
Tairua	n=87	n=55	n=20	n=3	n=3	n=168
Dune planting	94%	95%	100%	-*	-	95%
Construction of seawalls/rockwalls	32%	47%	35%	-	-	38%
Beach	46%	42%	45%	-	-	45%

nourishment						
Managed retreat	60%	47%	45%	-	-	53%
Do nothing	29%	9%	10%	-	-	19%
Waihi Beach	n=82	n=38	n=35	n=9	n=11	n=175
Dune planting	89%	97%	97%	-	100%	94%
Construction of seawalls/rockwalls	6%	11%	23%	-	46%	14%
Beach nourishment	38%	50%	60%	-	73%	48%
Managed retreat	61%	61%	49%	-	36%	57%
Do nothing	35%	5%	9%	-	9%	20%

*Less than 10 respondents in this category so excluded from comparison

Preferences are also cross-tabulated with levels of agreement to the statement that '*there is a range of methods available to stop coastal erosion indefinitely'* (Table 4.28). As for the previous statement, strong associations are found between the level of agreement with this statement and certain management preferences. Support for dune management is high, and independent of the level of agreement with the statement. However, there is an association between the tendency to strongly agree that 'there is a range of methods available to stop coastal erosion' and a preference for the construction of seawalls and rock walls. This is true at both sites, but is more pronounced at Tairua. The same association is also found with the preference for beach nourishment.

Table 4.28 Level of agreement with statement '*There is a range of methods available to stop coastal erosion indefinitely*' compared with approval of different coastal management options

	Proportion approving of each management option, against level of agreement with statement					
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Overall sample
Tairua	n=21	n=33	n=54	n=28	n=17	n=169
Dune planting	95%	94%	96%	96%	88%	95%
Construction of seawalls/rockwalls	67%	52%	41%	25%	12%	39%
Beach nourishment	62%	42%	41%	57%	35%	45%
Managed retreat	43%	46%	48%	71%	65%	54%
Do nothing	10%	6%	19%	29%	53%	19%
Waihi Beach	n=59	n=36	n=33	n=17	n=18	n=174
Dune planting	92%	100%	91%	94%	83%	93%
Construction of seawalls/rockwalls	22%	14%	15%	12%	0%	15%
Beach nourishment	54%	61%	42%	18%	44%	48%
Managed retreat	54%	44%	58%	71%	56%	56%
Do nothing	10%	19%	18%	18%	56%	19%

*Less than 10 respondents in this category so excluded from comparison

Considering the more nature-centric management approaches of managed retreat and doing nothing, Tairua respondents who strongly agree with this statement are less likely to support these management approaches. This is also true at Waihi Beach, but only for the approach of doing nothing.

Thus, in summary, there is a clear relationship between respondents' support for different management options and their general tendencies towards nature-centric or technocentric approaches to coastal management. These relationships are also examined in Section 4.2, where the cross-tabulations were carried out with the x and y axes reversed (see Sections 4.2.1.7 and 4.5.1.7). As noted previously these relationships are not surprising as preferred management options and acceptance of coastal erosion as a natural process, or beliefs that erosion can be 'stopped', are related concepts.

4.3.6 Specific knowledge about dune processes and seawalls

Respondents' management preferences are cross-tabulated with questions that probe knowledge of the environmental effects of seawalls on a sandy beach (Table 4.29). Respondents were asked to choose the best options for completing a set of statements.

The first statement, '*a good cover of plants on dunes...*' was considered to be best completed by the option '...*helps build up sand reserves by stopping it blowing away, making a store of sand*'. Responses are aggregated into correct compared with incorrect or unsure responses; non-responses were not included (Table 4.29).

Some differences are noted between the groups of respondents, but none are consistent for both locations. At Tairua, respondents who gave the correct response are less likely to approve of the construction of seawalls and rock walls, and at Tairua, respondents who give the correct response are more likely to approve of dune planting and also of beach nourishment.

Table 4.29 Respondents' knowledge of dune processes against approval of different coastal management options

	Respondents' knowledge of dune processes against level of approval of coastal management options		
	Correct response	Incorrect response or 'unsure'	Overall sample
Tairua	n=113	n=53	n=169*
Dune planting	97%	91%	95%
Construction of seawalls/rockwalls	34%	47%	38%
Beach nourishment	43%	43%	44%
Managed retreat	53%	51%	53%
Do nothing	20%	15%	19%
Waihi Beach	n=128	n=50	n=178
Dune planting	96%	84%	93%
Construction of	13%	16%	14%

seawalls/rockwalls			
Beach nourishment	54%	32%	48%
Managed retreat	57%	54%	56%
Do nothing	20%	18%	20%

*doesn't include non-responses

Trends are more apparent with respect to the second question (Table 4.30), in which respondents were asked to choose the most appropriate ending to the statement '*The effects a seawall has on the natural behaviour of a sandy beach ...*'. The most appropriate ending for this statement is thought to be '...*can increase the effects of coastal erosion along other parts of the beach*.' A notable finding from this table is that a much lower proportion of respondents at Tairua (73 of 171, or 43%) know the correct answer to this question, compared to 63% of Waihi Beach respondents. The most obvious explanation is that Waihi Beach people have direct experience of seawalls and have had the opportunity to observe the effects for themselves.

At both locations, the following differences are seen. Respondents who are able to complete the statement correctly are substantially less likely to approve of the construction of seawalls and rock walls, and more likely to approve of managed retreat. Thus there appears to be a clear influence of level of knowledge on forms of management approved of.

Table 4.30 Respondents' knowledge of seawall effects against approval of different coastal management options

	Respondents' knowledge of seawall effects against level of approval of coastal management options		
	Correct response	Incorrect response or 'unsure'	Overall sample
Tairua	n=73	n=98	n=171
Dune planting	97%	94%	95%
Construction of seawalls/rockwalls	25%	48%	38%
Beach nourishment	44%	45%	44%
Managed retreat	62%	47%	53%
Do nothing	23%	15%	19%
Waihi Beach	n=105	n=62	n=179*
Dune planting	95%	89%	93%
Construction of seawalls/rockwalls	2%	32%	15%
Beach nourishment	50%	47%	48%
Managed retreat	72%	31%	56%
Do nothing	21%	18%	20%

*does not include non-responses

4.3.7 Perceptions of erosion threat

Respondents' management preferences are cross-tabulated with a question in which they are asked to rate the current level of erosion threat to the study location, using a

four-point scale from ‘a severe threat’ to ‘not a threat’. Respondents’ ratings of erosion threat are very similar for both locations, with the most commonly-held view being that erosion is a moderate threat (by 58% of Tairua respondents and 54% of Waihi Beach respondents). As noted in our previous report (Stewart *et al*., 2007), this was somewhat of a surprise as many Waihi Beach respondents comment in their observations that the areas in front of the two stretches of rock wall have been scoured out, and that they find this unacceptable.

Strong relationships between the perceived level of threat and management preferences are found at Waihi Beach (Table 4.31). Respondents who regard erosion as a severe threat are slightly less likely to approve of dune planting, although the approval level is still high at 85%. These respondents are much more likely to approve of the construction of seawalls and rockwalls, less likely to approve of managed retreat and much less likely to approve of doing nothing. These trends are not apparent at Tairua, apart from a tendency for doing nothing to be less approved of by those rating the erosion threat at Tairua as severe or moderate.

Table 4.31 Respondents’ rating of erosion threat to their local beachfront against approval of management options

	Respondents’ rating of erosion threat to local beachfront against level of approval of management options				
	A severe threat	A moderate threat	A minor threat	Not a threat	Overall sample
Tairua	n=26	n=101	N=34	n=8	n=171
Dune planting	92%	96%	100%	-*	95%
Construction of seawalls/rockwalls	39%	42%	35%	-	38%
Beach nourishment	31%	48%	47%	-	44%
Managed retreat	54%	55%	53%	-	53%
Do nothing	15%	15%	27%	-	18%
Waihi Beach	n=26	n=98	N=42	n=12	n=179
Dune planting	85%	95%	93%	100%	93%
Construction of seawalls/rockwalls	31%	17%	2%	0%	15%
Beach nourishment	54%	49%	41%	50%	48%
Managed retreat	46%	55%	62%	67%	56%
Do nothing	4%	14%	41%	25%	20%

*category excluded from comparison as less than 10 respondents

Respondents were also asked to estimate the timescale on which coastal erosion is likely to affect the property to which the questionnaire was delivered (Table 4.32). At Tairua, comparisons are limited by small sample sizes in some response categories and few trends are evident.

At Waihi Beach, strong trends are evident, although numbers are small in two of the four categories. People who report that their properties are already affected by erosion are much more likely to be in favour of seawalls and rock walls (60% in favour, compared to 7% of respondents who consider their property unlikely to be affected by

erosion within 50 years) and beach nourishment. These same people are much less likely to be in favour of managed retreat (20% in favour, compared with 64% of respondents who consider their property unlikely to be affected by erosion within 50 years) and of doing nothing.

It is also noteworthy that the level of support for dune planting is independent of the erosion threat; even respondents in the most-threatened category still strongly approve (93% approve) of this option.

Table 4.32 Respondents' rating of erosion threat to their own property against approval of management options

	Respondents' rating of erosion threat to their own property against level of approval of management options				
	Already affects this property	Likely to affect this property within 10 years	Likely to affect this property within 50 years	Unlikely to affect this property within 50 years	Overall sample
Tairua	n=7*	n=5*	n=41	n=114	n=171
Dune planting	-	-	100%	95%	95%
Construction of seawalls/rockwalls	-	-	42%	37%	38%
Beach nourishment	-	-	54%	41%	44%
Managed retreat	-	-	51%	54%	53%
Do nothing			17%	18%	19%
Waihi Beach	n=15	n=12	n=47	n=105	n=179
Dune planting	93%	83%	94%	93%	93%
Construction of seawalls/rockwalls	60%	25%	15%	7%	15%
Beach nourishment	80%	33%	49%	44%	48%
Managed retreat	20%	50%	51%	64%	56%
Do nothing	0%	25%	23%	20%	20%

*category excluded from comparison as less than 10 respondents

4.3.8 Coastal erosion management: open responses

Respondents were asked if they could suggest other forms of coastal erosion management not already included in the list provided. Generally, the open responses received are already covered by the options provided. The most common suggestions received are related to the creation/protection of a sand dune buffer and education of the public about keeping off the dunes. The main 'new' options offered are:

- the need to restrict development in vulnerable areas, a concept which could be described as the development setback approach and which is already embraced by the Waikato Regional Council;
- at Waihi Beach, approximately 20 respondents suggest the construction of an offshore reef, which would also have the benefit of creating a surfing break;

- at Waihi Beach, around 10 respondents suggested that closing Two Mile and Three Mile creeks would be a good approach to managing erosion at this location; and
- other suggestions included the construction of backstop walls on at-risk properties, and the construction of groynes.

A greater number and range of suggestions were received from Waihi Beach respondents (55, compared to 19 from Tairua respondents). This perhaps indicates that there is a greater level of dissatisfaction with the current approach to erosion management at this beach, or perhaps that the situation at Waihi Beach has provoked people to think more about the issues and possible solutions.

Respondents were also asked to explain what their preferred approach is to long-term management of coastal erosion, and why they prefer this option. As noted previously, many respondents decline to nominate just one approach and indicated that they consider a combination of approaches to be the most appropriate. These open responses provide additional insight into the reasons for people's management preferences, and are discussed further below.

Key concepts associated with dune planting are that it is 'natural', 'aesthetically pleasing', 'cost-effective' and 'unobtrusive'. It is also seen as being compatible with other methods; for instance, in combination with beach nourishment. Typical comments include:

- *I prefer our beaches to be natural and this allows our birds to nest in the dunes.*
- *Sand dunes create a natural buffer to erosion. We must ensure that they are protected through appropriate beach access ways and increased planting.*
- *Planting will help for non-extreme weather events, but in the long term it will be impossible to stop all erosion.*
- *Dunes are nature's seawall.*
- *Dune planting keeps the beach like a beach.*
- *I think that (1) planting the dunes and (4) moving buildings back would be a grand idea.*

Other comments indicate that respondents generally understand well the purpose of dune planting and the dynamics of sand dune systems:

- *Dune planting catches the sand and builds dunes.*
- *Dune planting stabilises the area and reduces sand loss.*
- *[dune planting] is supporting natural systems which stabilise the coastal zone.*

There are also indications that some respondents have a realistic idea of the limitations of dunes in providing protection from storm events:

- *It is very difficult to stop nature (sea storm destruction effects). Dunes that are well maintained will lessen the effects of a storm.*
- *[Supports dune planting, but] ...I recognise that a few good storms will wipe out plantings, beach nourishment, seawalls etc..*
- *Dune planting is the most natural but unfortunately will not be enough with rising sea levels.*
- *Planting will help for non-extreme weather but in the long term it will be impossible to stop all erosion.*

A small number of respondents consider seawalls and rock walls to be the best long-term approach; typical comments include:

- *Valuable real estate should be protected with rock walls.*
- *Seawalls are the only permanent fix used all over the world and would only be required in a very few cases.*
- *A seawall built in the early 60s is still effective in our beach front location having been maintained solely by myself without any council input.*
- *If sea levels are rising, we are not going to abandon at-risk developments. The buildings need to be protected.*

Several respondents also took the opportunity to register their opposition to the use of seawalls and rock walls:

- *Has to be an environmentally sensitive approach – NOT A ROCK WALL.*
- *Seawalls and rock walls will make the beaches unsafe to swim on at high tide.*
- *No rock walls – they have proved useless over the years and spoil the whole natural aspect of the beach.*
- *I have seen too many seawalls destroyed (in UK and Holland) to expect any form of protection to be permanent.*
- *Reefs offshore – anything but a wall!*

Some respondents also support beach nourishment, particularly when used in conjunction with other methods. It is seen as being natural and assisting with natural processes, and some respondents point to successful schemes used elsewhere:

- *Dune planting and beach nourishment.*
- *Let the sea dictate, assist at times with extra sand.*
- *Adding sand would seem to be an excellent option and appears to have been successfully utilised elsewhere such as at Kohimarama.*

However, one respondent expresses reservations about this approach:

- *Adding extra sand will not solve anything as it will continue to move from one end of the beach to the other and back again as it always has.*

Managed retreat is supported by many respondents, and is seen as being compatible with dune planting. This approach is frequently supported by an accompanying view that coastal erosion is the result of development occurring too close to the coast. Although the management option of using development setbacks (i.e. buffers between development and the shoreline designed to accommodate natural and long-term changes in the shoreline) was not specifically canvassed in this question, it is notable that many responses describe the principles of the development setback approach.

- *I think that planting the dunes and moving buildings would be a grand idea so that the beach is protected from too much human interference.*
- *In the long run, people will have to accept larger setbacks from the sea. Erosion is only a problem when people and property are in the way.*
- *Move buildings back to protect the natural environment.*
- *Retreat of housing, some of which should not have been permitted.*
- *Managed retreat essential to correct inappropriate development in some areas.*
- *Moving houses back is best in the long term; stricter regulations are needed for seafront sections.*

- *Buildings that are close to the high tide mark and on the immediate dunes need to be moved back to allow for the dunes to be re-established.*
- *'Global warming is going to raise sea levels eventually and we need to be proactive and stop people building on beachfronts – we cannot keep building more seawalls and protection if this occurs.*

The option of 'doing nothing' is somewhat similar to managed retreat in that it is based on an acceptance that coastal erosion is a natural and inevitable process at the coast.

- *The sea will do what it wants.*
- *In the end nature will do what it will. Landscapes all change over time, and we should accept and appreciate that. Why try to intervene – it has a high price and only benefits a few.*
- *I think we should let the sea do what it will, don't fight it.*
- *Can't mess with nature; it will always beat you.*
- *Any attempt at stopping erosion artificially will spoil the beach for everyone. Dune planting will not contain long term changes.*
- *You can't build on the coastline then blame nature for the natural processes which are inevitable.*

4.3.9 Summary

The main findings for this section are summarised here for each management option.

Dune planting
Levels of approval for dune planting schemes are high and vary little with respect to any of the influences examined (location and property ownership status, demographic factors, environmental experience, perceptions of coastal processes, specific knowledge about dune processes and seawalls, and perceptions of erosion threat). We can therefore conclude that support for dune planting is close to universal, and that it is an uncontroversial approach. However, there may be room for improving public understanding of the level of protection offered by dune management (see Section 4.2.5).

The construction of seawalls and rock walls
This option can be described as controversial, and many differences are found with respect to the influences examined (Tables 4.23-4.32). It is also clear from the open responses (described in Section 4.3.9) that views on this option are polarised, particularly at Waihi Beach. A notable overall finding is that at Waihi Beach (a community with direct experience of rock wall construction to protect beachfront property) the level of approval for this option is just 14%, compared to an approval level of 38% within the Tairua sample, where a dune planting scheme has been active since 1994, and there are no seawalls or rock walls other than a very small stretch of rocks placed at the south end of the beach.

The construction of seawalls and rockwalls is more approved of as a coastal management option among the following groups:

- Visitors to Waihi Beach (in the Waihi Beach sample, 32% of visitors approve of this option compared to 9% of residents);
- Respondents who strongly agree or agree with the proposition that 'there is a range of methods available to stop coastal erosion indefinitely'.
- Respondents who regard coastal erosion as a severe threat to the beachfront (at Waihi Beach only); and

- Respondents whose property is already affected by coastal erosion, and to a lesser extent, those who expect erosion effects within 10 years;

Conversely, the construction of seawalls and rockwalls is less approved of by:

- Respondents who strongly agree or agree with the proposition that 'we must accept that 'erosion is a natural process at the coast' (at Waihi Beach only)
- Respondents who correctly answered a knowledge question about the environmental effects of seawalls on a sandy beach.

Support for rock walls and seawalls is associated with a belief that coastal erosion can be 'stopped', an underestimation of the harmful effects of seawalls, and a higher level of perceived erosion threat.

Dahm (2003) reviewed a study of Gold Coast beachfront residents (Smith, 1996), and noted that among the nearly 400 beachfront residents there was an 'almost infinite faith' in the efficacy of boulder walls and felt remarkably secure once they lived behind one. More generally, Dahm reports that 'available research and practitioner advice suggests that most beachfront communities tend to favour the use of engineering structures to manage coastal erosion'.

In contrast, residents in North Carolina beach communities (Ives and Furuseth, 1998, also reviewed by Dahm, 2003) had much more divided opinions on the value of seawalls as protection for beaches, with a significant proportion of the respondents believing that seawalls destroy rather than protect a beach. This case study was previously mentioned in Section 4.2.1.9 as an example of beach communities with a long history of association with the sea and its effects, and a high level of willingness to accept coastal erosion as being a natural process. Dahm noted that the community views on seawalls at the North Carolina beaches reflect 'increasing community awareness of the adverse effects of seawalls'.

Beach nourishment

This option is viewed favourably overall by survey respondents, with just under half of the respondents at both locations being generally in favour of it. While beach nourishment is seen as being a useful adjunct method, it is regarded on its own as the preferred long-term solution to coastal erosion by less than 5% of respondents.

Beach nourishment is more approved of by the following groups:

- visitors to Waihi Beach;
- men;
- respondents who strongly agree or agree with the proposition that 'there is a range of methods available to stop coastal erosion indefinitely'; and
- respondents whose property is already affected by coastal erosion.

Conversely, beach nourishment is less approved of by respondents who strongly agree or agree with the proposition that 'we must accept that erosion is a natural process at the coast' (at Waihi Beach only).

Dahm (2003) has also noted that beach nourishment appears to be a popular and widely accepted approach for the management of coastal erosion, based on her review of case studies from a wide range of countries.

Managed retreat

Managed retreat, or the moving of buildings back from the beachfront, is the second most popular management option generally approved of by the survey respondents, with just over half of respondents supporting this option (Figure 4.11). However, when asked to choose the best long-term option, the level of support for this option on a stand-alone basis is much lower (approximately 10%). Open-ended responses indicate strong support for this approach by some respondents.

As noted previously, the high level of support for managed retreat is surprising in view of the results of a review of coastal literature (Dahm, 2003) which suggested that retreat is in general seen as a last resort (together with 'doing nothing'). The majority of studies she reviewed suggested that coastal residents showed strong preferences for 'holding the line' and very little acceptance of the idea of allowing natural processes to do their work at the coast. While many of the studies reviewed were concerned specifically with the views of beachfront residents (as those most likely to be directly affected by a policy of managed retreat), it is not clear whether the views of the wider community, in coastal settlements, were also canvassed.

The current study provides the opportunity to gauge levels of support for various options in coastal communities on a wider scale.

Managed retreat is more approved of among the following groups:

- residents (at Waihi beach only);
- those who live further back from the beachfront;
- women;
- those who agree or strongly agree that 'we must accept that erosion is a natural process at the coast';
- those who disagree that 'there is a range of methods available to stop coastal erosion indefinitely';
- those who correctly answered a knowledge question about the environmental effects of seawalls on a sandy beach; and
- those whose property is unlikely to be affected by erosion.

Conversely, managed retreat is less approved of by:

- those living closest to the beachfront; and
- those whose property is already affected by erosion.

With respect to the respondents' own property and the current level of erosion threat they face, it was interesting that among the group of 15 Waihi Beach respondents who indicate that their property is already affected by coastal erosion, 20% of this group still support managed retreat (Table 4.32). The level of support increases to 50 per cent among the group of respondents who estimate that their property will be affected within 10 years, 51 per cent of the group who expect to be affected within 50 years, and 64 per cent of those who say erosion is unlikely to affect their property within 50 years. This perhaps indicates a level of willingness among people who may, in the not-too-distant future, have to deal with erosion effects, to consider managed retreat as a viable option rather than as a last resort.

Doing nothing

'Doing nothing' or allowing the sea to dictate, is approved of in general by approximately 20 per cent of the survey respondents (Figure 4.23), and is thus one of

the less popular options. The trends for approval of 'doing nothing' are generally similar to those for managed retreat.

'Doing nothing' is more approved of by the following groups:

- those who have lived at the beach for longer;
- men (at Tairua only);
- those who strongly agree that 'we must accept that erosion is a natural process at the coast'; and
- those who strongly disagree that 'there is a range of methods available to stop coastal erosion indefinitely'.

Conversely, 'doing nothing' is less approved of by:

- those who live closest to the beachfront;
- those who regard coastal erosion as a severe threat to the beachfront (at Waihi Beach only); and
- those whose property is already affected by erosion (none of the 15 Waihi Beach respondents in this category approved of this option).

Overall, 'doing nothing' can be seen as a similar but more extreme option to managed retreat. It is supported by fewer respondents, and those who support it tended to hold stronger 'nature-centric' views.

Finally, it is clear that there are differences between the study locations with respect to their management preferences and that, in general, the views of Waihi Beach respondents are more 'polarised'. This may be a reflection of the level to which coastal management has become 'politicised' at this beach. A recent edition of the *New Zealand Listener*[3] covers the unsuccessful appeal by two Waihi Beach residents in the Environment Court against the Western Bay of Plenty District Council's plan to erect a rock wall on the beach.[4] According to one of these residents, 'they're going to have to push the bodies out of the way when the bulldozers come, because people have had enough'.

Respondents' views on how control measures for coastal erosion should be funded

Respondents were asked for their views on who should fund coastal erosion control measures where both public and private property is at risk. As for the previous sections of this chapter, responses are cross-tabulated with a range of other variables. Few differences are found with respect to the management of erosion control on public land, so it will not be discussed further here.

The overall results (first shown in Stewart *et al*., 2007) are reproduced here (Figure 4.12).

[3] *New Zealand Listener* Vol 214, no 3556, July 5-11 2008.
[4] *Mason v Western Bay of Plenty District Council* Environment Court Auckland, A098/2007, 30 November 2007.

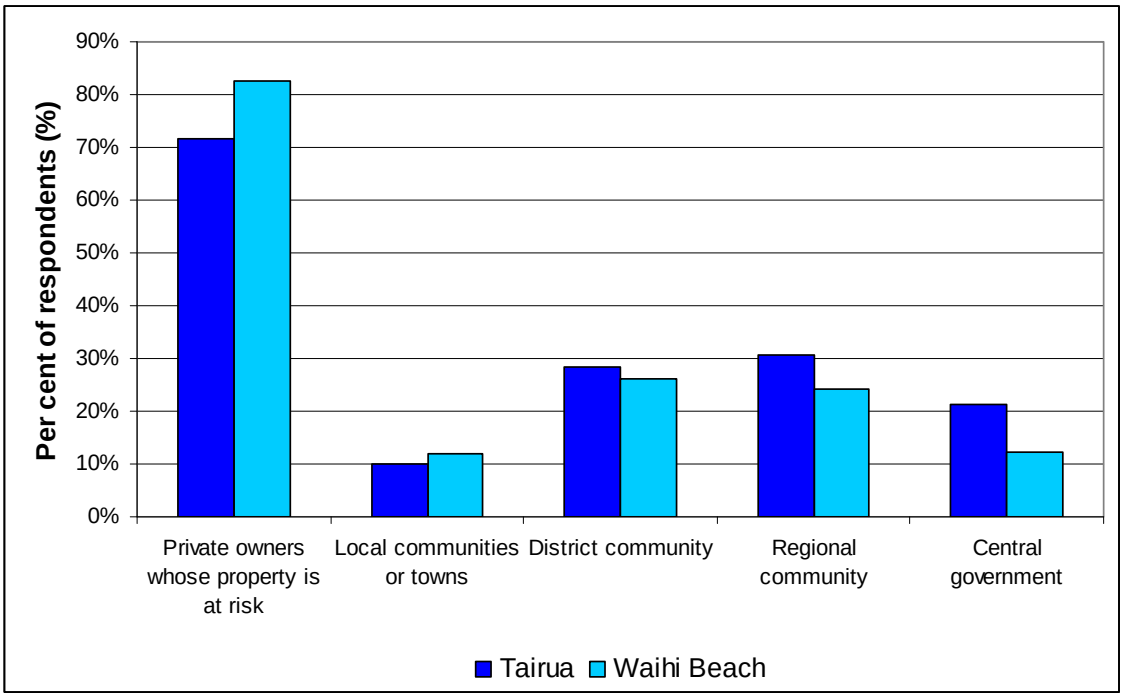

Figure 4.12 Respondents' views on funding coastal erosion control where private property is at risk

For private property, the majority of respondents clearly consider that erosion control should be funded by private property owners, with Waihi Beach respondents more likely to hold this view (83% favoured this option compared to 72% of Tairua respondents).

4.3.10 Property ownership and residency

Responses were aggregated into 'residents' and 'visitors', and also into 'property owners' and 'renters' (Table 4.33).

Table 4.33 Influence of property ownership status on respondents' views on funding erosion control for private property

	Proportion of each group in favour of funding various options for erosion control on private property				
	Property ownership status		Residency		
	Owners	Renters	Residents	Visitors	Overall sample
Tairua	n=154	n=14	n=107	n=61	n=169
Private owners	71%	79%	73%	69%	72%
Local communities	10%	7%	7%	16%	10%
District community	29%	29%	22%	39%	28%
Regional community	30%	36%	28%	34%	31%
Central government	22%	14%	18%	28%	21%
Waihi Beach	n=155	n=20	n=136	n=39	n=177
Private owners	83%	75%	82%	85%	83%
Local communities	12%	15%	7%	28%	12%
District community	25%	35%	23%	38%	26%

Regional community	23%	35%	21%	36%	24%
Central government	10%	30%	12%	15%	12%

With respect to property ownership, little difference is seen at Tairua, but Waihi Beach property owners are slightly more likely to have the view that private owners should fund erosion control where private property is at risk, and less likely to consider district, regional or central government involvement appropriate. However, this comparison is not particularly robust because of the small sample size of non-property owners (14 individuals at Tairua and 20 at Waihi Beach) so it remains a provisional finding.

With respect to residency, visitors (i.e. absentee property owners) are more likely to believe that funding of erosion control should be shared at various levels of government.

4.3.11 Proximity to beachfront

An influence of proximity to the beachfront on funding preferences is seen (Table 4.34). Respondents living closest to the beachfront are less likely to think that private owners should fund erosion control, and more likely to support other funding options.

Table 4.34 Influence of proximity to beachfront on respondents' views on funding erosion control for private property

	Proportion of each group in favour of funding various options for erosion control on private property				
	Beachfront	First row	Second row	Further back	Overall sample
Tairua	n=8	n=50	n=50	n=61	n=169
Private owners	-*	58%	72%	82%	72%
Local communities	-	14%	4%	10%	10%
District community	-	42%	24%	21%	28%
Regional community	-	46%	28%	18%	31%
Central government	-	26%	22%	15%	21%
Waihi Beach	n=18	n=26	n=10	n=77	n=131
Private owners	56%	85%	80%	88%	82%
Local communities	6%	8%	20%	12%	11%
District community	22%	23%	40%	26%	26%
Regional community	39%	27%	40%	17%	24%
Central government	22%	12%	10%	16%	15%

4.3.12 Perceived erosion threat

Clear relationships are found between respondents' perceived level of erosion threat to the local beach, and their views on how erosion control should be funded. Those who consider erosion to be a severe threat are less likely than those who perceive lesser levels of threat to consider that private owners should be responsible for funding erosion control, and more likely to support other funding options (Table 4.35). However,

it is important to note that this group (perceiving a severe threat) is relatively small, and constitutes around 15% of the whole sample at both locations.

Relationships between respondents' views on erosion control and the perceived level of threat to the property to which the questionnaire was delivered are shown in Table 4.36. Two of the four categories for Tairua contain fewer than 10 individuals so results for Tairua will not be discussed further here. For Waihi Beach, the group of 15 respondents who report that their property is already affected by erosion are still strongly in favour of private owners (i.e. themselves) funding erosion control, but are also, clearly more in favour than other respondents of funding from local, district and regional levels of government. This finding could be interpreted to imply that while they are more in favour of cost-sharing arrangements than other respondents, they are also strongly inclined to believe that they themselves should be involved – perhaps as a means of retaining some control over any seawalls or rock walls built.

Also of note in Table 4.36 is that the group who consider themselves most removed from the threat of erosional damage are, at both locations, less in favour of cost-sharing arrangements and more inclined to think that private owners should bear the majority of the cost.

Table 4.35 Influence of perceived erosion threat to local beachfront on respondents' views on funding erosion control for private property

	Proportion of each group in favour of funding various options for erosion control on private property				
Tairua	A severe threat n=25	A moderate threat n=100	A minor threat n=36	Not a threat n=8	Overall sample n=169
Private owners	52%	72%	83%	-	72%
Local communities	12%	11%	8%	-	10%
District community	36%	31%	19%	-	28%
Regional community	32%	36%	19%	-	31%
Central government	28%	25%	6%	-	21%
Waihi Beach	n=25	n=98	n=41	n=12	n=177
Private owners	52%	86%	93%	83%	83%
Local communities	24%	13%	5%	0%	12%
District community	40%	31%	15%	0%	26%
Regional community	40%	25%	22%	0%	24%
Central government	28%	12%	5%	8%	12%

Table 4.36 Influence of perceived erosion threat to respondents' own property on views on funding erosion control for private property

	Proportion of each group in favour of funding various options for erosion control on private property				
	Already affects this property	Likely to affect this property within 10 years	Likely to affect this property within 50 years	Not likely to affect this property within 50 years	Overall sample

Tairua	n=7	n=5	n=40	n=116	n=169
Private owners	-	-	65%	74%	72%
Local communities	-	-	10%	7%	10%
District community	-	-	40%	24%	28%
Regional community	-	-	40%	27%	31%
Central government	-	-	30%	17%	21%
Waihi Beach	n=15	n=12	n=46	n=104	n=177
Private owners	87%	75%	78%	85%	83%
Local communities	40%	17%	11%	8%	12%
District community	60%	50%	28%	17%	26%
Regional community	53%	17%	30%	18%	24%
Central government	20%	17%	20%	8%	12%

4.3.13 Management preferences

Respondents' views on how erosion control should be funded are cross-tabulated with their management preferences for coastal erosion. The pattern that emerges (Table 4.37) is that respondents who favour the construction of seawalls and rock walls are less inclined than respondents favouring other erosion control options to think that private owners should fund erosion control, and more inclined to support funding from other sources (particularly district and regional levels of government).

Table 4.37 Influence of preferred management options for coastal erosion on views on funding erosion control for private property

	Proportion of each group in favour of funding various options for erosion control on private property					
Tairua	Dune planting n=159	Seawalls/ rock walls n=64	Beach nourishment n=75	Managed retreat n=89	Doing nothing n=31	Overall sample n=167
Private owners	72%	66%	71%	76%	87%	71%
Local communities	10%	16%	7%	9%	10%	10%
District community	30%	30%	25%	27%	23%	29%
Regional community	31%	44%	29%	26%	19%	31%
Central government	21%	20%	24%	19%	10%	22%
Waihi Beach	n=165	n=25	n=85	n=100	n=35	n=177
Private owners	82%	72%	85%	85%	91%	83%
Local communities	12%	32%	15%	9%	6%	12%
District community	27%	60%	29%	17%	14%	26%
Regional community	26%	40%	24%	21%	20%	24%
Central government	13%	20%	13%	10%	9%	12%

There is also some differentiation between the views of the group favouring 'doing nothing' as a solution to erosion control and other respondents. This group has an opposite pattern of respondents to the group favouring seawall and rock wall

construction, and is more in support of private owners funding erosion control, and less in support of funding from other sources.

4.3.14 Summary

The most important overall finding is that the majority of respondents consider that where private property is at risk from coastal erosion, the private owners themselves should be responsible for funding erosion control measures. This option is supported by 72 per cent of the Tairua sample and 83 per cent of the Waihi Beach sample. Generally, levels of support remain high across all groups examined in this section. The groups that showed a lower level of support for private owner funding of erosion control on private property are:

- respondents living closest to the beachfront;
- those who perceive a severe erosion threat to the local beachfront; and
- those who favour building hard defences (seawalls and rock walls) as a coastal management option.

An interesting finding is that the group of 15 respondents at Waihi Beach who report that their property is already being affected by erosion strongly supports private owner funding of erosion control. This group is also, compared to other respondents, more in favour of other sources of government funding being involved, implying that it sees cost-sharing arrangements as being appropriate.

Dahm (2003) included an interesting section on perceptions of the role of government in the management of coastal erosion. Most of the studies reviewed were for the United States, either for the Great Lakes or the East Coast. Dahm's findings indicated that in general, people in the most high-risk situations (usually actively eroding beachfront properties) were the most inclined to think that paying for protection should be the responsibility of various levels of government. In one study of shorefront residents of Lake Superior, under half of respondents agreed that property owners themselves should bear some of the costs. Residents living back from the shorefront placed less emphasis on federal payouts and were more in favour of owners themselves financing the protective measures. There was a clear overall picture that most coastal residents, whether living on the shorefront or further back, do not believe that individual property owners affected by erosion should bear full financial responsibility for shore protection measures, despite in many cases having made fully-informed decisions to take on the risks.

The views of the respondents that participated in our study are somewhat different to those reviewed in Dahm's study. Most notably, the participants in the most high-risk situation (those with properties already affected by erosion) show more willingness to bear financial responsibility.

5 Conclusions

5.1 Key findings of this study

5.1.1 What people value about the coast

Overall, it is clear that the natural, unspoiled character of the coast is of central importance to the Coromandel coastal communities surveyed. Good access to the coast is also important.

The main differentiations within the overall sample of respondents with respect to their views on what is important about the coast and its management are between residents and visitors (particularly at Waihi Beach, less so at Tairua), between men and women, and between respondents who favour the construction of seawalls and rockwalls (i.e. a 'holding the line' approach to coastal management), and respondents favouring other solutions.

The values held as most important by respondents are in general compatible with a paradigm shift away from 'taming natural coastal processes' (or 'holding the line') towards 'living with natural coastal processes'. These values include retaining the natural character of the coast where possible, promoting natural-looking beaches and protecting sand dune systems and protecting scenic values.

5.1.2 Perceptions of coastal processes

In this study, respondents' level of agreement with a series of statements is used to identify their perceptions of coastal processes and coastal management options.

There is a high level of agreement with the statement that '*We must accept that coastal erosion is a natural process at the coast'*, as less than 10 per cent of responses are at the disagreement end of the scale ('strongly disagree' or 'disagree'). Thus, as well as valuing natural character as an attribute of the coast, respondents are also willing to accept the reality of coastal erosion as a natural coastal process. Respondents' management preferences appear to be linked with their levels of agreement with the statement. Respondents who favour the option of 'doing nothing' are substantially more likely to strongly agree with the statement, and conversely respondents favouring the construction of hard defences are less likely to strongly agree. These findings perhaps indicate a link between accepting coastal erosion as natural and being willing to work within a management paradigm of 'living with natural processes' as opposed to 'taming natural processes'. Results of cross-tabulation analyses also indicate that the direct, day to day experience of living at the coast appears to be a factor in accepting coastal erosion as a natural process

Respondents demonstrate a reasonable level of knowledge about sand dune processes, as indicated by the level of agreement with the statement that '*The width of the dune changes during the year*'. Factors such as length of property ownership and proximity of respondents' property to the beachfront are found to increase the likelihood of strongly agreeing with this statement, suggesting that experience plays a role.

A more varied level of knowledge is found about sand dune rehabilitation (as indicated by disagreement with the statement that '*Once a dune is destroyed there's no way to*

bring it back'). Waihi Beach respondents are substantially more likely to agree that sand dunes can be reintroduced along a shoreline (49% strongly disagreed, compared to 20% of Tairua respondents). This result is very likely due to the successful reintroduction of dunes along stretches of Waihi Beach where previously there were seawalls (for instance, at Brighton Reserve and Coronation Park).

The most mixed responses are shown towards the statement that '*There is a range of methods available to stop coastal erosion indefinitely'*. Waihi Beach respondents were more likely to strongly agree (34% strongly agree, compared to 12% of Tairua respondents). Reasons for this difference are not known, but it may simply be because erosion issues (and management methods such as rock walls) are more visible at Waihi Beach. At Tairua, the most common response is in the middle of the scale, indicating that respondents are undecided on this topic. With respect to management preferences, respondents who favour the construction of hard defences (seawalls and rock walls) as a solution to coastal erosion issues are more in agreement with the statement (that is, more likely to consider that methods exist to stop erosion). Conversely, respondents who favour the management approach of 'doing nothing (i.e. letting the sea dictate) are more likely to strongly disagree with the statement, implying that they do not believe that erosion can be stopped.

5.1.3 Management preferences

Dune planting

Levels of approval for dune planting schemes are high and varied little with respect to any of the influences examined. Support for dune planting can thus be described as uncontroversial and widely-supported.

The construction of seawalls and rock walls

This option is controversial, and many differences are found with respect to the influences examined. A notable overall finding is that at Waihi Beach (a community with direct experience of rock wall construction to protect beachfront property) the level of approval for this option is just 14 per cent, compared to an approval level of 38 per cent within the Tairua sample, where a dune planting scheme has been active since 1994, and there are no seawalls or rock walls other than a very small stretch of rocks placed at the south end of the beach.

Support for rock walls and seawalls is associated with a belief that coastal erosion can be 'stopped', an underestimation of the harmful effects of seawalls, and a higher level of perceived erosion threat.

Beach nourishment

Just under half of the respondents at both locations are generally in favour of this option. While beach nourishment is seen as being a useful adjunct method, it is regarded on its own as the preferred long-term solution to coastal erosion by less than 5 per cent of respondents.

Managed retreat

Managed retreat, or the moving of buildings back from the beachfront, is the second most popular management option generally approved of by the survey respondents, with just over half of respondents supporting this option.

Managed retreat is more approved of among:

- residents (at Waihi beach only);
- those who live further back from the beachfront;
- women;
- those who agree or strongly agree that 'we must accept that erosion is a natural process at the coast';
- those who disagree that 'there is a range of methods available to stop coastal erosion indefinitely';
- those who correctly answered a knowledge question about the environmental effects of seawalls on a sandy beach; and
- those whose property is unlikely to be affected by erosion.

Conversely, managed retreat is less approved of by the following groups:

- those living closest to the beachfront; and
- those whose property is already affected by erosion.

With respect to the respondents' own property and the current level of erosion threat they face, it is interesting that among the group of 15 Waihi Beach respondents who indicated that their property is already affected by coastal erosion, 20 per cent of this group still support managed retreat. The level of support climbed to 50 per cent among the group of respondents who estimate that their property will be affected within 10 years. This perhaps indicates a level of willingness among people - who may have to deal with erosion in the not-too-distant future - to consider managed retreat as a viable option rather than as a last resort.

Doing nothing

'Doing nothing' or allowing the sea to dictate is approved of in general by approximately 20 per cent of the survey respondents and was thus one of the less popular options. The trends found for approval of 'doing nothing' are generally similar to those for managed retreat.

Overall, respondents' management preferences are aligned well with Environment Waikato's Coastal Erosion Risk Mitigation Strategy (Dahm, 1999) and its central theme of encouraging coastal residents to live with coastal erosion rather than thinking in terms of modifying natural coastal processes. Dune planting is a very well-supported and uncontroversial option, and the option of managed retreat is also approved of by over half of the sample of respondents. Support for the construction of hard defences is not high, particularly at Waihi Beach, a location at which rock walls have been constructed to protect private property. Open-ended responses provided further valuable insights into respondents' views on coastal management.

This picture of management preferences is in marked contrast to Dahm's finding (Dahm, 2003) that 'available research and practitioner advice suggests that most beachfront communities tend to favour the use of engineering structures to manage coastal erosion'.

5.1.4 Views on how erosion control should be funded

The majority of respondents consider that where private property is at risk from coastal erosion, the private owners themselves should be responsible for funding erosion control measures. This option is supported by 72 per cent of the Tairua sample and 83 per cent of the Waihi Beach sample.

A group of 15 respondents at Waihi Beach who report that their property is already affected by erosion is strongly in support of private owner funding of erosion control. This group is also, compared to other respondents, more in favour of other sources of government funding being involved, implying that it sees cost-sharing arrangements as being appropriate. The level of willingness on the part of individual property owners to bear financial responsibility for coastal protection is higher for this study than in studies reviewed by Dahm (2003), mostly for North American coastal communities. Dahm reported that in the United States most coastal residents, whether living on the shorefront or further back, do not believe that individual property owners affected by erosion should bear full financial responsibility for shore protection measures, despite in many cases having made fully-informed decisions to take on the risks.

5.2 Concluding comments

In general, the findings of this study indicate that there is good philosophical support in coastal communities for 'living with natural processes' as opposed to 'holding the line', at least among participants in this study. Opportunities exist to build this understanding throughout the wider community, and to promote more natural management options that reflect this paradigm. How exactly this could be done still requires further investigation. While people may philosophically agree with certain approaches, practical implementation may not be as straightforward (e.g. dune planting may not be appropriate in certain areas as a way of managing erosion). However, such a philosophical basis provides a good starting point to work with communities to address coastal erosion problems in ways that reflect being able to 'live with natural processes' rather than using a 'hold the line' approach as the first or only option.

A key finding that has arisen as part of this work is that community members value both naturalness and access to the coast. There is a need to work with communities to better understand the type of naturalness they wish to maintain, the types of access that are acceptable, whether these vary depending on the stretch of coast in question, and what compromises might need to be made to satisfy both of these requirements. A better understanding of these issues will assist with future planning for the coastal area, assist with educational efforts for the coast, and ultimately ensure community needs are met.

The surveys show that people with direct experience of coastal matters, long-term experience of living on the coast, or general environmental experience are more likely to have a better understanding of the coastal environment and to prefer natural approaches to management. Opportunities exist to harness such experience for use in future coastal planning. For example, existing coastal or environmental groups could be specifically involved in providing input into plans and strategies. They may also provide a conduit for educational activities and assist in increasing the public's understanding about coastal issues. Likewise long-term local residents and property holders should be involved in planning for the future as much as possible. Research shows that the earlier and more involved people are in such a process, then the more

likely it is that better and timelier environmental outcomes will be reached (Blackett and Hume, 2006).

Finally, in terms of undertaking coastal erosion mitigation, many survey respondents indicate that they are not averse to cost-sharing arrangements. There are opportunities to investigate this idea further with communities, to see how such arrangements might work in practice.

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7 Appendices

7.1 Appendix 1: Postal questionnaires for Tairua and Waihi Beach

Managing our coast

Questionnaire
January 2007

Coastal management questionnaire

We are interested in your views on how we manage our coasts. This information is part of a national project conducted by GNS Science and NIWA to help agencies with responsibilities for coastal management better understand the views and values of communities.

The first set of questions concerns the property that this questionnaire was delivered to.

1. Choose the option that best describes your situation: (tick one option only)

   ☐ 1 Permanent resident, own this property
   ☐ 2 Permanent resident, renting this property
   ☐ 3 Visitor, own this property (e.g. if it is your bach or holiday home)
   ☐ 4 Visitor, don't own this property
   ☐ 5 Other (please describe) _____

2. If you **own** this property, how long ago did you buy it? (tick one option only)

   ☐ 1 Less than 1 year
   ☐ 2 Between 1 year and 5 years
   ☐ 3 Between 5 years and 10 years
   ☐ 4 More than 10 years

3. If you are a **visitor**, where do you normally live? _____

4. Thinking of the past couple of years, which option best describes how often you visit **Tairua's Ocean Beach**? (tick one option only)

   ☐ 1 Once a day or more, year-round
   ☐ 2 Once a day or more, but more in summer than in winter
   ☐ 3 Once a week or so, year-round
   ☐ 4 Once a week or so, but more in summer than in winter
   ☐ 5 Once a month or so
   ☐ 6 Two or three times a year
   ☐ 7 Once a year or less

5. What do you value about the coast? (Please tick the option in each row that best matches your view)

	Very important (1) ← → Not Important (5)				
Appearance of the beach and dunes (whether or not they are natural, etc)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Good recreational facilities in general (e.g. boat ramps, reserves, etc)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
A dry beach at high tide levels for recreational activities, such as sun bathing and sports	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Easy access onto the beach	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Walking access along the full length of the beach at high tide	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Protection of iwi / Māori values	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Retaining some undeveloped, natural beaches around the coast	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Retaining some undeveloped, natural headlands around the coast	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Protection of scenic values when looking out over the beach and toward the sea	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Protection of scenic values when looking inland (e.g. towards houses or the surrounding landscape)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
The involvement of local people in decision-making about the coast	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
The involvement of people who do not live locally in decision-making about the coast	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Protecting beachfront property, even if it means losing the sandy beach	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Good fishing and shellfish gathering	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Your suggestions on what you value about the coast…please describe.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

The next set of questions asks about your awareness and experience of natural hazards in general.

6. Which are the **two** natural hazards you consider most likely to affect Tairua?

- ☐ 1 Flooding (river or sea)
- ☐ 2 Storm or cyclone with high winds
- ☐ 3 Forest or bush fire
- ☐ 4 Earthquake **Tick two only.**
- ☐ 5 Ash fall from a volcanic eruption
- ☐ 6 Tsunami
- ☐ 7 Coastal erosion
- ☐ 8 Landslide

7. Have you ever (a) personally experienced any of the following hazards in the past, and (b) suffered loss or damage as a result? (tick all that apply)

	I've had personal experience of:	**I've experienced loss/damage due to:**
Flooding (river or sea)	☐ 1	☐ 1
Storm or cyclone with high winds	☐ 2	☐ 2
Forest or bush fire	☐ 3	☐ 3
Earthquake	☐ 4	☐ 4
Ash fall from a volcanic eruption	☐ 5	☐ 5
Tsunami	☐ 6	☐ 6
Coastal erosion	☐ 7	☐ 7
Landslide	☐ 8	☐ 8

Please give details here: _____

_____

The questionnaire now moves on to coastal erosion and its management. Coastal erosion is common around New Zealand's coastline, but is most noticeable and causes problems when property is threatened. This can include public assets such as roads and parks, and also private property.

8. What do you think is the main cause of coastal erosion? (tick one option only)

- ☐ 1 Changes in the sand supply to the beach
- ☐ 2 Storms
- ☐ 3 Sea level rise
- ☐ 4 Other cause (please describe) _____
- ☐ 5 Don't know

9. For each of the following statements do you agree or disagree? (please tick one option in each row)

	Strongly Agree (1) ←				→ Strongly Disagree (5)	Don't Kn
Inappropriate development in coastal areas can put houses at risk from erosion	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
We must accept that erosion is a natural process at the coast	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
There are a range of methods available to stop coastal erosion indefinitely	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
The width of the dune changes during the year	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
Once a dune is destroyed there's no way to bring it back	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6

The next few questions are about managing erosion.

10. **In general**, which forms of coastal erosion management do you approve of? (tick all that apply)

☐ 1 Dune planting (to restore or maintain an adequate buffer zone)
☐ 2 Construction of seawalls and rock walls
☐ 3 Beach nourishment (adding extra sand)
☐ 4 Moving of buildings back from the beachfront (managed retreat)
☐ 5 Doing nothing (i.e. letting the sea dictate)
☐ 6 Other options (please describe) _____

11. In general, which of the above options do you consider to be the best **long term** approach for managing erosion (i.e. over the next 50 -100 years)? Please write the option number from above and briefly state the reasons why you chose this option.

_____

_____

_____

_____

With respect to managing erosion, please tick the statement you think best follows on from the starting sentence.

12. A good cover of plants on dunes… (tick one option only)

- ☐ 1 Stops the beach eroding because their roots keep the sand from being washed away in storms
- ☐ 2 Helps build up sand reserves by stopping it from blowing away, making a store of sand
- ☐ 3 Won't help with beach erosion as the dunes come and go with the tides and winds
- ☐ 4 Protects buildings built on dunes from erosion
- ☐ 5 Unsure

13. Building a seawall on a sandy beach… (tick one option only)

- ☐ 1 Protects beach-front properties from erosion indefinitely
- ☐ 2 Only provides limited protection to the properties behind it
- ☐ 3 Provides protection for properties immediately to the sides of the seawall
- ☐ 4 Protects properties behind it from storm events of any size
- ☐ 5 Unsure

14. The effect a seawall has on the natural behaviour of a sandy beach… (tick one option)

- ☐ 1 Is limited to the beach in front of the seawall
- ☐ 2 Doesn't change the width of the beach
- ☐ 3 Doesn't increase the effects of coastal erosion along other parts of the beach
- ☐ 4 Can increase the effects of coastal erosion along other parts of the beach
- ☐ 5 Unsure

15. **In general**, who do you think should fund coastal erosion control measures where **private property** is at risk? (tick all that apply)

- ☐ 1 Private owners whose property is at risk
- ☐ 2 Local communities or towns
- ☐ 3 District community (e.g. via District Council rates)
- ☐ 4 Regional community (e.g. via Regional Council rates)
- ☐ 5 Central government (via taxes)
- ☐ 6 Other (please describe) _____

16. **In general**, who do you think should fund coastal erosion control measures where **public property** (e.g. reserves and roads) is at risk? (tick all that apply)

- ☐ 1 Private property owners living nearby (e.g. at risk of losing road access)

☐ 2 Local communities or towns
☐ 3 District community (e.g. via District Council rates)
☐ 4 Regional community (e.g. via Regional Council rates)
☐ 5 Central government (via taxes)
☐ 6 Other (please describe) _____

17. Please tell us any thoughts you have on your choices for questions 15 and 16:

_____

18. Currently, how much of a threat is coastal erosion to **Tairua's Ocean Beach**? (tick one option only)

☐ 1 A severe threat
☐ 2 A moderate threat
☐ 3 A minor threat
☐ 4 Not a threat

19. Thinking about the property that this survey was delivered to, on what timescale is coastal erosion likely to affect this property directly? (tick one option only)

☐ 1 Already affects this property
☐ 2 Likely to affect this property within 10 years
☐ 3 Likely to affect this property within 50 years
☐ 4 Unlikely to affect this property within 50 years

Only respondents who <u>own the property</u> where the questionnaire was delivered should answer questions 20 and 21. All others please skip to question 22.

20. What consideration did you give to coastal erosion issues when you bought this property? (please describe)

_____

21. Have you seen a map of development setback lines for Tairua's Ocean Beach?

☐ 1 Yes
☐ 2 No

The next set of questions (22 to 31) are concerned with the management of coastal erosion at Tairua's Ocean Beach.

At Tairua's Ocean Beach, local people together with assistance from the district and regional councils have worked to maintain a sand dune buffer by planting sand-binding grasses and creating well-defined access-ways (see the photograph above).

22. Are you familiar with the dune buffer at Tairua's Ocean Beach?

☐ 1 Yes
☐ 2 No

If you answered 'no' to question 22, please skip ahead to question 32 (demographic information). Otherwise please continue.

23. How do you rate the success of this approach in addressing the current erosion problems at Tairua's Ocean Beach? (tick one option only)

☐ 1 Very successful
☐ 2 Quite successful
☐ 3 Not very successful
☐ 4 Don't know

24. Do you think that the dune buffer approach is a good long-term solution for coastal erosion at Tairua's Ocean Beach? (tick one option only)

☐ 1 Yes
☐ 2 Unsure/too soon to tell
☐ 3 No

25. Do you think a different management approach would have worked better?

☐ 1 Yes
☐ 2 No (go to question 27)

26. If you answered 'yes' to question 25, what do you think would have been a better approach?

_____

_____

27. What do you think are the main advantages and disadvantages of Tairua's erosion management approach (dune buffer)? (list up to three of each)

Advantages:

1._____
2._____
3._____

Disadvantages:

1. _____
2. _____
3. _____

28. With respect to the dune buffer approach to erosion control at Tairua's Ocean Beach, please consider the following statements and tick the box on each line that best describes your attitude:

(1) Agree strongly ← → Disagree strongly (5)

This approach is visually attractive	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
The beach's natural character has been adversely affected by this approach	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
The approach is a good solution to Tairua's erosion problems	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
I feel positive towards the approach taken toward erosion management at Tairua's Ocean Beach.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
The approach will help protect my property	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
It is unfair to 'let the sea dictate' (ie do nothing) when people's properties are at risk	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

29. Has your usage of the beach been affected by the dune buffer zone?

☐ 1 Positively affected (how?) _____
☐ 2 Much the same as before
☐ 3 Negatively affected (how?) _____

The following questions concern the extent to which local people were involved with the decision-making process for the current erosion control approach.

30. Thinking back to **before** the current planting and dune buffer maintenance programme began, did you personally… (tick all that apply)

- ☐ 1 Attend any public meetings about the proposed approach
- ☐ 2 Participate in any focus groups or interviews
- ☐ 3 Complete a survey (e.g. a questionnaire or phone survey)
- ☐ 4 Make submissions about the proposed approach (e.g. to council)
- ☐ 5 Receive any information about the approach (e.g. flyers, newspapers, articles etc.). If yes, please describe_____
- ☐ 6 Actively seek information about the approach. If yes, please describe _____
- ☐ 7 Other (please describe) _____
- ☐ 8 I was aware the approach was being proposed, but wasn't involved in any way
- ☐ 9 I was not aware the approach was being proposed (if so, skip to question 32)

31. Once again, think back to **before** the current planting and dune buffer maintenance programme began. Please indicate how much you agree or disagree with the following statements (tick one for each line).

	(1) Agree strongly ←			→ Disagree strongly (5)
I expected the scheme to look different to how it looks now	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
I expected the scheme to have less impact on how the beach looks now	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
I expected the scheme to have less impact on my use of the beach	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
I was well aware of the impacts of the scheme	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
I would have liked more opportunities to become involved in decision making before the scheme was put in place	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
There was an adequate amount of information available about the proposed scheme	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
I was not interested in the scheme before it was implemented	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

The final set of questions concerns information about yourself. This information will be treated with complete confidence, and we will only report on general trends. We need this information to determine how representative our sample is of the general population in Tairua.

32. Are you?

- ☐ 1 Male
- ☐ 2 Female

33. Which best describes the situation you are living in now? (tick one option only)

- ☐ 1 Family with children
- ☐ 2 Family without children
- ☐ 3 Alone
- ☐ 4 With non-family
- ☐ 5 Other (please specify) _____

34. Which ethnic group do you belong to? (tick one option only)

- ☐ 1 New Zealand European
- ☐ 2 Māori
- ☐ 3 Pacific Island
- ☐ 4 Chinese
- ☐ 5 Indian
- ☐ 6 Other (please state)

35. In what year were you born? _____

36. What is your current employment status? (tick one option only)

- ☐ 1 Employed full-time
- ☐ 2 Employed part-time
- ☐ 3 Not in paid employment (e.g. if you are retired or an at-home parent)
- ☐ 4 Self-employed

37. What was your gross household income for 2006 before tax is removed?

- ☐ 1 Under $5,000
- ☐ 2 $5,000 to $15,000
- ☐ 3 $15,001 to $20,000
- ☐ 4 $20,001 to $30,000
- ☐ 5 $30,001 to $40,000
- ☐ 6 $40,001 to $50,000
- ☐ 7 $50,001 to $60,000
- ☐ 8 $60,001 to $90,000
- ☐ 9 $90,001 to $150,000
- ☐ 10 $150,001 to $200,000
- ☐ 11 Over $200,001

38. What is your highest educational qualification?

☐ 1 No school qualifications
☐ 2 Secondary school qualifications
☐ 3 Trade certificate or professional certificate or diploma
☐ 4 University undergraduate degree (such as a diploma or bachelors degree)
☐ 5 University postgraduate degree (such as a masters degree or doctorate)

39. Have you had any experience with environmental matters (e.g. have you been involved in activities, groups or employment related to the environment)?

☐ 1 Yes (please describe) _____
☐ 2 No

40. Please use this space to write any other comments regarding erosion management for Tairua's Ocean Beach, coastal management in general, or this survey. All remarks will be useful.

_____

_____

_____

_____

_____

_____

_____

Thank you for taking the time to complete this questionnaire.

Please post the questionnaire in the envelope provided.

Managing our coast

Questionnaire

January 2007

Coastal management questionnaire

We are interested in your views on how the coast is managed, as part of a national project conducted by GNS Science and NIWA. Information from this project will be used by agencies with responsibilities for coastal management.

The first set of questions concerns the property that this questionnaire was delivered to.

1. Choose the option that best describes your situation: (tick one option only)

- ☐ 1 Permanent resident, own this property
- ☐ 2 Permanent resident, renting this property
- ☐ 3 Visitor, own this property (e.g. if it is your bach or holiday home)
- ☐ 4 Visitor, don't own this property
- ☐ 5 Other (please describe) _____

2. If you **own** this property, how long ago did you buy it? (tick one option only)

- ☐ 1 Less than 1 year
- ☐ 2 Between 1 year and 5 years
- ☐ 3 Between 5 years and 10 years
- ☐ 4 More than 10 years

3. If you are a **visitor**, where do you normally live? _____

4. Thinking of the past couple of years, which option best describes how often you visit **the beach** at Waihi Beach? (tick one option only)

- ☐ 1 Once a day or more, year-round
- ☐ 2 Once a day or more, but more in summer than in winter
- ☐ 3 Once a week or so, year-round
- ☐ 4 Once a week or so, but more in summer than in winter
- ☐ 5 Once a month or so
- ☐ 6 Two or three times a year
- ☐ 7 Once a year or less

5. What do you value about the coast? (Please tick the option in each row that best matches your view)

	Very important (1) ◄——► Not Important (5)				
Appearance of the beach and dunes (whether or not they are natural, etc)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Good recreational facilities in general (boat ramps, reserves, etc)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
A dry beach at high tide levels for recreational activities, such as sun bathing and sports	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Easy access onto the beach	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Walking access along the full length of the beach at high tide	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Protection of iwi / Māori values	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Retaining some undeveloped, natural beaches around the coast	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Retaining some undeveloped, natural headlands around the coast	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Protection of scenic values when looking out over the beach and toward the sea	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Protection of scenic values when looking inland (e.g. towards houses or the surrounding landscape)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
The involvement of local people in decision-making about the coast	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
The involvement of people who do not live locally in decision-making about the coast	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Protecting beachfront property, even if it means losing the sandy beach	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Good fishing and shellfish gathering	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Your suggestions on what you value about the coast…please describe.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

The next set of questions asks about your awareness and experience of natural hazards in general.

6. Which are the **two** natural hazards you consider most likely to affect Waihi Beach?

- ☐ 1 Flooding (river or sea)
- ☐ 2 Storm or cyclone with high winds
- ☐ 3 Forest or bush fire
- ☐ 4 Earthquake
- ☐ 5 Ash fall from a volcanic eruption
- ☐ 6 Tsunami
- ☐ 7 Coastal erosion
- ☐ 8 Landslide

Tick two only.

7. Have you ever (a) personally experienced any of the following hazards in the past, and (b) suffered loss or damage as a result? (tick all that apply)

	I've had personal experience of:	**I've experienced loss/damage due to:**
Flooding (river or sea)	☐ 1	☐ 1
Storm or cyclone with high winds	☐ 2	☐ 2
Forest or bush fire	☐ 3	☐ 3
Earthquake	☐ 4	☐ 4
Ash fall from a volcanic eruption	☐ 5	☐ 5
Tsunami	☐ 6	☐ 6
Coastal erosion	☐ 7	☐ 7
Landslide	☐ 8	☐ 8

Please give details here: _____

_____

The questionnaire now moves on to coastal erosion and its management. Coastal erosion is common around New Zealand's coastline, but is most noticeable and causes problems when property is threatened. This can include public assets such as roads and parks, and also private property.

8. What do you think is the main cause of coastal erosion? (tick one option only)

- ☐ 1 Changes in the sand supply to the beach
- ☐ 2 Storms
- ☐ 3 Sea level rise
- ☐ 4 Other cause (please describe) _____
- ☐ 5 Don't know

9. For each of the following statements do you agree or disagree? (Please tick the option in each row that best matches your view)

	Strongly Agree (1) ← → Strongly Disagree (5)					Don't Know
Inappropriate development in coastal areas can put houses at risk from erosion	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
We must accept that erosion is a natural process at the coast	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
There are a range of methods available to stop coastal erosion indefinitely	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
The width of the dune changes during the year	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
Once a dune is destroyed there's no way to bring it back	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6

The next few questions are about managing erosion.

10. **In general**, which forms of coastal erosion management do you approve of? (tick all that apply)

☐ 1 Dune planting (to restore or maintain a sand dune buffer)
☐ 2 Construction of seawalls and rock walls
☐ 3 Beach nourishment (adding extra sand)
☐ 4 Moving of buildings back from the beachfront (managed retreat)
☐ 5 Doing nothing (i.e. letting the sea dictate)
☐ 6 Other options (please describe) _____

_____

11. **In general**, which of the above options do you consider to be the best **long term** approach for managing erosion (i.e. over the next 50 -100 years)? Please write the option number from above and briefly state the reasons why you chose this option.

_____

_____

_____

_____

With respect to managing erosion, please tick the statement you think best follows on from the starting sentence.

12. A good cover of plants on dunes… (tick one option only)

- ☐ 1 Stops the beach eroding because their roots keep the sand from being washed away in storms
- ☐ 2 Helps build up sand reserves by stopping it from blowing away, making a store of sand
- ☐ 3 Won't help with beach erosion as the dunes come and go with the tides and winds
- ☐ 4 Protects buildings built on dunes from erosion
- ☐ 5 Unsure

13. Building a seawall on a sandy beach… (tick one option only)

- ☐ 1 Protects beach-front properties from erosion indefinitely
- ☐ 2 Only provides limited protection to the properties behind it
- ☐ 3 Provides protection for properties immediately to the sides of the seawall
- ☐ 4 Protects properties behind it from storm events of any size
- ☐ 5 Unsure

14. The effect a seawall has on the natural behaviour of a sandy beach… (tick one option only)

- ☐ 1 Is limited to the beach in front of the seawall
- ☐ 2 Doesn't change the width of the beach
- ☐ 3 Doesn't increase the effects of coastal erosion along other parts of the beach
- ☐ 4 Can increase the effects of coastal erosion along other parts of the beach
- ☐ 5 Unsure

15. **In general**, who do you think should fund coastal erosion control measures where **private property** is at risk? (tick all that apply)

- ☐ 1 Private owners whose property is at risk
- ☐ 2 Local communities or towns
- ☐ 3 District community (e.g. via District Council rates)
- ☐ 4 Regional community (e.g. via Regional Council rates)
- ☐ 5 Central government (via taxes)
- ☐ 6 Other (please describe) _____

16. **In general**, who do you think should fund coastal erosion control measures where **public property** (e.g. reserves and roads) is at risk? (tick all that apply)

- ☐ 1 Private property owners living nearby (e.g. at risk of losing road access)
- ☐ 2 Local communities or towns
- ☐ 3 District community (e.g. via District Council rates)
- ☐ 4 Regional community (e.g. via Regional Council rates)
- ☐ 5 Central government (via taxes)
- ☐ 6 Other (please describe) _____

17. Please tell us any thoughts you have on your choices for questions 15 and 16:

_____

_____

18. Currently, how much of a threat is coastal erosion to **Waihi Beach**? (tick one option only)

- ☐ 1 A severe threat
- ☐ 2 A moderate threat
- ☐ 3 A minor threat
- ☐ 4 Not a threat

19. Thinking about the property that this survey was delivered to, on what timescale is coastal erosion likely to affect this property directly? (tick one option only)

- ☐ 1 Already affects this property
- ☐ 2 Likely to affect this property within 10 years
- ☐ 3 Likely to affect this property within 50 years
- ☐ 4 Unlikely to affect this property within 50 years

Only respondents who own the property where the questionnaire was delivered should answer questions 20 and 21. All others please skip to question 22.

20. What consideration did you give to coastal erosion issues when you bought this property? (please describe)

_____

_____

_____

21. Have you seen any hazard maps for coastal erosion at Waihi Beach?

☐ 1 Yes
☐ 2 No

The next set of questions (22 to 31) are concerned with the management of coastal erosion at Waihi Beach.

Rock wall, Waihi Beach

Currently, a combination of different approaches is used for coastal protection at Waihi Beach. Rock walls (such as the one shown in the photo above) have been placed in front of beachfront properties along Shaw Rd and the Loop.

In other areas, seawalls have been removed and replanted with native dune plants to help build up sand dunes.

An example of this programme in Coronation Park is shown on the next page.

Coronation Park, Waihi Beach (Photographs: Coastcare, Environment Bay of Plenty)

July 2000
Sea wall removed, and planting undertaken in winter 2003.
Rocks were left on the beach.

October 2006
Rocks are now buried by the accreted white sand, raising
the beach profile and improving dune resilience.

22. Please consider each of the following statements and tick the box on each line that best describes your attitude:

	(1) Agree strongly ←				→ Disagree strongly (5)
I am happy with the 'package' of coastal protection measures used at Waihi Beach	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
The current approach to managing coastal erosion at Waihi Beach benefits everyone	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Rock walls are the best long-term approach to protecting beachfront properties at Waihi Beach	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Sand dunes are the best long-term approach to protecting beachfront properties at Waihi Beach	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
The rock walls spoil the natural character of Waihi Beach	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
There are plenty of public accessways to the beach	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
I like the appearance of the sand dune buffer zones at Waihi Beach	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

	(1) Agree strongly ← → Disagree strongly (5)				
I would be happy to see more removal of rock walls and replacement by dune planting programmes at Waihi Beach	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
It is unfair to 'let the sea dictate' (i.e. do nothing) when people's properties are at risk	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Managed retreat - moving of buildings back from the beachfront is the best long-term approach to protecting beachfront residences at Waihi Beach	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

23. How do you rate the success of dune buffer zones in addressing any current erosion problems at Waihi Beach? (tick one option only)

☐ 1 Very successful
☐ 2 Quite successful
☐ 3 Unsuccessful
☐ 4 Don't know

24. How do you rate the success of rock walls in addressing any current erosion problems at Waihi Beach? (tick one option only)

☐ 1 Very successful
☐ 2 Quite successful
☐ 3 Unsuccessful
☐ 4 Don't know

25. Has your usage of the beach been affected by the dune buffer zones?

☐ 1 Positively affected (how?) _____
☐ 2 Much the same as before
☐ 3 Negatively affected (how?) _____

26. Has your usage of the beach been affected by the rock walls?

☐ 1 Positively affected (how?) _____
☐ 2 Much the same as before
☐ 3 Negatively affected (how?) _____

27. If you have any other comments about coastal protection at Waihi Beach, please write them here:

_____

_____

_____

28. This question refers specifically to the rock wall along the Shaw Rd beachfront. This wall was originally built in 1968, and rebuilt during the 1970s. Since then, more large boulders have been added to the wall.
Can you remember back to how the beach looked **before** the wall was built?

☐ 1 Yes (please answer question 29)
☐ 2 No (please skip to question 30)

29. Thinking back to **before** the rock wall was put in place, please indicate how much you agree or disagree with the following statements (Please tick the option in each row that best matches your view).

	(1) Agree strongly ←				→ Disagree strongly (5)
I expected the wall to look different to how it looks now	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
I expected the wall to have less impact on how the beach looks now	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
I expected the wall to have less impact on my use of the beach	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
I would have liked more opportunities to become involved in decision-making before the wall was put in place	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
There was an adequate amount of information available about the proposed wall	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
The rock wall hasn't had much effect on the beach in front of it	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
It was a good idea to build the rock wall	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

30. Have you participated in any decision-making processes (e.g. public meetings, making a submission) with respect to coastal protection at Waihi Beach?

☐ 1 Yes (please describe) _____
☐ 2 No

31. Do you think there have been enough opportunities for the public to be involved with options for coastal protection at Waihi Beach?

☐ 1 Yes
☐ 2 No (please add here any suggestions you have for increasing public input)

_____

_____

The final set of questions concerns information about yourself. This information will be treated with complete confidence, and we will only report on general trends. We need this information to determine how representative our sample is of the general population in Waihi Beach.

32. Are you?

- ☐ 1 Male
- ☐ 2 Female

33. Which best describes the situation you are living in now? (tick one option only)

- ☐ 1 Family with children
- ☐ 2 Family without children
- ☐ 3 Alone
- ☐ 4 With non-family
- ☐ 5 Other (please specify) _____

34. Which ethnic group do you belong to? (tick one option only)

- ☐ 1 New Zealand European
- ☐ 2 Māori
- ☐ 3 Pacific Island
- ☐ 4 Chinese
- ☐ 5 Indian
- ☐ 6 Other (please state) _____

35. In what year were you born? _____

36. What is your current employment status? (tick one option only)

- ☐ 1 Employed full-time
- ☐ 2 Employed part-time
- ☐ 3 Not in paid employment (e.g. If you are retired or an at-home parent)
- ☐ 4 Self-employed

37. What was your gross household income for 2006 before tax is removed?

- ☐ 1 Under $5,000
- ☐ 2 $5,000 to $15,000
- ☐ 3 $15,001 to $20,000
- ☐ 4 $20,001 to $30,000
- ☐ 5 $30,001 to $40,000
- ☐ 6 $40,001 to $50,000
- ☐ 7 $50,001 to $60,000
- ☐ 8 $60,001 to $90,000
- ☐ 9 $90,001 to $150,000
- ☐ 10 $150,001 to $200,000
- ☐ 11 Over $200,001

38. What is your highest educational qualification?

☐ 1 No school qualifications
☐ 2 Secondary school qualifications
☐ 3 Trade certificate or professional certificate or diploma
☐ 4 University undergraduate degree (such as a diploma or bachelors degree)
☐ 5 University postgraduate degree (such as a masters degree or doctorate)

39. Have you had any experience with environmental matters (e.g. have you been involved in activities, groups or employment related to the environment)?

☐ 1 Yes (please describe) _____
☐ 2 No

40. Please use this space to write any other comments regarding erosion management for Waihi Beach, coastal management in general, or this survey. All remarks will be useful.

_____

_____

_____

_____

_____

_____

_____

Thank you for taking the time to complete this questionnaire.

Please post the questionnaire in the envelope provided.

7.2 Appendix 2

List of cross-tabulation tables (available in the format of Excel files from the Waikato Regional Council)

Table	Q5 vs	Valued attributes.xls
A1	Q1	Valued attributes versus property ownership status and residency
A2	Q2	Valued attributes versus length of property ownership
A3	Q1	Valued attributes versus whether residents or visitors
A4	Q5	'Easy access to the beach' versus 'Retaining some natural undeveloped beaches around the coast'
A5	Q5	'Protecting beachfront property, even if it means losing the sandy beach' versus 'Walking access along the full length of the beach at high tide'
A6	Q10	Valued attributes versus general management preferences
A7	Q12	Valued attributes versus knowledge about dune processes
A8	Q13	Valued attributes versus knowledge about seawalls
A9	Q14	Valued attributes versus knowledge of seawall effects on sandy beaches
A10	Q23	Valued attributes versus views on success of dune buffer scheme used at Tairua's Ocean Beach
A11	Q24	Valued attributes versus views on whether dune buffer is a good long-term approach to coastal management at Tairua's Ocean Beach
A12	Q22	Valued attributes versus views on whether erosion control approach at Waihi beach benefits everyone
A13	Q22	Valued attributes versus views on rock walls and sand dunes at Waihi Beach
A14	Q23	Valued attributes versus views on the success of dune buffer zones at managing erosion at Waihi Beach
A15	Q24	Valued attributes versus views on the success of rock walls at managing erosion at Waihi Beach
A16	Q25	Valued attributes versus effects of dune buffer zone on beach usage
A17	Q26	Valued attributes versus effects of rock walls on beach usage
A18	Q30	Valued attributes versus views on decision-making process at Waihi Beach
A19	Q32	Valued attributes versus gender
A20	Q33	Valued attributes versus living situation
A21	Q35	Valued attributes versus age
A22	Q36	Valued attributes versus employment status
A23	Q37	Valued attributes versus income
A24	Q38	Valued attributes versus educational status
A25	Q39	Valued attributes versus 'environmental experience'
	Q9 vs	**Perceptions of coastal processes**
A26	Q10	Perceptions of coastal processes versus management preferences
A27	Q11	Perceptions of coastal processes versus preferred long-term options for erosion management
A28	Q12	Perceptions of coastal processes versus specific knowledge on dune processes
A29	Q13	Perceptions of coastal processes versus knowledge about seawalls
A30	Q14	Perceptions of coastal processes versus specific knowledge about seawalls
A31	Q1	Perceptions of coastal processes versus ownership and residency
A32	Q1	Perceptions of coastal processes versus resident/visitor

A33	Q2	Perceptions of coastal processes versus length of property ownership
A34	a	Perceptions of coastal processes versus proximity to beachfront
A35	Q7	Perceptions of coastal processes versus respondents' previous experiences with coastal erosion
A36	Q8	Perceptions of coastal processes versus respondents' views on the main cause of coastal erosion
A37	Q18	Perceptions of coastal processes versus respondents' rating of erosion threat to study area
A38	Q19	Perceptions of coastal processes versus respondents; estimation of when erosion is likely to affect their property
A39	Q32	Perceptions of coastal processes versus gender
A40	Q33	Perceptions of coastal processes versus living situation
A41	Q35	Perceptions of coastal processes versus age
A42	Q36	Perceptions of coastal processes versus employment status
A43	Q37	Perceptions of coastal processes versus income
A44	Q38	Perceptions of coastal processes versus educational achievements
A45	Q39	Perceptions of coastal processes versus 'environmental experience'
	Q10 vs	**Management preferences**
A46	Q1	Management preferences versus ownership and residency
A47	Q1	Management preferences versus resident/visitor
A48	Q2	Management preferences versus length of property ownership
A49	a	Management preferences versus proximity to beachfront
A50	Q9b and 9c	Management preferences versus perceptions about coastal processess
A51	Q12	Management preferences versus knowledge about dune processes
A52	Q14	Management preferences versus knowledge about seawalls
A54	Q18	Management preferences versus respondents' views of current level of erosion threat to the study location
A55	Q19	Management preferences versus respondents estimation of the timescale on which erosion is likely to affect their property
A56	Q32	Management preferences versus gender
A57	Q33	Management preferences versus living situation
A58	Q37	Management preferences versus income
A59	Q38	Management preferences versus educational achievements
A60	Q39	Management preferences versus 'environmental experience'
	Q15 vs	**Views on how erosion control should be funded**
A61	Q1	Views on how erosion control should be funded versus ownership and residency
A62	a	Views on how erosion control should be funded versus proximity to beachfront
A63	Q5c	Views on how erosion control should be funded versus the importance of 'a dry each at high tide'
A64	Q10	Views on how erosion control should be funded versus general management preferences
A65	Q11	Views on how erosion control should be funded versus ling-term management preferences
A66	Q18	Views on how erosion control should be funded versus perceived level of erosion threat to study location
A67	Q19	Views on how erosion control should be funded versus perceived timescale of erosion threat to respondents' own property
A68	Q32	Views on how erosion control should be funded where private property is under threat versus gender
A69	Q33	Views on how erosion control should be funded where private property

		is under threat versus living situation
A70	Q35	Views on how erosion control should be funded where private property is under threat versus age
A71	Q36	Views on how erosion control should be funded where private property is under threat versus employment status
A72	Q37	Views on how erosion control should be funded where private property is under threat versus income
A73	Q38	Views on how erosion control should be funded where private property is under threat versus educational status
A74	Q39	Views on how erosion control should be funded where private property is under threat versus 'environmental experience'

a This information was determined from GPS coding of delivery locations for questionnaires