Environment Waikato Technical Report 2003/03

Beach User Values and Perceptions of Coastal Erosion.

Final

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Executive Summary

Purpose of Report

This report was commissioned to review available research on both beach user perceptions and values, and perceptions of coastal erosion.

A key finding is that, although beaches are highly valued and utilised resources, beach user opinions and preferences and community perceptions of coastal erosion have only rarely been studied and even more rarely used as a contribution to management.

Nonetheless, some preliminary findings can be drawn from the available work. It should be noted that these findings are largely drawn from overseas literature and primarily based on surveys of beach users of European descent.

Beach Use

Major beach use activities tend to be passive and restful, particularly sunbathing, doing nothing/resting, walking and swimming, with only a relatively small proportion of users engaged in more physically demanding activities.

There is only limited information on temporal variations in beach use, but there appears to be a general trend for highest use in summer, holiday periods, weekends and afternoons.

Most beach users typically spend 2-4 hours on the beach per visit.

Day visitors tend to spend most of their time on the beach, while multiple day visitors tend to spend more time in other activities.

Most beach visitors appear to come in groups of 2-5, the majority of which are family groupings.

Beach User Values and Perceptions

The most important element in the beach experience, for both developed and undeveloped beaches, appears to be the opportunity it gives for tangible, close up contact with nature.

However, in obtaining this contact with nature, some people are more strongly attracted to some areas than to others.
Users visiting developed beaches tend to give a higher priority to facilities, good road access and parking close to the beach. Beaches have to be functional, comfortable, user-friendly and safe.

Users of relatively undeveloped beaches are attracted by their special qualities, including attractive natural settings, views and scenery, peace and quietness, solitude and uniqueness and attach a low priority to improvements in road access, parking or other facilities.

Overall, natural beaches with limited development and without prominent human-made structures score much better than overdeveloped and overcrowded beaches. There is also evidence from various studies of a growing demand for the natural.

Visitors to both developed and undeveloped beaches give a high priority to environmental quality or perceived environmental quality, with water quality and beach cleanliness often rated as the most important characteristics of an ideal beach.

Physical characteristics, including wave conditions, presence or absence of dunes, beach width and the type and quality of the sand rate high in respondents' attributes of an ideal beach, but are far less significant factors in choice of beach to visit.

Sand beaches are markedly preferred over other types, with lighter sand colours generally preferred.

Physical and climatic attributes that affect physical safety (e.g. waves, currents, beach steepness) and comfort (e.g. warmer water and finer sand) are significant factors for users of developed beaches, but relatively insignificant for users of natural or undeveloped beaches.

Accessibility is an important factor in beach choice for day users, with considerable decline in visitation with increasing distance from point of origin. This factor is far less significant for multiple day visitors.

Length of travel is also closely related to the desires and expectations of the users, with people willing to travel greater distance to get to a relatively undisturbed beach environment with higher standards of tranquillity and cleanliness.

Familiarity and tradition appear to be significant factors in beach choice, with visitors tending to return to a beach they have had an association with in the past and have known and visited for many years.
In general, studies have found that most beach users are not sympathetic to vehicles and/or dogs on beaches and want these activities controlled.

Perceptions of Coastal Erosion

Erosion is commonly perceived as being unnatural (a man-induced phenomenon) and often attributed to notable human activities in the area.

Some studies suggest that the coast is perceived as unchanging, often reflected in a desire to stop coastal erosion and to maintain coastal features as they have always known them.

Beachfront residents generally appear to be well aware of the existence of coastal erosion and are usually able to provide reasonably reliable estimates of magnitude.

In general, property owners are not deterred by erosion. Some studies have found that owners purchased beachfront property with full knowledge of the risks and history, finding the risk acceptable because they "want to be there".

Perceptions of Adjustment Options

In general, it appears that coastal erosion is more likely to engender responses than most other hazards.

Beachfront owners tend to use only those adjustments which they perceive as being possible, defined by experience, subjective economic efficacy criteria and legal guidelines. Individuals may not be aware of all strategies for dealing with a hazard and the usual pattern is to repeat remedial activities that have "worked" in the past.

In general, engineering adjustments tend to be preferred by property owners, particularly rock walls, rather than relocating or allowing natural processes to take their course. In many areas, beach nourishment is also highly favoured by beachfront owners and the wider community.

Protection decisions are often generated by crisis erosion conditions and affected individuals can tend to adopt a wide variety of ad hoc adjustments in situations where

coastal structures are poorly regulated or there is a lack of community cohesion or informed technical opinion.

Available studies suggest that the community believes that government has a responsibility for the management of coastal erosion, particularly post-disaster assistance and the control of development in hazardous areas.

Available studies have found a general perception among beachfront property owners that government should largely pay for protection works, while the wider community tends to emphasize the responsibility of property owners.

The perception and management of coastal erosion hazard can be a very “political” process, as there is often a diversity of opinions towards coastal erosion according to differences in experience and training, vested interest, socio-economic/cultural values and other factors.

Various studies have noted that the community and technical risk experts often vary significantly in their selection, definition and perception of risks and that the effective management of environmental hazards depends on reconciliation of these different risk perspectives.

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1 Introduction

1.1 Purpose and Methodology

Environment Waikato commissioned Economos to review available research, both overseas and NZ, on beach use and values and perceptions of coastal erosion.

The work is part of Environment Waikato's Coastal Erosion Project that aims to develop a better understanding of people's perception, use, commitment to and understanding of the coastal environment.

The report is primarily a literature review, supplemented with information from practitioners involved in coastal management in the Waikato and adjacent regions.

The review also includes the preparation of an annotated bibliography.

1.2 Structure of the Report

The report has the following structure:

- Section 2 examines beach use patterns and activities
- Section 3 reviews the various factors influencing beach user preferences
- Section 4 examines the community perception and understanding of coastal erosion and hazard adjustment options
- Section 5 summarises the main findings of the report.

1.3 Waikato Beaches and Coastal Erosion

The Waikato Region has approximately 1,150 km of open coast and estuarine shoreline, which can be broadly subdivided into the East Coast (Coromandel Peninsula and Firth of Thames) and the West Coast (Environment Waikato, 1998).

The Eastern Coromandel is characterised by embayed sandy beaches separated by rocky headlands and cliffs. The western Coromandel and Firth of Thames coastline consists of a variety of coastal environments, including many mixed sand and gravel beaches. The beaches of the East Coast have significant natural and amenity values and are very popular holiday destinations, particularly during summer when populations in coastal areas can expand by up to a factor of 10.

The beaches have also been subject to considerable development pressure, particularly since the 1960's, with 75% of all Coromandel beaches now developed or partially developed (Environment Waikato, 1998; Dahm, 1999a). Much of this development has been located close to the sea and many of the settlements have existing or potential coastal erosion problems (Dahm, 1999a). The management of coastal erosion has traditionally emphasized the use of ad hoc engineering structures, particularly shoreline armouring and this has in some cases led to degradation of beach values and there is increasing conflict between private and public interest and values (Environment Waikato, 1998; Dahm, 1999a; Dahm, 1999b).

The East Coast beaches are recreational assets of regional and importance and are extremely important to the local Coromandel economy.

The beaches of the West Coast are rugged and exposed to high wind and wave energy. These beaches have been subject to considerably less development pressure than the East Coast beaches. Nonetheless, similar erosion hazard problems do occur at some beach settlements (Environment Waikato, 1998; Dahm, 1999a).

West Coast beaches can also attract large numbers of visitors – specifically to get that West Coast experience (Mr G Lowe, FDC, pers. comm., May 2002). This is particularly true of those beaches close to major metropolitan areas with road access. For instance, vehicle counts at Karioitahi Beach, the northern limit of the Waikato Region, suggests this site gets about 588,000 visitors per year (Mr G Lowe, FDC, pers. comm., May 2002).

1.4 Importance of Beaches

The coastal zone is home to over 70% of the world's population and subject to intense and increasing human use pressures, especially beaches and estuaries (Pearce and Kirk, 1986; Fabbri et al, 1990; Agardy, 1993; Beatley et al, 1994; NOAA, 1988; Nelson et al 2000).

In the leisure market, beaches are extremely popular and frequently more highly sought for human outdoor recreation than any other recreational destination.
For instance, an extensive household survey carried out in the Hunter Region of NSW, found that beaches were the most favored recreational area and also the most frequently used (Chapman, 1989). Similarly, work in the UK sampling 542 households in 4 regions of England and Wales, found that beaches were rated more enjoyable than national parks, lakes, rivers, woods, museums, leisure centres or theme parks (Tunstall and Penning-Rowsell, 1998). Other UK work indicated that beaches are twice as popular as visiting villages, perhaps 4 times as popular as visiting country pubs, and 20 times as popular as lay-bys and roadsides (Brotherton, 1982).

The economic importance and values of beaches, particularly that to the American economy has also been well documented (Bell and Leeworthy, 1985; Sam Smith and Piggot, 1989; Finkl, 1996; Anonymous, 1998; Stronge, 2000; Houston, 2002). As Houston concluded: "travel and tourism is America's largest industry, employer, and earner of foreign exchange, and beaches are the largest factor in travel and tourism. Beaches receive more tourist visits than combined visits to all Federal and state parks, recreational areas, and public lands". Many small coastal towns in New Zealand are also very dependent on beaches and other coastal values. For instance, Whitianga on the eastern Coromandel has a strong economic dependence on the approximately 50,000 summer visitors (Envirocare, 2002).

In New Zealand, going to the beach is also a popular recreational activity and has, over time, consolidated into a beach culture and an integral part of New Zealand life (Barnett and Wolfe, 1993; Carlin, 1999). For instance, beaches have consistently rated as the most important contributor to the quality of life in the Auckland region, as determined by the three-yearly environmental awareness surveys conducted by the Auckland Regional Council (Forsyte Research, 2000). A recent study in the Wellington Region, while not specifically addressing beaches, found that the connection with the sea is as strong as connection with the land, except within the Wairarapa (ACNelsen, 2001). Similarly, within the Waikato Region, the coast of the Coromandel Peninsula is a major visitor destination for residents of the Auckland and Waikato Regions, with most of the major holiday settlements located at or near popular beaches. The importance of beaches to New Zealanders was further emphasized by a recent survey of Year 13 (Seventh Form) students in the Tauranga District. When asked, "what do you most love about Tauranga", 75% (255 out of 397) answered "the beaches" were (Mr D Phizacklea, pers. comm., May 2002).

The high human value placed on beaches is also reflected in rapid urbanisation of these areas, worldwide, particularly since World War II and the value of beachfront properties. For instance, many studies have noted the implicit value of property attributes such as, view of, frontage on, and proximity to water contributing to coastal property values with a fall off in property values with distance from the sea (Brown and Pollakowski, 1977; Edwards, 1989; Wertheim *et al*, 1992; Smith, 1994). Hedonic price analysis recently conducted in the US indicated average beachfront property values

ranging from $275,000 (Gulf Coast) to $1,133,000 (Pacific) (Kriesel *et al*, 2001). Within the Waikato Region, beachfront properties along the eastern Coromandel are typically valued at $450-600,000, 3-5 times the value of similar-sized plots well inland from the coast. Similar trends are noted elsewhere. For instance, in Tauranga District, property values in the coastal strip are continuing to rise and recent property sales of beachfront property far exceed government valuation figures (Mr D Phizacklea, pers. comm., May 2002).

The popularity of beaches, "paradise on earth" (Lencek and Bosker, 1998), is resulting in worldwide decline in environmental quality. "All along seashores in the Northern Hemisphere, the British Isles, the Atlantic beaches of Europe and the United States, the American West coast … (and) "Down Under" in Australia, the desire to escape crowded urban areas for seashore vacations has resulted in sprawling colonisation, … the liberating, solitary, spiritually uplifting beaches of the nineteenth century became a thing of the past … with the growing sub urbanisation of the seashore, the beach lost its character as a pristine natural environment" (Lencek and Bosker, 1998, p272-273). A recent assessment of the Australian coastal environment concluded that Australians are "loving the coast to death" (RAC, 1993).

While beaches are a resource that attract and are enjoyed by large numbers of people, they are also among the most mobile landforms, influenced by many factors including waves, wind, currents, sea-level rise, sand supply, and the shape of the shore (Alexander, 1993; Aubrey, 1993; Nicholas, 1995). Coastal erosion is a natural process and part of the natural dynamic behaviour of every beach in the world. However, once a coastal area has been developed and become a home to humans, this natural process can become a hazard and costly.

Coastal erosion is often viewed as not being a serious natural hazard as it poses no direct threat to human life and is a low frequency hazard that tends to affect areas used primarily for recreation (Mitchell, 1974; Furuseth and Ives, 1987). However, serious beach erosion can endanger seafront property and, in extreme cases, even lead to houses toppling into the sea. Coastal erosion and inappropriate management can also generate many other significant "hidden" costs such as psychological and family trauma, social disruption and dislocation, and damage to natural resources and ecosystems (David *et al*, 1999; H. John Heinz III Centre, 2000) and associated economic impacts (Dunn *et al*, 2000). The physical changes associated with coastal erosion or coastal protection works can also change perceptions of the beach and the subjective and economic value of the beach experience (Tunstall and Penning-Rowsell 1998).

Local economic interests often view coastal erosion as a near catastrophic natural hazard and options preferred by property owners may not be the lowest cost or most cost effective or appropriate from a general societal perspective (Furuseth and Ives, 1987). Therefore, worldwide, coastal erosion is becoming an increasingly complex and difficult management issue and an increasing source of conflict, particularly between public and private interests. The best solutions are also often extremely expensive.

These issues are likely to be further exacerbated in the future by ongoing development of coastal areas and aggravation of erosion by changes likely to accompany predicted global warming.

1.5 Importance of Beach User Values and Perceptions

It is clear from preceding sections that beaches are highly valued and highly utilised resources and that coastal erosion issues pose an increasing threat to many of these values.

There is increasing recognition of the need to better understand the behaviour of beach users and their views and preferences. Questions such as who uses the beach and why, different types of beach uses, frequentation, perception and opinion of beach users, the social and environmental factors that influence the use and choice of different types of beaches, user preferences for facilities, influence of level of development, control of beach usage and activities, perceptions of coastal erosion and the factors which lead people to live in hazardous areas and which influence choice of adjustment options.

An understanding of these various questions can help to match public policies to what the public want and accept and to better resolve and balance conflicting interests. Such user-based value information complements “expert” derived coastal management information in the design of coastal policies and action to protect beaches and their values. This information is particularly useful where there is tension between conflicting uses.

Human perception plays a pre-eminent role in structuring the nature of hazard response (Mitchell, 1974). Individuals tend to make decisions based on the perceived environment rather than the real world (Tobin and Mortz, 1997). Therefore, in the management of coastal erosion, it is important understand community perception of this natural process and of the various adjustment options.

However, beach user opinions and preferences, the relationship between the beach and its users and perceptions of coastal erosion have rarely been studied in the past and even more rarely been used as a contribution to management (Mitchell, 1974; Furuseth and Ives, 1984; Chapman, 1989; Breton *et al*., 1996; Morgan, 1999a). Surprisingly, researchers in the UK have also noted that beach-user opinions and preferences are not accounted for in many of the existing beach award systems, some of which also only consider one or only a few of the parameters important to beach users (Williams and Morgan, 1995; Morgan, 1999b).

2 Beaches and Uses

This section reviews existing beach visitor surveys examining the nature and pattern of beach use and the characteristics of beach users.

2.1 Temporal Variations in Beach Use

Daily Variations

Various studies have noted significant variations in beach use during the day, though there seems to be a general trend for highest use in afternoons.

This appears to be particularly the case at popular recreational beaches. For instance, work in the UK by Williams and Sothern (1986) found that over 80% of vehicles arrived in the afternoon period. This was similar to findings in other local recreational areas and probably a function of the weather. In their study of South African beaches, van Herwerden et al (1989) found that beach attendances peaked between 12 noon and 4pm, with 2pm being the busiest time. In a survey of beach use in Barcelona, Breton et al (1996) noted that arrival and departure times in the high use season were very concentrated – with peak arrival times between 10-11 am and 3-4pm and departure peaks at 1pm and between 6-7pm.

In a study of beach use at a relatively isolated and undeveloped site, Spaulding (1973) noted that most people arrived at the beach between 9am and noon, although a significant proportion (about 40%) also arrived between noon and 3pm.

Seasonal Variations in Beach Use

In sub-tropical, temperate and cooler sites, beach use normally peaks during summer - the long, warm and sunny days of summer being more conducive to beach visitation and use than the shorter and often wet and cold days of winter (van Herwerden *et al*, 1989).

However, notwithstanding this, beach visitation is not merely a summer or weekend activity. For instance, Chapman (1989) in his study of Australian beaches noted that of the total number of people who visited the beach in summer, 44% also went in autumn, 24% in winter and 53% in spring.

The strongest seasonal patterns appear to occur at holiday destinations and are marked in areas like the Coromandel, Western Bay of Plenty (Mr G Bridgwater, WBoPDC, pers. comm., May 2002), the island beaches of the Hauraki Gulf (where beach use is associated with boating numbers in the Gulf) (Mr M Paterson, ACC, pers. comm., May 2002) and Mount Maunganui beaches (Mr D Phizacklea, TDC, pers. comm., May 2002).

On the Coromandel Peninsula, the district population increases from about 25,000 to 160-180,000 over summer. Moreover, in some of the more popular beach resorts, such as Whangamata, there is an approximately 10-fold increase in population (Mr Peter Mickleson, Area Manager, TCDC, pers. comm., May 2002). At beach sites in the Western Bay of Plenty, population can increase by 2-2.5 times (Mr G Bridgwater, pers. comm. May 2002).

A survey of Mount Maunganui beaches in 1988 estimated an influx of an additional 20,000 people from outside the district over peak summer period. Isthmus Group (1996) estimated that up to 20,000 people per day visit the Main Beach (Mt Maunganui) over summer (Mr D Phizacklea, pers. comm., May 2002). Traffic count data for beach settlement roads (e.g. Marine Parade) show vehicle numbers treble over summer compared with non-summer periods (Mr D Phizacklea, pers. comm., May 2002).

In beaches within or very close to major metropolitan centres, the seasonal variations, though present, are less marked and beaches are often used fairly regularly throughout the year. For instance, locals primarily use the beaches of Auckland City and although use is greater over the summer, use for passive recreation is fairly constant throughout the year (Mr M Paterson, ACC, pers. comm., May 2002). The same is true of beaches of the North Shore, which are also highly used by people walking for recreation throughout the year (Ms K Coombes, NSCC, pers. comm., May 2002).

This is also true, to a slightly lesser extent, for the beaches of Franklin District, which are relatively close to Auckland. The busiest water activity period is from October through to the end of March, but the beaches are used all year round for various recreational pursuits (Mr G Lowe, FDC, pers. comm., May 2002).

The beaches at Mt Maunganui, Omanu and Papamoa are used year round by local residents for active and passive recreation, including quad bike access for fishing, walking, running as well as for events such as surf life saving, triathlons etc. mainly in February-March of the year (Mr D Phizacklea, pers. comm., May 2002).

When comparing weekly utilisation patterns, differences are evident between holiday and non-holiday periods. For instance, in a study of various sites near a major city, van Herwerden *et al* (1989) noted that, outside the holiday season, weekly counts were much lower than those over weekends, with Saturday showing the maximum attendance.

Time Spent on the Beach/Length of Stay

"A day at the beach" is a popular saying but is perhaps not an accurate description of the length of stay at a beach.

For instance, Spaulding (1973) found that about four hours was the most frequently reported interval spent on the relatively undeveloped Sand Beach on Rhode Island, US.

In a study of popular recreational beaches in Australia, Chapman (1989) found an average stay of 2.6 hours per visit. Studies on Welsh beaches have noted that the majority of respondents stayed or planned to stay for 3-6 hours, with most 3-4 hours (Williams *et al*, 1993; Morgan and Williams, 1995; Young *et al,* 1996). Tunstall and Penning-Rowsell (1998) found that most of the people interviewed at UK beach resorts spent less than 4 hours actually on the beach, most commonly 2-4 hours, with substantial minorities spending only one to two hours. The proportion spending four or more hours at the beach varied from about 20-35%. For Turkish beaches, average planned length of stay was found to be 4.3 hours (Morgan *et al*, 1995).

2.2 Beach Activities

Various studies have examined the nature of activities undertaken at beaches and the characteristics of beach users. This section briefly summarises this work.

Major Beach Use Activities

Various studies have noted that the major activities at beaches tend to be passive, restful beach activities (Spaulding, 1973), the most common being sunbathing, swimming, walking and doing nothing/resting (Chapman, 1989; van Herwerden *et al*, 1989; Breton *et al*, 1996; Tunstall and Penning-Rowsell, 1998; Carr, 1999). Sunbathing generally appears as the favourite activity on beaches (Breton *et al*, 1996). For people who live in metropolitan areas, the beach is seen as an urban space for leisure, fulfilling users' demand for sunbathing and relaxation (Breton *et al*, 1996). Beachcombing has also been noted as a widely appreciated, if low-key, recreational experience in US and Australian beach studies (Field and Cheek, 1974; Kenchington, 1993).

This pattern appears to be consistent between both male and females. In a study of young tourist behaviour in England, Carr (1999) found that the majority of people in both genders cited a desire "to relax" and a wish "to enjoy themselves" as their two most important reasons for having taken a vacation. In contrast, sport/physical activity and visiting new places were not important motivations for either gender.

In most studies, activities such as surfing, off-road vehicles, jet skiing, windsurfing and sports are only engaged in by relatively small proportions of the population (Chapman, 1989; Breton *et al*, 1996; Tunstall and Penning-Rowsell, 1998).

The traditional, almost ritual, beach pursuits of playing in the sand and informal games of family cricket or Frisbee are also a feature of English beach user surveys (Tunstall and Penning-Rowsell, 1998).

There does appear to be some link between beach use and age, as would be expected. In examining the recreational use of beaches in the Metropolitan Region of Barcelona, Spain, Breton *et al* (1996) noted that although people of all ages sunbathe, it is especially important in the 20-29 age group. This work also found that older people tend to like walking while swimming is a more popular activity for young people.

Day Visitors vs. Multi-Day Visitors

Various studies suggest there is a difference in the pattern of beach use between day visitors and those visiting for longer periods.

Tunstall and Penning-Rowsell (1998) found that the great majority of visitors indicated the seaside or the particular beach as the main reason for their visit, with other aspects of the resort (e.g. the town and its facilities, the scenery and places to visit in the surrounding area) less important at almost all locations. Similarly, in their study of Metropolitan beaches in Barcelona, Breton *et al* (1996) found that most weekend beach users spent their time on the beach and had relatively little interaction with the wider township.

The 1998 Lake Erie Beach User Survey (Ohio Sea Grant, 2000) found that beach visitation was the primary destination for single-day visitors, who spend 67% of their trip time on the beach. Multiple-day visitors spent a much greater proportion of their time in other activities, such as visiting family, typically spending about one-quarter (28%) of their trip time at the beach.

The 144,000 annual single day visitors to the 14 beaches contributed a total of $20 million to the local community, or $1.4 million per beach, with more than 50% of the expenditure within 10 miles of each beach (Ohio Sea Grant, 2000).

Visitors on multiple day trips spent more than three times as much, but these visitors engaged in a variety of recreational activities on their multiple day trips, not just beach visitation. Although beaches were not the main attraction for individuals taking longer trips, they played a strong role in the set of recreational activities in which these individuals engaged (Ohio Sea Grant, 2000).

Beach Activity is Group Oriented

It appears that groups dominate beach-visiting patterns (Field and Cheek, 1974; Tunstall and Penning-Rowsell, 1998). Tunstall and Penning-Rowsell (1998) note that this is probably in part a function of transport, with most travelling to the beach in relatively small car-sized groups of two to four, rather than as part of very large social gatherings.

The social experience of visiting a beach is therefore, generally an intimate small group experience. Various workers have observed that these groups are commonly family groupings (Spaulding, 1973; Field and Cheek, 1974; Chapman, 1989; Tunstall and Penning-Rowsell, 1998). For instance, Field and Cheek (1974), in their study of water-based recreation, found that 78% of those observing nature along water areas were with family groups, as were 81% of those visiting a beach or beachcombing (Field and Cheek, 1974). Spaulding (1973) found that beach users tended to come in groups of 2-5 people and that slightly over half of these (52.8%) were family groups.

Field and Cheek, (1974) observed that families without children were more often found on beach areas that were open and unstructured in terms of designated activity spots. Walking, observing beach and animal patterns, and collecting were three of the most common human activities at these sites.

Family with children under ten were the most common family group present where swimming was a designated activity, with adult members of the family providing a measure of control and supervision and seldom engaging in separate activities away from the children (Field and Cheek, 1974).

However, while groups dominate, studies have also noted that people do visit beaches alone (Spaulding, 1973; Chapman, 1989) and that this is an acceptable solitary experience (Tunstall and Penning-Rowsell, 1998). Chapman (1989) found the proportion of visitors who went to the beach as individuals was quite large compared with other recreational settings.

3 Factors Influencing Beach User Preferences

This section briefly summarises available literature related to beach user preferences, drawn from a variety of sources including beach perception surveys, beach-rating systems, use of visual materials (e.g. photographs, filmed panoramas) to examine coastal landscape preferences and relevant leisure studies investigating outdoor recreational behaviour.

The available literature suggests that the major factors which influence beach users preferences include:

- Beach development status
- Environmental quality
- Physical characteristics
- Accessibility and Convenience
- Personal association and familiarity
- Other aspects

Each of these factors is examined in turn in the following sections.

3.1 Beach Development Status

It has been apparent since even the earliest studies that there is considerable variation in the attractive power of different beaches and that some people are more strongly attracted to some areas than others (Hecock, 1970).

The development status of a beach appears to be a very significant factor in such preferences and that users on beaches with different levels of development will desire different characteristics on an ideal beach (e.g. Chapman, 1989; De Ruyck *et al*, 1995).

This section examines the relationship between development levels and beach preferences.

Developed Beaches

The available literature suggests that users preferring or visiting developed beaches tend to do so for reasons related to facilities and services. Beaches are seen as places where one can escape from everyday activities, but they also have to be functional, comfortable, user-friendly and safe (Breton *et al*, 1996).

In their study of South African beaches, De Ruyck *et al* (1995) found that respondents using semi- and highly developed beaches desired a variety of facilities, together with the crowds this attracts. For instance, the most important reasons for visiting Kings Beach, a developed and popular resort, were its facilities, human activity and the accessibility of the beach due to its proximity to the city centre. Other influencing factors included the presence of sufficient lifeguards. Existing facilities were significantly more important for visiting Joorst Park (a medium resort) than Sardina Park (a nature reserve). Extra toilets were one of the most important facilities considered necessary on all three beaches surveyed (De Ruyck *et al*, 1995).

Morgan (1999a) in his study of beach users in Wales also found that a user preference for a commercial beach resort implies a set of priorities, with emphasis on availability of resort facilities overriding desires for scenic beauty. Visitors stating a preference for visiting more developed beaches gave higher priority to “facilities” (particularly toilets, drinking water, shower facilities and chair/sun beds), “access and “parking”.

It appears that preference for more comprehensive refreshment facilities also increased with preference for visiting more commercialised beaches. Highest preference changed from “basic refreshments” for those preferring beaches with no facilities to “cafes with a wide selection of food” for those preferring to visit developed beaches (Morgan, 1999a).

Breton *et al* (1996) in their study of metropolitan Barcelona beaches found that the provision of services on beaches was very important, especially those related to sanitary concerns (cleanliness of sand and water principally), safety (life guards, Red Cross, police) and those which are considered basic amenities (e.g. showers, toilets, telephones). Similar findings were observed in a study on the Turkish coast, where those preferring to visit larger resorts placed higher priority on provision of seating, lifeguards and refreshment facilities (Morgan *et al*, 1995).

The form of action proposed by interviewees to improve beaches tended to emphasize the presence of more lifeguards, Red Cross personal and police. Breton *et al* (1996) concluded that people were, in general, more concerned about health and safety than about nature, aesthetic considerations or overcrowding.

Other services generally considered important were those related to comfort and social relations (bars, deckchairs, etc.), although a considerable number of users totally condemned them, describing them as invaders of the sand and public areas and a source of noise and annoyance (Breton *et al.* (1996).

Breton *et al* (1996) noted that young beach-goers were especially attracted by the presence of facilities for various sports or physical exercise. In contrast, older people, who usually frequent the central section of beaches, openly stated their opposition to zones for ballgames, alleging that they disturb their peace or might cause accidents. Hecock (1970) also found that teenagers tend to visit those beaches with food facilities and crowds.

Interestingly, Breton *et al* (1996) found that the perception of the quality of services was largely equated to quantity - the greater the quantity of any particular amenity on the beach, the higher the quality perceived.

Morgan (1999a) found that users of beach resorts preferred “a wide signposted road” as against other forms of road access, with highest preference given to car parking within 200m of the beach and a level and even engineered (e.g. tarmac) path from the car park to the beach. Similarly, Young *et al* (1996) found that users of more commercialised beaches place a much higher preference on there being a car park within 200 metres of the beach and a road or level concrete/tarmac path on which to access the beach. These results differ significantly from users of undeveloped beaches, as discussed further below.

There is also some evidence that personality traits may affect beach preferences, with extroverted personalities perhaps tending to favour developed rather than undeveloped beaches (Morgan *et al*, 1993). Also, visitors of higher socio-economic class tended to place lower priority on visitor facilities in general (Morgan and Williams, 1995). They were also more critical of deficiencies in facilities, such as shortage of toilets and seating (Williams *et al*, 1993).

Tunstall and Penning-Rowsell (1998) noted that, even at the more highly developed sites, the coastal scenery was an important attractor. It appears that even at these sites, the seemingly “natural” appearance of the coastal landscape – the sea and the shore – is highly appreciated and significant in guiding people’s choices. They note that the natural setting of the beach was an important factor in the choice of the place to visit, even for resort towns, despite the intensive urban development there and the complex system of human made structures which keep the beach in place. They conclude that the sea, the waves pounding on the beach or seawall, the advance and

retreat of the tides, all remain potent symbols of natural forces at work, even where there is much evidence of human intervention.

Interestingly, studies of developed beach resorts in the UK suggest some users still favoured resorts that were regarded by coastal managers and experts as being in decline, with dilapidated facilities. Many of those interviewed saw the beach and seafront as unchanging and this perceived stability appeared to be one of the attractions for beach visitors (Tunstall and Penning-Rowsell, 1998). However, it was also noted that those who perceive seaside resorts to be in decline might no longer choose to visit there. Visitors may also perceive these areas as unchanging because the focus of their perceptions is the beach and the ever-advancing waves and the sea, rather than the facilities behind the seawall (Tunstall and Penning-Rowsell, 1998).

Therefore, there appear to be contradictions and complexities in people's perception of developed beaches. Tunstall and Penning-Rowsell (1998) note that while many users of developed English resorts emphasised a significant contact with nature, the beaches and resorts, which attracted visitors in large numbers, were often artefacts of human intervention (e.g. a coastal scene complete with "prom", hotel, guest houses, beach and sea view).

This is similar to the findings of Cutter *et al* (1979) at Ocean City in eastern US, where "aesthetics" were cited as an important reason for going there. The authors found the emphasis on aesthetics in Ocean City rather surprising considering the groin fields and intensive development. They argued that the aesthetics might be related to the perceived family orientation of the community and the relatively high quality and diversity of the commercial structures along the boardwalk.

Natural or Relatively Undeveloped Sites

Various studies have found that people are attracted to undeveloped beaches because of their special qualities, including attractive natural settings, views and scenery, peace and quietness, solitude and uniqueness (Hecock, 1970; Spaulding, 1973; Morgan *et al,* 1993; De Ruyck *et al*, 1995; Breton *et al*, 1996; Leatherman, 1997; Tunstall and Penning-Rowsell, 1998; Morgan, 1999c; Nordstrom and Mitteager, 2001).

In a survey of a natural, remote Rhode Island beach, Spaulding (1973) found that the solitude of the setting, the natural environment, and the sensory experience while at the beach were reported most frequently as being its greatest benefits. Similarly, Breton *et al* (1996) noted that those users who valued solitude or (less commonly) corporal freedom were usually very sensitive to landscape beauty and natural or unspoiled aspects of beaches. The vast majority of users of the most unspoilt stretches of beach shared these opinions. Tunstall and Penning-Rowsell (1998) found that the attractive natural setting of the undeveloped beach and quietness were key attractors.

Leatherman (1997) evaluated 650 beaches nationwide within the US on the basis of 50 criteria, with a sliding scale to quantify the elusive quality factor. The results revealed that in general, pristine beaches with limited development scored much better than overdeveloped and overcrowded urban resort areas.

In a separate study using a video panorama technique, Morgan (1999c) found a clear preference in all judging groups for beaches without prominent human-made structures. The observed tendency for beaches with prominent human-made structures to attract low scores suggested that minimising the visibility of such structures should be a priority for coastal planners.

Nordstrom and Mitteager (2001) found that natural beauty and cleanliness were mentioned most frequently as reasons why high school students prefer the beach they identified as their favourite. The preference for the natural also carried through to a desire for restoration. When asked whether natural dunes and vegetation that had been eliminated in New Jersey municipalities should be restored, an overwhelming

majority (72%) of students in all schools said “yes”, compared to only 17.6% who answered “no” (Nordstrom and Mitteager, 2001).

A study of metropolitan beaches in Barcelona found a growing consciousness of beaches as natural resources and a call to respect beaches as natural areas, or to maintain specific landscapes (Breton *et al*, 1996). The opinion that beaches should, above all, retain their natural characteristics was the majority view on some undeveloped stretches of beaches, these users placing priority on natural and aesthetic values (presence of dunes, natural vegetation, natural landscape and birds).

Similarly, a survey of several South African beaches noted that the most important reasons given by visitors to relatively undeveloped beaches were that they came to the beach for a “nature” experience, to get away from crowds or to bring their dog for a walk (De Ruyck *et al*, 1995). The authors noted that the fact that these users were prepared to drive longer distances for this type of experience emphasised the need for undeveloped, wilderness beaches close to the cities for those wanting a peaceful encounter with nature.

The growing demand for the natural is also reflected in a recent survey of German tourists. When asked the question: "When thinking about your next holidays, which of the following environmental factors are most important for you?", 50% said "no urbanization of rural areas", and 45.8 % demanded "good nature protection in the holiday destination" (Coastal Guide News, 2002).

Tunstall and Penning-Rowsell (1998) noted that perhaps one of the most important elements in the beach experience is the opportunity it gives for tangible, close up contact with the natural physical world, in a way that many other visits to natural environment do not provide. Similarly, De Ruyck *et al* (1995) found that the beach is perceived as a place to escape from everyday life to a natural environment for a “nature” experience.

Another opinion, expressed mainly by young people, but also by others who used the more undeveloped or relatively inaccessible beaches, is that the beach is, above all, an area of solitude and of corporal freedom – though the latter aspect is not so universally shared as that of solitude (Breton *et al*, 1996).

In his study of Cape Cod beaches, Hecock (1970) found that a frequent response by visitors when questioned about why they came to a particular beach is “I came here to get away from the crowds”. Eastwood and Carter (1981) asked users in Northern Ireland to consider two photographs of beaches and to describe the good and bad aspects of each. The results revealed that most common aspects regarded as “bad” related to “crowding” (52%), “cars” (37%), and “litter” (11%). Crowding also reduces the economic value of a coastal recreational experience, affecting the demand for coastal recreation (McConnell, 1977).

However, perception and tolerance of crowding depends on the kind of beach and on the users (Hecock, 1970; Morgan *et al*, 1993; De Ruyck *et al*, 1995; Breton *et al*, 1996).

For instance, in Barcelona, the users of an undeveloped beach considered it to be crowded, while at more developed beaches higher occupation levels were not seen as a problem (Breton *et al*, 1996). De Ruyck *et al* (1995) also noted that preferred beach user spacing was greatest (further apart) at a nature resort and least (closest) at a highly developed resort.

Morgan *et al* (1993) and Williams *et al* (1993) in their study of UK Glamorgan Heritage Coast beach users observed that beaches with low user density and noise levels (e.g. Nash Beach) appeared to attract an older, introverted clientele interested in aspects such as wildlife, cliff scenery, quiet and solitude and planning relatively short stays. Conversely, the developed Southerndown Beach appeared to attract the younger,

more extrovert beach users, planning a longer stay at the beach (Morgan *et al*, 1993; Williams *et al*, 1993). Hecock (1970) also noted that teenagers and college students seem to express a strong positive reaction to crowding, and indeed thrive upon the close social and physical proximity to other teenagers and college students. “We came here to be with our friends”, “this is where the action is”, “all our friends come here”, were typical responses to questions concerning beach choice by teenagers and college students.

Beach users at relatively undeveloped beaches also generally feel strongly that frequentation of such areas should not be encouraged and that improved access by car would lead to environmental degradation (Morgan, 1999a). Users preferring beaches with no facilities gave highest preference to access by “a narrow road and also preferred car parking “over 200 yards away but within half a mile” (approximately 200m-1km), with lowest preference given to car parking “within 200 yards of the beach”. The users also preferred “a rough path” to other options for beach access from the car park.

A study on the Turkish coast found that those preferring less commercialised beaches were generally concerned about the proximity of industry, commerce and road traffic, factors that detracted from their enjoyment of these beach environments (Morgan *et al*, 1995).

Morgan (1999a) noted that many beach users stating a preference for undeveloped beaches were actually at other types of beaches at the time of the survey. He argued that the apparent inconsistency between actual beach choice and stated beach type preference could be a reflection of conflicts between the actual preferences of the person and the perceived needs of his or her family and/or children.

This appears to be confirmed by Tunstall and Penning-Rowsell (1998), who observed that the more “natural” locations were less attractive to families with young children. Other contributing factors may include knowledge of beach location, ease of access and socio-economic constraints.

Young *et al* (1996) found the two least commercialised beaches in their study attracted the highest proportion of visitors in their “social class 1” (i.e. professionals), such people seeking a more pristine, natural, quiet environment. Earlier work by Hecock (1970) also noted a significant relationship between certain beach characteristics (e.g. beaches which had high dunes on the fore beach, or those that had spectacular surf or broad expanses of glistering white sand), and the distribution of visitors with high socio-economic attributes, especially those in highly paid, highly educated managerial or professional-technical occupation categories. This gives some credence to the notion that these groups are more demanding in terms of aesthetics (Peterson and Newmann, 1969).

3.2 Environmental Quality

Various studies suggest that environmental quality or perceived environmental quality, particularly water quality and beach cleanliness play a significant role in beach user perception.

This section examines the environmental aspects of beaches including water quality, and related aspects such as sewage debris, litter, etc. that are important to beach users. Factors influencing beach users’ perception of environmental quality including visual factors are also discussed.

Water Quality and Beach Cleanliness

Beach water quality and beach cleanliness (clean sand, absence of litter, sewage and debris, etc.) are given a high priority by the majority of beach users (Cutter et al, 1979; Morgan *et al*, 1993; Morgan *et al*, 1995; Morgan and Williams, 1995; Breton *et al*, 1996;

Young *et al*, 1996; Williams and Nelson, 1997; Morgan, 1999a; Nordstrom and Mitteager, 2001).

Cutter et al (1979) found in their beach user survey of New Jersey beaches that the most important characteristic of the ideal beach was the cleanliness of the beach and water. Similar results were observed by Young *et al* (1996) who asked beach users to rank 5 major beach characteristics - facilities, sand and water quality, views and landscape, swimming and water safety, access and parking. At all 4 locations studied, "sand and water quality" was deemed the most important of these 5 aspects.

In response to the question "what is the worst beach you have visited and why?", 54% of responses in a UK study had comments relating to litter, sewage, polluted water or sand (Morgan *et al*, 1993). On the other hand, good water quality, clean beaches and sand, and absence of litter were mentioned in 42% of responses to the question "what is the best beach you have visited and why?''

A study of Turkish beach users identified water clarity and the absence of litter, sewage debris, oil and water pollution as the major priorities, together with beach safety (Morgan *et al*, 1995). Likewise, Breton *et al* (1996), in their study of various beaches in Barcelona, reported that people asked for more frequent and efficient cleaning of the sand and water.

In a beach user survey at a Welsh resort, Williams and Nelson (1997) found that most people rated water quality as the most important aspect of a beach. Similar results were noted in the study by Morgan (1999a) that involved a larger number of sites. Those visiting both developed and undeveloped beaches gave a high priority to bathing water quality.

Nordstrom and Mitteager (2001) found that natural beauty and cleanliness were mentioned most frequently as reasons why students prefer the beach they identified as their favourite.

These findings are also consistent with the results of a recent survey of German tourists. When asked the question: "When thinking about your next holidays, which of the following environmental factors are most important for you?", the highest priority was given to "clean beaches and water" closely followed by "no rubbish in the resort and surrounding area" (Coastal Guide News, 2002).

Practitioners indicate that beach and water quality are major factors for beach users in New Zealand. A Massey University survey of public attitudes to the environment found 94.6% rated water pollution in rivers, lakes and at beaches as a serious or very serious issue (Environment, 2001). In the Auckland region, water pollution (including beach water quality) raises most concern, with two thirds (65%) of all respondents saying they are very concerned, and another quarter (25%) concerned (Forsyte Research, 2000). Concerns about water quality are also the dominant issues raised in respect of the beaches of North Shore City (Mr J Dahm, pers. comm., April 2002).

In respect to beach cleanliness, certain types of litter have been found to be more offensive than others. For instance, the work by Herring and House (1990) concluded that sewage-derived contaminants have a greater impact than any other aesthetic pollution parameter on the enjoyment of a visit to the beach. Field experiments conducted by Williams and Nelson (1997) to assess how the public viewed three selections of beach debris (sewage related debris such as condoms and sanitary towel backing strips, general debris and mixtures of the two), found the lowest tolerance of debris related to the mix of sewage related and general debris. The enjoyment of a visit to the beach was sufficiently affected by the debris to discourage future visits.

Increasing community intolerance of litter is also illustrated by the work of De Ruyck *et al* (1995) in their survey of various South African beaches. They reported a high

awareness of litter, with the majority of respondents at all 3 beaches surveyed believing that litterbugs should be fined.

Factors Influencing Perceptions of Environmental Quality

Various studies have indicated that perceptions of beach and water quality can be influenced by a variety of factors.

The accuracy of perceptions of environmental quality depends on access to information and experience (Martin *et al*, 2001; Pendleton, 2001; Pendleton *et al*, 2001). For those with incomplete information, perceptions could be based on other factors. For instance, Eiser *et al* (1994) illustrated the importance of knowledge or "bad news" on public perception of bathing water quality. They found that the public was more likely to perceive their beach to be polluted where a well-publicised hazard or pollution incident had occurred.

Research has also found that the public tend to form their perceptions about water quality and levels of pollution based on visual factors (Dinius, 1981; Smith *et al*, 1991). In examining lay perceptions of water quality, Dinius (1981) found that increases in water discolouration and the quantity of litter were perceived as increases in the level of pollution. The public not only rated visually polluted sites lower for recreational uses, they also perceived the quality of the actual water to be lower. Other workers have noted that the use of water for swimming is most sensitive to water appearance (Vent and Davies-Colley, 1988).

The association of litter with water quality noted by Dinius (1981) may help to explain why in Morgan *et al* (1993) the beach with the most litter was also perceived to have the poorest water quality. Morgan *et al* (1993) argued that the proximity of this site to sewage treatment works, the unexciting beach scenery and possibly also recollection of previously poor water quality, may also have been factors that combined to produce a lower overall evaluation of the quality of this beach. In their observations relating to urban and rural lakes in New Zealand, Smith *et al* (1991) also suggested that surroundings could play a part in overall site perception.

Even when information is made available through public campaigns, people may still retain inaccurate perceptions of environmental quality. For instance, in a telephone survey in Southern California, fewer than half the 403 respondents were able to correctly rank two randomly chosen beaches in terms of water quality (Pendleton, 2001). Pendleton also noted that perceptions of water quality at the 14 beaches discussed tended to correlate with beach site attributes. For instance, high water quality was positively correlated with natural areas and surf spots, but negatively correlated with bike paths and public access ways.

A person's socio-economic status, cultural ties, and past experiences can also influence how they perceive environmental quality (Renn *et al*., 1992.)

For instance, surveys of Welsh beach users by Morgan *et al* (1993) and Williams *et al* (1993) noted that respondents in higher socio-economic groups tended to perceive poorer water quality better than those in lower groups, possibly reflecting a greater awareness of and concern about water pollution. In anther study of Welsh beach users, Morgan and Williams (1995) found that absence of litter, along with cleanliness of toilet facilities were ranked more highly in terms of importance by people from higher social groups.

Similarly, in a beach perception study conducted at 4 Welsh beaches, Young *et al* (1996) found that those from professional groups were more concerned about various aspects of pollution (the absence of noise, oil on the beach, smells from factories, sewage debris, and vehicle fumes) than those from other socio-economic groupings. They also noted that those from professional groups distinguished between natural and

other smells. They expressed the least concern with regard to seaweed or other "fishy" smells and the greatest concern with regard to all other pollution-related parameters.

Gender may also be a factor. Williams and Nelson (1997) noted that females appeared to be more sensitive to the perception of beach debris and more perturbed by sewage contaminants (i.e. condoms, sanitary towels and faecal matter) than male. They suggested that this might relate to a higher recognition of these particular items.

Age has also been shown to be a factor in some studies. For instance, Morgan *et al* (1993) noted there was no close correlation between perceived quality of the beach for swimming and overall beach quality amongst children at Southerndown, suggesting that they did not closely associate the parameters in the same way as adults.

William and Nelson (1997) also observed that retired people showed the highest resilience to debris perception, while people in their thirties seemed to be most sensitive.

Bonaiuto *et al* (1996) noted that a strong local identity tended to lead young residents to perceive their beach as less polluted and a strong national identity led young inhabitants to perceive less pollution in the country's beaches. Similarly, Williams and Nelson (1997) found local groups proved to be the most tolerant to beach debris. It is possible that visitors may have higher expectations than locals.

Conversely, Tunstall and Penning-Rowsell (1988) found that local residents had heightened awareness and many would not consider swimming in those areas where visitors congregated, preferring more remote parts of the coast believed to be cleaner.

Morgan (1999a) noted a trend for bathing water quality to be a higher priority among those users preferring less developed beaches, even though bathing water quality was also the highest priority for users of developed sites. Those preferring undeveloped beaches also tended to give higher priority to water clarity, absence of oil contamination and to sand and water quality than those preferring more commercialised beaches, and a lower priority to the absence of seaweed and seaweed/fishy smells. He noted this suggests that those preferring undeveloped beaches have a greater wish for a pristine, unspoiled environment.

3.3 Physical Characteristics

The importance of physical beach characteristics (including climatic conditions, beach width, waves and currents, sand characteristics and dunes) in beach choice appears to vary.

Early work by Hecock (1970) found that different physical characteristics of beaches within the Cape Cod area did not seem to have a substantial influence on beach selection decisions. He concluded that neither physical safety (e.g. off-shore gradient and the strength of waves or currents) nor comfort measures (e.g. warmer water and finer sand) seemed to influence beach visitor's choice. However, he did note that under questioning many people responded that physical safety characteristics were important considerations of beach choice.

Cutter *et al* (1979) found that physical characteristics of the beach, including wave conditions, presence or absence of dunes, beach width and the quality of the sand placed second in respondents' attributes of an ideal beach at 4 of their 5 New Jersey study sites.

However, these factors, while important attributes of the respondent's ideal beach, actually played very little role in their selection of the site where they were surveyed. Less than 3% of those surveyed listed the site's natural characteristics as the reasons for beach selection. Cutter *et al* (1979) noted that users were not visiting sites which

conformed to their notion of an ideal beach but which were convenient, had a particular reputation, or because their friends went there.

Interestingly, when asked what the most bothersome characteristics on the beaches were, aspects of the natural environment were mentioned most frequently for all beaches. These included such things as bad weather, bugs, and blowing sand (Cutter *et al*, 1979).

Climate, Waves and Beach Safety

A Welsh beach survey revealed highest preference for a beach that was "sheltered but with some breezes", followed by "sheltered from all breezes". "Very exposed" was given lowest preference (Morgan, 1999a). Morgan noted the highest preference wave size was 0.3-1m, though users of beach resorts showed highest preference scores for even smaller wave sizes of 0.1-0.3m (Morgan, 1999a).

Priority scores for beach safety aspects appear to be linked to preferred beach type. For instance, users visiting beach resorts were less concerned with scenic beauty, but gave a higher priority to climate and water temperature (Morgan and Williams, 1995). Those preferring relatively undeveloped or "natural" beaches were less concerned with natural phenomena such as dangerous currents, large waves, etc. Those preferring more commercialised beaches had an image of a beach environment where both the on-shore aspects (facilities, management) and those off-shore (bathing hazards) are controlled for the purpose of human convenience, with natural features taking a lower priority (Morgan, 1999a).

Morgan (1999a) argued that those preferring less developed beaches might like the spectacle of large, dramatic waves on the sea to complement the natural, wild beach environment. In contrast, those preferring resort beaches might wish for a calmer sea, not only suggesting a desire for safe bathing conditions, but also more under the control and influence of man.

This is also apparent in the difference between use of East Coast and West Coast beaches in the Waikato Region – the main holiday sites and most beach resorts being located on the more sheltered and lower wave energy East Coast beaches. On the other hand, the more exposed, high-energy West Coast beaches appear to be valued for the remote West Coast beach experience.

The importance of safety is also reflected in studies of preferred distances between users in the sea. A survey of South African beach users revealed that the preferred distance between groups in the sea was less than 2 meters for all the beaches (developed and undeveloped), much smaller than the distance preferred between groups on the beach (De Ruyck *et al*, 1995). The authors believed this was an indication of the need for a feeling of safety in the sea. People generally like to swim in a crowd.

Morgan (1999a) also found that users preferring resort beaches gave higher priority to climate factors compared to those preferring undeveloped beaches. He postulated a contrast between those who prefer to visit less commercialised beaches to enjoy the natural attributes of the beach environment and are less concerned about the climate, with those who prefer a traditional "beach resort" with warmth, sunshine, and abundant varied facilities to supplement their enjoyment.

The importance of climate has also been reinforced by recent research, commissioned by Tourism New Zealand, which suggests that overseas tourists may not perceive New Zealand as a beach resort destination because of its "cold" climate. The work, which explored the perceptions of Australian visitors, indicated that Australians do not consider New Zealand a beach holiday destination because of its "cold" climate. When beaches were mentioned, they were often described as remote, isolated, rugged,

wilderness type beaches rather than “lay back, relax and take it easy” beaches (Tourism Information, 2000).

This is similar to work in Golden Bay which found that, although visitors viewed beaches as a key element of their holiday experience, the key factors drawing people to the area were the sense of isolation, the region's pristine environment, its cultural resources, and its unique “way of life” (New Zealand Tourism Research Institute, 2000).

Collectively, these studies tend to suggest that, because of New Zealand’s “cold” climate, natural beaches may be far more important in drawing overseas tourists than developed beach resorts.

Beach Width, Sand and Dunes

The limited available studies tend to suggest a preference for wide, rather than narrow high tide beaches (Lindsay *et al*, 1992; Morgan, 1999a; Nordstrom and Mitteager, 2001), with Morgan noting a preferred beach width of 20-50m. The work by Lindsay *et al* (1992), examining beach visitors’ willingness to pay for a beach erosion control programme, revealed that most people felt strongly that they would enjoy the beach experience less if the beach were narrow due to erosion.

Morgan (1999a) found that sand beaches were the first preferred choice for 97% of those interviewed. Colour of sand was also important. Highest overall preference for sand colour was given to light tan, although those preferring beaches with no facilities gave a slightly higher score to white sand. It may be that beach users preferring undeveloped beaches have a greater desire for the pristine natural environment suggested by white sand. Grey and black sands were low preferences (Morgan, 1999a).

Similarly, Leatherman (1977) noted that, in discussions of his beach rating scale with colleagues, white and pink sands were the most highly rated, while grey sand was assigned the lowest rating.

The physical characteristics such as white sand, surf, sand dunes and climate are among the many factors that make the beaches in Tauranga District attractive (Mr D Phizacklea, pers. comm., May 2002).

The presence of natural features of the beach including sand dunes plays a role in attracting beach users. Eastwood and Carter (1981) asked users in Northern Ireland to consider two photographs of beaches and to describe the good and bad aspects of each. Users regarded the presence of dunes as a “good” aspect, considering them to be natural, beautiful, and interesting.

In the study of Nordstrom and Mitteager (2001), students mentioned natural attributes most frequently in response to a question about the importance of a beach.

In a beach survey connected with a willingness-to-pay assessment, Lindsay *et al* (1992) found that sand dunes were a valued, physical beach attribute that respondents felt strongly they would pay to maintain.

Interestingly, some studies suggest there appear to be certain idiosyncratic traits between beach and dune users (Eastwood and Carter, 1981; Williams *et al*, 1992).

For instance, the results of the personality test of Eastwood and Carter presented the average dune user as a positively motivated person, seeking out the dune environment for specific purposes.

The findings of Williams *et al* (1992) suggested that a typical dune user would live local to the dune area, have an introverted personality type, an internal locus of control,

would be more likely to be male, and would usually visit the dunes alone or in small groups (2-3) people. The beach user, on the other hand, would be more likely to live a reasonable distance from the beach area, a more extroverted personality type, external in locus of control, would have as much chance of being female as male, and would be likely to travel with others (Williams *et al*, 1992). From a coastal managers viewpoint, they noted dune users would appreciate information boards regarding dune formation and vegetation. In their study area, all such boards were located in the beach environment where the typical beach users hardly gave them a glance (Williams *et al*, 1992).

3.4 Accessibility and Convenience

Accessibility and convenience appear to be very important factors influencing beach visits (Hecock, 1970; Mercer, 1972; Cutter *et al,* 1979; Heatwole and West, 1980; Chapman, 1989; Houghton, 1989; Breton *et al*, 1996; Tunstall and Penning-Rowsell, 1998).

Hecock (1970) found that accessibility was an important factor in beach choice for day users, with considerable decline in visitation with increasing distance from point of origin. However, this factor did not exert a significant influence on longer-term visitors from further afield.

Similarly, Chapman (1989) found that beaches of the Hunter Region of NSW beaches with highest visitation rates were proximal to residential areas with the highest population densities. Most beach visitors went to a beach that was reached in less than 10 minutes and the steepness of the distance decay function indicated that convenience of access was an important factor in beach usage.

Other workers have also reported similar findings. Cutter *et al* (1979) found that convenience was the most important reason for site selection among visitors to New Jersey beaches and that users were prepared to trade off quality of the beach for convenience. Heatwole and West (1980) and Breton *et al* (1996) report that, at sites where local demand predominates, beach use is heavily dependent on location in relation to the road network. Tunstall and Penning-Rowsell (1998) reported many family group travels to the seaside with children and, other things being equal, go where it is easier to go.

However, the length of the journey is also closely related to the desires and expectations of the users. For instance, studies have found that people are willing to travel greater distance to get to a relatively undisturbed beach environment with higher standards of tranquillity and cleanliness (Mercer, 1972; Cutter *et al*, 1979; Breton *et al*, 1996).

These findings also appear to be reflected in the use of beaches in the Auckland, Waikato and Bay of Plenty regions. For instance, the users of Auckland city beaches appear to be largely locals with average travel times probably less than half an hour (Mr M Paterson, ACC, pers. comm., May 2002; Ms K Coombes, NSCC, pers. comm., May 2002). However, the beaches of the Hauraki Gulf Islands and Coromandel, which are less developed and have higher standards of tranquillity and environmental quality, tend to draw visitors from much further afield, probably with average travel times of 1-2 hours (Mr M Paterson, ACC, pers. comm., May 2002).

Accessibility is also an important factor in the popularity of the beaches of Tauranga District, with nearly all of coastal/land interface in public reserve or accessible to the public (good beach access) with good parking. The beaches are also within 2 hours' drive of 60% of New Zealand's population (Mr D Phizacklea, pers. comm., May 2002).

The majority of studies have shown, not surprisingly, that most people visit beaches by means of private cars (e.g. Williams and Sothern, 1986; Breton *et al*, 1996; Tunstall

and Penning-Rowsell, 1998), with studies in undeveloped coastal locations receiving almost all their visitors by car (Tunstall and Penning-Rowsell, 1998).

This can have significant management implications. The lack of public transport to a particular beach, being accessible only to people with private cars, can put this beach out of the reach of visitors who do not have a car. Work by both Heatwole and West (1980) and De Ruyak *et al* (1995) noted that, more than any other single factor, available mode of access explains the pattern of "poor" beaches and "rich" beaches. De Ruyck *et al* (1995) noted that, due to economic and transport restraints, those from low-income suburbs may have been forced to visit less developed beaches closer to home, while actually favouring highly developed beaches further afield.

3.5 Personal Association and Familiarity

Past experiences and familiarity appear to have a significant effect on choice of recreation sites, including beaches, and it appears that beach visitors commonly return to a site they have had an association with in the past and that is familiar to them (Burch, 1969; Spaulding, 1973; Schreyer *et al*, 1984; Williams and Sothern, 1986; De Ruyck, 1995; Breton *et al*, 1996; Tunstall and Penning-Rowsell, 1998; Ohio Sea Grant, 2000).

In his survey of the relatively undeveloped Sand Beach in Rhode Island, Spaulding (1973) found that over 75% of visitors had previously used the beach. Similarly, in their UK study, Williams and Sothern (1986) found less than 22% of beach visitors were first time visitors and that a relatively high percentage visited at least once a year.

Ohio Sea Grant (2000) noted that Lake Erie beach users tend to visit frequently, with single day users taking an average of over 15 trips per year, 11 of these to the same beach where they were surveyed and four trips to other Lake Erie beaches. Multiple day users take approximately six trips to the Lake Erie Region, with 60% of those trips to the same area and beach.

Similar findings were noted in a study of visitors to Golden Bay in New Zealand conducted by the New Zealand Tourism Institute. It was found that the visitors generally had a long tradition of coming to the Golden Bay area for their annual summer holiday and, often, Easter. Visitors were largely families with children and generally stayed in camping grounds. Businesses also noted that the area attracted a very loyal visitor market (New Zealand Tourism Research Institute, 2000).

A Barcelona beach survey revealed that users usually go the same stretch of beach and sometimes even the same spot on the beach (Breton *et al*, 1996). They argued that the need for protection in this environment, which is not an everyday living place and where people are a little afraid of the elements or even of the unfamiliar surroundings, could help explain this strong territoriality.

Tunstall and Penning-Rowsell, (1998) noted that familiarity with the location played an important role at some beaches and that people seemed to seek the reassurance of the familiar, rather than risk the unknown. Those visitors who had sought novelty and who were, therefore, visiting the location for the first time were a small minority amongst those on holiday and among day-trippers. They noted that the high proportion of older visitors at some locations, some with memories of the place going back as much as 30 to 60 years, may partly explain the long association.

They found that perhaps one of the most important meanings of a beach visit is an experience which reconnects people with their past, with visits made in childhood and youth. People interviewed tended to make visits to places they had known for many years. At all the beaches where the question was asked, half of those who had been before had gone there at least 20 years ago (Tunstall and Penning-Rowsell, 1998).

De Ruyck *et al* (1995) found that the most characteristic reason given for visiting one of the South African beaches (Joorst Park) in his study was tradition - the respondents used to visit this beach with their parents or did so out of habit. He noted this might reflect the remnants of forced aggregation in the past due to apartheid, when certain ethnic groups were refused access to beaches except those developed specially for them.

In a similar vein to the above studies, Blaikie (1997) noted that retirement to the sea, a "decision to move to the coast, or to the scenes of their youth, appears to be blend both nostalgic and environmental preferences".

3.6 Other Aspects

Vehicles and Dogs

Most studies that have considered vehicles and/or dogs on beaches have generally found that beach users are not sympathetic to these activities or wish them controlled or limited in some manner. (Morgan *et al*, 1995; Morgan and Williams, 1995; Breton *et al*, 1996; Young *et al*, 1996; Morgan, 1999a).

Morgan (1999a) found that, overall, only 11.3% of beach users wanted vehicles allowed onto the beach. For all preferred beach types, highest preference was for water sports to be allowed in one area only. Interestingly, no distinction was made between motorised water sports and others such as surfing, sail boarding. Young *et al* (1996) revealed beach users' desire at all four beaches in their study to see an area set aside for water sports (surfing, windsurfing, water skiing and jet skiing), to keep these activities separate from other beach users such as swimmers and sunbathers.

De Ruyck *et al* (1995) found that most visitors to the undeveloped beach nature reserve in their study wanted dogs to be allowed on the beach. In contrast, visitors to beach resorts (Joorst Park and King's Beach) did not want dogs on the beach.
In their study of metropolitan beaches in Barcelona, Breton *et al* (1996) found that most users would forbid the presence of animals (especially dogs) and radio-cassettes. Many people would also propose to forbid beach games and motorboats near swimming areas.

Morgan and Williams (1995) and Young *et al* (1996) found that, overall, a majority of respondents (75% and 77% respectively) at their study beaches expressed a desire to see dogs banned from the beaches. Percentages range from 63% at Manorbier (a beach with few facilities) to 85% at Amroth (a small resort). Similarly, Morgan (1999a) found that, overall, 74.6% of beach users wanted dogs banned from the beaches. This percentage increased from 64% for those preferring beaches with no facilities to 79% for those preferring small resort beaches. A study of Turkish beaches found a very high proportion of users (95%) preferred to see dogs banned from the beach (Morgan *et al*, 1995). This latter finding could reflect cultural influences. Turkey is an Islamic country and Muslims generally avoid contact with dogs.

Cultural and Other Factors

Culture influences can also affect perceptions of environmental qualities; either because of culturally influenced attitudes or differential access to information.

A number of leisure studies investigate socio-cultural factors and their role in affecting style, behavior and participation levels in recreation (Jackson, 1989; Cofer-Shabica *et al,* 1990; Carr and Williams, 1993; Floyed *et al*, 1998). For instance, Cofer-Shabica *et al* (1990) found a need for sensitivity to expectations that different ethnic groups bring to a national park in Miami when designing services and programmes offered with the park.

Few beach studies have examined this aspect in any detail and most studies noted in this report relate to surveys of beach users of European descent. Therefore, the findings may not hold well for other ethnic groups (e.g. Maori).

However, some studies have noted that group identity and stereotypes affect beach user perceptions (e.g. Morse *et al*, 1977; Bonaiuto *et al*, 1996). For instance, Morse *et al* (1977) found that people rated their own beach more positively than they rated other beaches. As noted earlier, Bonaiuto *et al* (1996) found that students who were more attached to their town or nation tended to perceive their local and national beaches as less polluted. They argued that traditional predictors of environmental evaluation (e.g. socio-demographic variables, environmental concern, use of the environment) did not play an important role in predicting beach pollution perception. Rather, they suggested that the denial of pollution was a strategy used to cope with the threat to place identity posed by the labelling of local beaches by a powerful out group (the European Union).

Other authors have also noted sociological influences. For instance, Shields (1991) examined the cultural positioning of Brighton Beach as a seaside resort to show how this position was constructed within the broader framework of the spatialisation of British culture. He identified three overlapping phases in the disposition of the beach as a social zone. Fiske (1983) considered a beach in the Perth area, treating it as a text, a signifying construct of potential meanings operating at a number of levels. He argued that, though different people use the beach differently and find different meanings in it, there is a core of meanings that all users share to a greater or lesser extent.

4 Coastal Erosion

Research to date on coastal erosion has largely focused on physical processes, planning and engineering solutions and legal aspects. Relatively few studies have explored social factors in their analysis, in particular, public attitudes and perceptions toward this hazard. Mitchell (1974) and Rowntree (1974) were among the earliest researchers directly examining perceptions of coastal erosion hazard. Subsequently, further work has been undertaken by Furuseth and Ives (1984, 1987), Ives and Furuseth (1988), Rasid and Hufferd (1989), Dilley and Rasid (1990), Miller (1992), Smith (1996), and Tunstall and Penning-Rowsell (1998).

In addition, research has examined perceptions of other natural hazards (e.g. White, 1974; Burton *et al*, 1993; Tobin and Montz, 1997; Samanta, 1997) and perceptions of risk (e.g. Burton and Kates, 1964; Slovic *et al*, 1980; Slovic, 1987; Green *et al*, 1991; Cvetkovich and Earle, 1992, Dake, 1992). Much of this literature is also relevant to coastal erosion.

How people perceive and reach their conclusions about risk influence their expectations about hazards and their responses to these events. Variations in perceptions are also likely to affect management/adjustment policies.

This section summarises the above studies and also incorporates information from practitioners to provide a preliminary understanding of the perception and response of individuals and communities to coastal erosion.

The following aspects are examined:

- Perception and understanding of coastal erosion
- Perception of adjustment options
- Perception of the role of government
- Social construction of perception and political dimensions of coastal erosion

4.1 Perception and Understanding of Coastal Erosion

Research on natural hazards suggests that variation in hazard perception can be accounted for by factors such as the magnitude and frequency of an event, recency and frequency of personal experience, significance of the hazard to income interest, and personality traits (White, 1974).

Coastal erosion is almost universally characterised in western literature and art as a struggle between land and the sea (Mitchell, 1974). It has been proposed that the degree to which either element (or man – acting on behalf of land) can dominate provides a useful way of differentiating three primary attitudes to erosion:

- Geological/fatalistic, an attitude characterised by complete domination of the land by the sea and man's inability to prevent the inevitable;

- Ecological, an attitude which views the sea and land as engaged in a conflict in which it is difficult to predict the outcome; and

- Engineering, a perspective which emphasizes man's ability to retard, but not prevent, the sea's progress (Mitchell, 1974).

Similarly, in Maori tradition the shoreline or beach represented a safe corridor between the known and occupied world and the uncertainty of the ocean. The ongoing battle between land and sea was endlessly waged, like two feuding kingdoms unable and reluctant to settle old grievances (Carlin, 1999).

Burton and Kates (1964) noted that the divergence in hazard perception may be as fundamental as basic attitudes towards nature represented by "man subject to nature", man with nature" and "man over nature".

Causes of Coastal Erosion

In a Thematic Apperception Test (TAT) scene featuring a property at risk from erosion, Mitchell (1974) found that 78% of respondents felt that natural processes were responsible for the perceived coastal erosion problem. Only 7% suggested that man-made structures played some part (Mitchell, 1974).

Conversely, in the individual surveys, a majority (60%) of respondents regarded erosion as solely a man-induced phenomenon – though there were differences between the sites, with some placing more emphasis on the role of natural causes. Mitchell concluded that the results suggested a prevailing view that erosion was unnatural and must be a consequence of man's interference.

He argued that this perception ran counter to the facts at many sites, with the role of humans given particular emphasis in locations where "large scale 'improvements' of coastal inlets and construction of jetties… have occurred so recently… that human impacts may simply be more visible by contrast with pre-existing conditions" (Mitchell, 1974, p100).

Work on Lake Superior found that the majority of shorefront residents perceived human regulation systems (in this case, the regulation of lake levels by the International Joint Commission) to be the main cause of high lake levels and shore property hazards (Rasid and Hufferd, 1989). Beachfront respondents in both exposed and sheltered locations shared this view.

Other workers have also noted that hazards are often interpreted as being the result of some human cause rather than natural events (Burton *et al*, 1968).

Practitioners also agree that erosion is often blamed on notable human activities in the area that probably have had little to no influence. For instance, the erosion at Buffalo

Beach in the late 1990's followed marina construction and dune nourishment, with many in the local community blaming these causes for what was actually a natural erosion cycle (Mr J Dahm, pers. comm., April, 2002). Similarly, long-standing erosion at Koputauaki Bay on the western Coromandel was attributed by many locals to recent construction of marine farms in areas offshore – even though the erosion had occurred consistently since about 1909 (Mr J Dahm, pers. comm., April 2002).

However, perceptions can also vary with time and community experience. For instance, the later work of Ives and Furuseth (1988) found that most residents at Carolina Beach and the Outer Banks were aware of coastal erosion hazard and tended to view it as a continuous, natural process with which they must cope, a necessary part of the natural beach processes. They also knew of the role of coastal storms in the erosion process. Residents of both areas also demonstrated a broad understanding that beach erosion hazard is not simply a result of natural processes or human action alone. They understood that erosion risk is increased by human action, particularly activities that involve encroachments onto the foreshore, but had sufficient appreciation of the complexities of the problem to avoid blaming any single factor.

They concluded that these findings were not surprising given the traditional maritime orientation of the two communities and their reliance on ocean and foreshore for livelihood. That is, they had long experience with and were knowledgeable about their environment.

Perceptions of Magnitude and Frequency

Mitchell (1974) found that most beachfront respondents (>90%) were well aware of the existence of erosion hazards in their communities and could also provide reasonably reliable estimates of the magnitude of erosion of their properties.

Interestingly, the site with the lowest awareness and where respondents consistently underestimated the severity of previous shoreline recession (Westhampton Beach, New York State) had a long history of severe erosion and storm disasters but had not experienced problems for several years. This is consistent with the findings of natural hazard research that memories of hazard events fade and that the more recent the experience, the greater the awareness of the hazard (White, 1974; Burton *et al*, 1993). These workers also note that, if recent events are especially severe, earlier events will become less clear. Mitchell (1974) also suggested that underestimates of recession found at a very hazardous beach location might have been a device adopted by locals to reduce the stresses induced by knowledge of past destruction.

In contrast to the high levels of awareness of magnitude, no single image of frequency was found in Mitchell's (1974) study. Rather, the frequency of erosion was commonly interpreted in terms of the incidence of coastal storms. The majority of respondents recognised a definite future risk of erosion and expected sizeable damages, though, interestingly, a substantial minority (30%) were equally convinced that no damages were likely!

Rowntree (1974) investigated individual awareness of cliff erosion hazard in different hazard-zones. He noted that residents in the high-hazard zone had a high level of awareness and understanding about the frequency and characteristics of the erosion hazard. Renters were almost as knowledgeable as property owners, but were less concerned about the long-term implications. However, beyond the high-risk zone, respondents were not nearly as knowledgeable. These residents were aware of the hazard but knew little about its frequency, severity or predictability. However, interestingly, respondents in the low risk area who had close friends or relatives living in the high-hazard zone tended to view coastal erosion more along the lines of those directly affected by it.

Similar results were found in a later study by Dilley and Rasid (1990) in the Canadian coastal settlement of Shuniah on Lake Superior. Awareness of shoreline erosion was

high along the shorefront, with no fewer than 94% recognising that there was an erosion problem. Even among those with no shoreline property, fewer than 20% were unaware of the problem. There was also a reasonable consistency in the estimates of magnitude by beachfront owners, with a median estimate of five feet and ranging from 4 to eight feet for the various beach zones. However, not all were well aware of the magnitude. Some respondents reported figures as high as 35 and 47 feet, probably the result of exaggeration for effect!

However, earlier work by Rasid and Hufferd (1989) in other areas of Lake Superior noted that property owners underestimated long-term rates of erosion and exaggerated the more recent rates. Interestingly, owners in the more sheltered locations reported a higher frequency of erosion events than those in the more exposed areas. This is probably explained by the lower elevation and the limited setback of houses in the sheltered areas, making these owners both more vulnerable to and aware of erosion (Rasid and Hufferd, 1989).

Practitioners also indicate that, in their experience, most affected property owners provide reasonable estimates of property loss, though occasional examples of over-inflated estimates occur - particularly when owners are trying to draw attention to their problems.

Perception of Risk

Natural hazards research suggests that many people make a conscious decision to locate in hazardous environment, recognising the hazard to which they are subject (Burton *et al*, 1993). The limited available work also suggests this could be the case for many beach environments exposed to coastal erosion hazard.

In a survey of communities in North Carolina and New York states, Miller (1992) found that owners had generally bought oceanfront property knowing the risks and history. They found the risk acceptable because they "want to be there", the amenities of an oceanfront location (e.g. view, easy access to the beach, water recreation, peace and quiet) appearing to meet deeply felt emotional needs of the people who owned property there (Miller, 1992). None would voluntarily relocate because of the risk and they were far more likely than their riverine counterparts to rebuild in the same location if a disaster destroyed their home.

In North Carolina, each respondent also demonstrated a high level of awareness of the interplay between risk, insurance, property values, rental income, and other factors affecting the economic value of their property. The owners all stated that they carried enough insurance to cover their investment and most other losses they might incur. They were also all aware that they might lose the property under circumstances not covered by their insurance, but most considered that possibility small. In other words, the owners generally felt that they had the risk covered.

Miller noted that the availability of flood insurance reduces the owner's risk of remaining and other financial incentives which aimed to encourage anticipatory relocation were not sufficient to overcome individual, market and regulatory incentives to remain in place.

Similarly, Rowntree (1974) found that respondents agreed that the amenities were worth the risk - the homes in the high risk cliff erosion zone having unmatched views!

Conversely, in his interviews with beachfront residents facing severe coastal erosion along the Queensland Gold Coast, Smith (1996) observed that the instinctive reaction was that of disbelief. However, once catastrophic coastal erosion was visibly evident, residents' complacency was suddenly replaced by concern and, if the erosion continues, by alarm and sometimes panic. Once the erosion ceased, the reaction changed to stoic acceptance and complacency returned. Within a year or so, the original "impossibility" of any hazard occurring becomes re-asserted. The vast majority

of beachfront residents expected that any great erosive storm could never be more than an once-in-a-lifetime event.

Smith (1996) reported that all the residents found it extremely difficult to visualise the meaning of storm probabilities, such as a 1 in 100 or 1 in 50 year return period event. To the resident, a 1 in 100 year storm would not occur until another 100 years had passed, so they would never need to worry about it! The explanations of coastal engineers were politely listened to, but not believed. In some cases, residents who had actually been through a major storm were among the most confident that they would never be faced with another. In fact, there could never be a worse one than the one the resident had just experienced! He suggested that beachfront residents find the enjoyment of living near the beach so strong that any possibility of future unpleasant events is firmly rejected or deliberately kept out of mind. Mitchell (1974) also made similar observations in respect of one of his study sites (Westhampton Beach).

Smith (1996) noted that the complacency was passed on by word of mouth to new residents and their neighbours, and that land agents making beachfront sales also downplay any possible independent hazard evaluation by new residents. He suggested that the average beach dweller's expectation of an erosion-free future was based "not on the common law of statistics, but on the common lore of optimism and persuasion". This is consistent with much hazard theory which suggests that risk perceptions are socially constructed, with individuals making inferences and reaching conclusions by giving meaning to uncertain and ambiguous information on the basis of communications with others (Slovic *et al*, 1980; Slovic, 1987; Cvetkovich and Earle, 1992).

Some studies have also suggested an innate conservatism in people's attitudes and perceptions of the coast, in that it is perceived as unchanging despite the reality of widespread coastal erosion. For instance, in an analysis of beach user surveys, Tunstall and Penning-Rowsell (1998) found an essentially conservative approach to change at the coast. At all locations investigated, visitors were resistant to allowing erosive changes to the beach, cliffs or seafront to continue. They wished to see the familiar beach, promenade and other coastal features maintained, as they had always known them**,** a desire to keep things as they are.

To date, little to no work has been done on the perception of coastal erosion hazard in New Zealand. However, a recent telephone survey of 403 residents in the Tauranga District found that the two natural hazards which respondents were *most* concerned about were coastal erosion (64%) and rainfall and stormwater flooding (55%). When asked which hazard was of most concern to the Tauranga District, 31% said coastal erosion, which was the highest followed by rainfall and stormwater flooding (26%) and none (14%). A breakdown by area showed higher concern for coastal erosion by those respondents in beach settlements (Mr D Phizacklea, pers. comm., May 2002).

4.2 Perceptions of Adjustment Options

Hazard research suggests that human responses to hazards are related both to perception of the phenomena themselves and to awareness of opportunities to make adjustments (Burton *et al*, 1993).

A wide range of factors influence the choice of adjustments adopted. These include the event characteristics, human experience with the hazard, resource use and the material wealth of the individuals concerned. Other factors such as personality traits and perceived role of the individual in a social group – ability to act and sense of responsibility – are also important. (Burton *et al*, 1993). In particular, research into the adoption of particular adjustment alternatives has found that experience is a significant influence on people's choice of adjustment alternatives. Individuals at risk may not be aware of all strategies for dealing with a hazard. If particular remedial activities worked in the past, the usual pattern is to repeat that behaviour (Tobin and Mortz, 1997).

These findings seem to be supported by specific research on coastal erosion.

Coastal Erosion Engenders Response

Mitchell (1974) noted that coastal erosion is more likely to engender responses than other hazards. He found that people exposed to erosion hazard were not only more aware of adjustment options, but also more likely to adopt them. He noted this might be due to the fact that flooded land can always be reoccupied after waters subside but once eroded, property disappears permanently.

Most residents also defined the purpose of their adjustment simply in terms of its success in preserving homes or land. “It matters little how the protection is achieved … so long as the results are acceptable” (Mitchell, 1974, p138).

He noted that, where coastal structures are poorly regulated, or there is no access to informed technical opinion, or a lack of community cohesion, a wide variety of adjustments are practised by affected individuals. Conversely, where regulations are strongly enforced, technical information is readily available and there is well-organised local concern (i.e. more social cohesion), adjustments tend to assume a more uniform and less diverse character. “A given site’s adjustment pattern reflects the operation of social and behavioural influences rather than the physical characteristics of the erosion and socio-economic data” (Mitchell, 1974, p142).

Analysing the responses of various communities, Mitchell (1974) also concluded that collective protection decisions were generated by crisis erosion conditions when beach frontagers were faced with the prospect of severe economic losses.

Coastal Engineering Structures

Available research and practitioner advice suggests that most beachfront communities tend to favour the use of engineering structures to manage coastal erosion (Mitchell, 1974; Rasid and Hufferd, 1989; Dilley and Rasid, 1990; Smith, 1996).

Mitchell (1974) found that beachfront respondents consciously used only those adjustments which they perceived as being possible, defined by such factors as experience, subjective economic efficacy criteria and legal guidelines. In general, Mitchell found that hazard proofing (e.g. deep piling) and various hazard modification techniques (e.g. engineering structures, beach nourishment) constituted the bulk of preferred adjustment strategies.

However, the preferred adjustment was influenced by previous experience. For instance, he found that 62% of respondents preferred engineering adjustments at one site, while at another (where former bulkheads and seawalls had dramatically failed) the figure was only 33%, the majority (67%) opting for non-engineering adjustments.

Mitchell noted that the proliferation of private coastal protection structures suggested a general belief in optimistic prospects for preventing erosion. It probably also reflects the community’s desire to “do something” (anything!) in the face of erosion. A similar proliferation of coastal engineering structures is evident around the coast of the Waikato Region (Environment Waikato, 1998).

Rasid and Hufferd (1989) noted that a great variety and number of structural measures were used for the protection of properties from erosion, with retaining walls (seawalls), riprap, and fill materials (sand and gravel) the most favoured measures.

Adding rock protection was also the most favoured form of response noted by Dilley and Rasid (1990). “Rocks, BIG rocks, THOUSANDS of rocks”, as one respondent wrote on his questionnaire. This option was followed closely by the building of a retaining wall, again, often of rock. There was no evidence of the disillusionment with physical structures, reportedly found elsewhere in Ontario, where some property

owners want to remove armour stone revetments constructed during periods of high water, to improve access to their beach or the appearance of their property. Few adopted other techniques and only one individual was prepared to consider moving a cottage.

However, most owners were only involved in small-scale works. Rasid and Hufferd (1989) found that most coastal structures were superficial in nature and involved only a relatively small amount of investment (1.9-4.5% of the property value). Similarly, Dilley and Rasid (1990) found that the median amount spent on control or prevention of erosion was only $1,000, with only five respondents claiming to have spent more than $6,000.

Beachfront residents' appreciation of seawalls was also observed by Smith (1996) during his meeting with nearly 400 residents along the Gold Coast. Smith found that the beachfront residents had an almost infinite faith in boulder walls and felt remarkably secure once they resided behind one. The residents also appeared to believe that the biggest walls are capable of absorbing the most wave energy, thus having high storm stability. Many beachfront owners were ready to cut back on secondary armour and filter layer material (important to the success of the seawalls!) as long as they could obtain the biggest face boulders that could talk their contractor into providing (Smith, 1996).

However, Furuseth and Ives (1984) found a significant division of opinion on the value of sea walls as protection for beaches, and on whether or not the technology to stop beach erosion currently exists. Residents were also divided in their opinion of what the placement of sea walls actually does to the beach. A significant proportion of the respondents believed that sea walls destroy rather than protect a beach. This reflects increasing community awareness of the adverse effects of seawalls, these effects now well documented in the scientific literature1 (Granja and de Carvalho, 1995; Kraus, 1988; Pilkey and Wright, 1988).

Interestingly, the communities studied by Furuseth and Ives (1984, 1988) are in North Carolina, a US state that has prohibited the use of seawalls on ocean beaches. They found that the respondents strongly favoured non-structural approaches and suggested that the low level of support for structural measures may reflect community awareness of the ineffectiveness of previous engineering solutions for dealing with erosion at Carolina Beach (Furuseth and Ives, 1984). Further work by Ives and Furuseth in 1988 looking at two separate communities also found that respondents in both communities strongly favoured non-structural measures, including land-use planning and regulations to control development in fragile or hazardous areas. There was only moderate support for structural measures.

These findings are also reflected in the experience of practitioners. For instance, at Muriwai Beach, west of Auckland, residents and others undertook extensive seawall protection works in the 1970's and 1980's. However, after complete failure of these works the community moved away from a preference for such measures and indicated a strong preference for approaches which did not involve human intervention with natural coastal processes (Coastline Consultants, 2002). However, the relevant practitioners note that this is very rare and that at this site there was no private property threatened by coastal erosion (Mr J Dahm, pers. comm., May 2002).

Planning and Development Controls

The limited studies available suggest that communities generally favour control of development in hazardous areas (Furuseth and Ives, 1984; Ives and Furuseth, 1988).

Work at two eastern US coastal communities found that the use of zoning and other regulatory mechanisms to control development in fragile or hazardous areas was

1 The Journal of Coastal Research (1988), Special Issue, provides an extensive review of the effects of seawalls on beaches and their role as a coastal protection measure.

favoured by the vast majority (Furuseth and Ives, 1984; Ives and Furuseth, 1988), 78% in the 1984 study. In voluntary comments made during the studies, many respondents were also dismayed over the foolishness of building on the primary dunes.

Dune Management

The importance of coastal dunes in providing natural protection from erosion and flooding features in some studies (Eastwood and Carter, 1981; Furuseth and Ives, 1984; Nordstrom and Mitteager, 2001).

For instance, Furuseth and Ives (1984) noted a very strong consensus (90% agreement) among respondents that tougher laws were required to prevent the destruction of dune vegetation, though many also noted that appropriate legislation was in place more stringent enforcement was all that was required.

These findings contrast with earlier work by Eastwood and Carter (1981) who found a weak public recognition of the role recreational use has on dunes and coastal erosion. This reflects growth in community understanding with knowledge and experience and reinforces the important role of well-targeted information and community participation programmes such as Beach care.

Nordstrom and Mitteager (2001) also found a high level of awareness of the importance of coastal dunes in mitigating erosion and flooding in their survey of high school students along the coast of the eastern US.

Smith (1996) noted that beachfront residents had tremendous faith in the capacity of frontal dunes to minimise or even halt erosion. However, Furuseth and Ives (1984) note that respondents were less willing to agree with the idea that stabilising the beach using vegetation is the best way to prevent beach erosion. Practitioners note that this is understandable, since the aim of dune management is not to prevent erosion but rather to enhance the natural protection provided by dunes. They note that while the importance of coastal dunes is widely understood, there are misconceptions among many that dune management can stop or prevent coastal erosion (Mr J Dahm, pers. comm, April, 2002).

Beach Nourishment

Beach nourishment appears to be a very popular and widely accepted approach for the management of coastal erosion, being widely used in coastal communities (e.g. eastern US; Netherlands) experiencing severe erosion problems and actively advocated by politicians, communities and coastal management practitioners (Wiegel, 1992; Stronge, 1995; Finkl, 1996; Anonymous, 1998). Most coastal engineering practitioners consider beach nourishment a technically sound approach, when properly designed and placed in an appropriate location (Lankford and Baca, 1989; Committee on Beach Nourishment and Protection, National Research Council, 1996).

For instance, a public consultation exercise conducted in the Netherlands in 1989-1990, examining 4 alternative strategies to coastal management, indicated an almost unanimous support for a policy of holding the present shoreline through the use of beach nourishment. This led to a national policy of “Dynamic Preservation” of the coast from 1990 (Koster and Hillen, 1995).

Studies at other sites have also found that the majority of residents felt that previous expenditures for beach nourishment had been worthwhile, even though most realised this procedure was only a temporary measure (Furuseth and Ives, 1984).

Economic studies involving community surveys also tend to suggest that many communities see considerable benefit in beach nourishment (Bell, 1986; Pompe and Rinechart, 1995; Silberman and Klock, 1988; Pompe and Rinechart, 1999; Whitmarsh *et al*, 1999).

For instance, Bell (1986) quantified the recreational benefits of beach nourishment of saltwater beaches in Florida and demonstrated that benefits exceed costs for beach nourishment projects. Pompe and Rinechart (1995, 1999) examining the contribution of beach quality, as measured by beach width, to property value found that the wider beach created by nourishment increased the value of developed and undeveloped lots on the beach.

Silberman and Klock (1988) estimated recreational benefits associated with beach re-nourishment along a 12-mile stretch of beach in Northern New Jersey. They asked beach users about their willingness-to-pay and visit under the with- and without- beach nourishment conditions. The study found that people were willing to pay more for access to the beach after nourishment compared with its, then, current state, though the incremental benefits in this case were small.

A survey of beach visitors at a UK beach resort by Whitmarsh *et al* (1999) indicated that visitors attached a positive monetary value to their recreational enjoyment. They expected this value to be reduced (by about 25% on average) as a consequence of erosion if no management action was taken, but to be increased (by about 12.5% on average) with nourishment.

Relocation and Retreat

Available studies suggest that property owners tend to consider relocation and demolition as options of last resort (Dilley and Rasid, 1990; Miller, 1992; Tunstall and Penning-Rowsell, 1998; Toy, 2001).

For instance, Tunstall and Penning-Rowsell (1998) found that while coasts were appreciated for their natural setting, most people preferred artificial structures to preserve the status quo rather than the “do nothing” option of allowing nature to take its course. This was true even of relatively “natural” undeveloped coasts as well as of seawall protected resorts (Tunstall and Penning-Rowsell, 1998).

They concluded a strong preference for the maintenance of the familiar human-affected beach and coast and very little acceptance, as yet, of the idea of allowing natural processes to do their work at the coast. They noted, ironically, that the resilience of the social construction appears greater than that of the coast itself! (Tunstall and Penning-Rowsell, 1998).

These findings are similar to the Netherlands experience noted above, where a public consultation exercise in 1989-1990 indicated almost unanimous support for a policy of holding the present shoreline (Koster and Hillen, 1995).

Similar results were noted by Dilley and Rasid (1990). They found little sign that property owners along the shores of Thunder Bay were being deterred by erosion. Only one respondent was prepared to even consider moving his cottage and there was a fairly high level of willingness among residents to finance repair and defence work out of their own pockets (Dilley and Rasid, 1990). Nearly two-thirds of those who had suffered from shoreline erosion had taken steps themselves to try to decrease or prevent the erosion of their property. The residents, facing manageable costs for repairs and protection, were found to have developed a degree of tolerance for coastal erosion. For those on the shoreline, the attraction of living in an environment of persistent appeal outweighed the costs involved.

Miller (1992) noted that owners considered relocation and demolition as options of last resort, exercised primarily when they were not allowed to repair or rebuild. Those who had either relocated or demolished their homes or applied for demolition benefits had all done so because they were forced to by state or local requirements. None had done so voluntarily to avoid the risk or to protect their investment. If state or local government agencies issued permits to effect repairs, all owners chose to repair, no matter how close erosion was certified or perceived to have come to their house! The

clear and dominant choice they make is to remain where they are and assume whatever financial and other risks not covered by insurance.

He concluded that oceanfront property owners have to be forced off their property by nature and find no incentive to relocate or demolish their houses. The desire to “be there”, tenaciously holding on to property at the brink, may relate less to the house than to the land itself. From the owner’s perspective, the house can be replaced, as long as enough land remains to build upon (Miller, 1992).

Toy (2001) in a discussion of response to coastal erosion on Fire Island in New York State also noted a spirit of “holding the line”, residents expressing views such as "we are just trying to hang on to what we have.” The president of an affected homeowners association noted: "Letting Mother Nature take its course is great, but over time everything from Montauk Point to Fire Island has been modified by man, so to say that this now should be pristine and left to nature is kind of strange. And to tell families that have been living here for 100 years that it's time to pack up and leave, that's not the way people do things in America."

Practitioners note that this is also their experience in the Waikato and, NZ as a whole, with the community emphasis nearly always on stopping erosion, holding the present shoreline. In general, there is little to no support for some form of adjustment or living with the hazard when property is affected or threatened. Managed retreat is generally strongly resisted or opposed, particularly as there is generally no significant financial incentives to encourage the action (Mr J Dahm, pers. comm., May 2002). Sites where communities favoured adjustment are extremely rare, though occasionally noted (e.g. Muriwai).

These findings have significant implications for approaches such as “managed retreat” and the establishment of a resilient naturally functioning coastline, now being widely promoted by coastal managers (Pilkey, 1987; Platt and Beatley, 1991; Lennon *et al*, 1996; Pilkey *et al*, 1996; Dean, 1999).

4.3 Perception of the Role of Government

Various studies have examined community perception of the role of government in the management of coastal erosion (Mitchell, 1974; Rowntree, 1974; Day *et al*, 1977; Rasid and Hufferd, 1989; Dilley and Rasid, 1990).

For instance, Mitchell found that, while the majority (78%) of TAT responses adopted a pessimistic attitude and a sense that the erosion was beyond personal control, a few (8%) suggested seeking government aid. He noted that this reflects a view that public agencies can achieve protection that individuals cannot provide.

Rowntree (1974) found that, without exception, all residents in the high-risk zone thought that outside government (federal, state and/or county) assistance would solve their problem. However, beyond the high-risk zone, respondents were more indifferent or even hostile towards the need for government assistance.

Similar findings were obtained in studies of erosion problems on Lake Erie (Day *et al*, 1977) and Lake Superior (Rasid and Hufferd, 1989; Dilley and Rasid, 1990).

The work on Erie indicated that those directly involved in an expensive government scheme overwhelmingly supported the idea of 100% government funding. Others, less directly involved, preferred a lower percentage of government support, giving most support to repayable grants. On Lake Superior, those who lived on the shoreline felt particularly strongly that paying for damage or protection should be the responsibility of the federal and the provincial governments, with under half agreeing that the property owners themselves should bear some of the costs. Residents living away from the

shoreline put less emphasis on federal payouts and were more willing to see the owners themselves financing the protective measures.

An earlier study, also on Lake Superior, found that very few respondents (less than 8%) were prepared to bear the full responsibility for shore protection measures, despite the fact that they had made the choice to live on the hazardous edge of water (Rasid and Hufferd, 1989). More than three quarters of the respondents asserted that either the International Joint Commission alone or a combination of various levels of governments (federal, sate, and municipal) should be responsible for shore protection works. Less than 18% would even settle for sharing responsibilities with the various levels of governments.

In a study at Carolina Beach in the US, residents strongly supported public intervention to reduce the risk of erosion, rejecting the free-market view that government has no responsibility to protect individuals and their investments and that those who place themselves at risk must bear the full costs of their decision (Furuseth and Ives, 1984). Only a small proportion of respondents agreed that individual owners should bear the cost of solutions for the beach erosion problem. Similar results were also found in a subsequent study in the area which included a further community (Ives and Furuseth, 1988). Residents of this additional community, Outer Banks, were even less likely to place the financial burden of erosion damage on individual property owners.

However, respondents did not support unrestricted government involvement. In general, they tended to favour local and state government assistance to reduce erosion damage and to support controls on development in erosion control areas. The use of zoning and other regulatory mechanisms to control development in fragile or hazardous areas was favoured by the vast majority (78%) of the sample (Furuseth and Ives, 1984).

Interestingly, federally guaranteed erosion insurance was not favoured by the majority in either study (Furuseth and Ives, 1984; Ives and Furuseth, 1988). In voluntary comments, many respondents were dismayed over the foolishness of building on the primary dunes and post-erosion relief to the risk takers. However, few of the critics wanted to end government post-disaster assistance! This finding is not unexpected as government post-disaster assistance helps lift community burden of environmental risk and socialises the cost of property and revenue losses (Furuseth and Ives, 1984; Ives and Furuseth, 1988).

While there appears to be a high level of support for government intervention among those directly affected, some studies have indicated community scepticism about the likelihood of such response. For instance, Dilley and Rasid (1990) found that just over one third of respondents made an attempt to bring the problem to government attention, with the figure being nearly 70% in the earlier study by Rasid and Hufferd (1989). There was a general impression that these political actions helped to increase official awareness of the erosion problem. However, few were convinced of the efficacy of these actions in eliciting response and residents generally had more faith in their own structural defence than political action (Dilley and Rasid, 1990).

Expectations of government also appear to be rather unrealistic in some cases. Dilley and Rasid (1990) found that the vast majority (93%) of respondents believed that lowering the level of Lake Superior would help reduce the erosion problem and this was the most common request made to government, despite the fact that all evidence pointed to natural causes being primarily responsible for most of the fluctuations in lake level. That such action was effectively beyond the power of Government was not appreciated. Interestingly, a small number wanted a reduction of up to seven feet, enough to leave shipping stranded! (Dilley and Rasid, 1990).

Smith (1996) reported that that the majority of beachfront residents along the Gold Coast have always strongly resisted paying for any erosion protection for their

properties before a storm actually arrives. However, in the event of severe erosion, they will dip deeply into their pockets to provide whatever protection they can for themselves. However, within a year or so after the storm has gone, and they have had time to reflect, the average beachfront resident finds some rationale that can be expounded to ensure that public monies will be used in the future to protect their property.

Overall, the common conclusions appear to be that government assistance is expected with the management of coastal erosion problems and government is also expected to control development in risk areas.

4.4 Social Construction and Political Dimension of Coastal Erosion

Perception is a cultural and mediatized value and different users may have a diversity of opinions towards coastal erosion according to differences in experience and training, vested interest, socio-economic/cultural values and other factors (Burton and Kates, 1964; Slovic *et al*, 1980; Slovic, 1987; Green *et al*, 1991; Cvetkovich and Earle, 1992, Dake, 1992).

Consequently, the perception and management of coastal erosion hazard can also be a very "political" process (Rowntree, 1974; Steinberg, 1997).

For instance, Rowntree (1974) noted that the manner in which coastal erosion is managed depends on the meaning that erosion holds for each resident and, more importantly, for the community as a whole. He noted that the meaning given to coastal erosion in the Californian community of Bolinas had been institutionalised by a complex community political process involving conflicts between a variety of interest groups. However, a basic concern shared by nearly everyone was to preserve the identity of the community in the face of outside pressures for recreational and residential development. Consequently, the community chose to accommodate itself to the hazard, rejecting a large-scale technological fix, not only because the latter was considered to be too expensive for the community, but also because it was viewed as an inducement to growth and tourism. These latter phenomena were the real hazards for the locals!

Steinberg (1997) also demonstrated the political dimension of coastal erosion and storm hazards. He argued that South Florida had become a "disaster waiting to happen" because private developers had sought to maximise the land's tourist and agricultural potential by building in areas susceptible to hurricanes and flooding. He demonstrated that commercial interests had consistently downplayed the possibility of hurricane disasters to deny the very real risks of that development. Moreover, after the occurrence of a major event (Hurricane Andrew), they sought to blame nature for the disaster.

Various hazard studies have also noted that there can be significant differences in the risks selected and defined within and across groups in society (e.g. Burton and Kates, 1964; Slovic, 1987; Green *et al*, 1991). These different perceptions can relate to differences in experience and training, vested interest, personality and many other factors.

Importantly, public and technical risk experts often vary significantly in their selection, definition and perception of risks. Slovic (1987) notes that there is wisdom as well as error in public attitudes and perceptions. While lay people sometimes lack certain information about hazards, their basic conceptualisation of risk is often much richer than that of experts and reflects legitimate concerns that are typically omitted from expert risk assessments. This implies that there is a limit as to how well the public can accept certain types of technical information regardless of how "scientific" or "reliable" it

may be. If not properly managed, these differences in risk perception can give rise to complex political difficulties for management agencies.

The effective management of environmental hazards depends on reconciliation of these different risk perspectives. As a result, Slovic (1987) argues that risk communication and risk management efforts are destined to fail unless they are structured as a two-way process. Each side, expert and public, has something valid to contribute. Each side must respect the insights and intelligence of the other. This can be accomplished by recognising that risk communication, the exchange of information and opinions about hazards, should integrate technical information about hazards with the interests and values of affected parties including the public, in order to develop common solutions (Cvetkovich and Earle, 1992).

5 Conclusions

Beach uses and user opinions and preferences have rarely been studied and, to date, very few attempts have been made to utilise beach user opinions within coastal management.

In spite of the limited literature, some preliminary conclusions can be drawn and are outlined below. However, it should be noted that these conclusions are largely drawn from overseas literature, primarily involving surveys of beach users of European descent. Therefore, the findings may not hold well for other ethnic groups (e.g. Maori).

Beaches are highly valued and highly utilised resources, among the most recreational destinations. This also translates into significant economic importance. For instance, in the US travel and tourism is the largest industry, employer, and earner of foreign exchange and beaches receive more tourist visits than combined visits to all federal and state parks, recreational areas, and public lands.

The popularity of beaches for holidays and as places to live is resulting in rapid urbanisation and a worldwide decline in environmental quality and loss of the natural. Much development has also been placed very close to the shoreline, vulnerable to the natural processes of coastal erosion and flooding. This vulnerability is commonly managed in a manner that further degrades the values of the beaches. Nonetheless, beachfront properties are also typically the most expensive.

In New Zealand, beaches are also major visitor destinations and an integral and highly valued part of Kiwi life. For instance, beaches have consistently rated as the most important contributor to the quality of life in the Auckland region. There is also growing urbanisation of beaches, particularly along the east coast of the North Island, including the Coromandel Peninsula within the Waikato Region.

Limited information on temporal variations in beach use, but there appears to be a general trend for highest use in summer, holiday periods, weekends and afternoons.

Most beach users typically spend 2-4 hours on the beach per visit. Day visitors tend to spend most of their time on the beach, while multiple day visitors tend to spend more time in other activities.

While beach visiting is an acceptable solitary experience, most visitors appear to come in groups of 2-5, the majority of which are family groupings.

Beaches are places where people go largely to relax and enjoy themselves. Major activities tend to be passive and restful, particularly sunbathing, doing nothing/resting, walking and swimming, with only a relatively small proportion of users engaged in more physically demanding activities.

The most important elements in the beach experience, for both developed and undeveloped beaches, appears to be the opportunity it gives for tangible, close up contact with the natural physical world, a place to escape from everyday life for a "nature" experience. The beach, waves and the advance and retreat of the tides provide potent symbols of natural forces at work, even where there is much evidence of human intervention.

In obtaining this contact with nature, some people are more strongly attracted to some areas than to others and there is considerable variation in the attractive power of different beaches.

Users visiting developed beaches tend to give a higher priority to facilities, good road access and parking close to the beach than other aspects. Beaches have to be functional, comfortable, user-friendly and safe. On the other hand, users of undeveloped beaches are attracted by their special qualities, including attractive natural settings, views and scenery, peace and quietness, solitude and uniqueness. These users also generally feel strongly that frequentation of such areas should not be encouraged by improvements to road access, parking or other facilities.

However, overall, available studies suggest that natural beaches with limited development and without prominent human-made structures score much better than overdeveloped and overcrowded beaches. There is also evidence from various studies of a growing demand for the natural.

In many studies, there is an apparent inconsistency between actual beach choice and stated beach type preference. This appears to reflect conflicts between the actual preferences of the person and the perceived needs of his or her family and/or children. Other contributing factors may include knowledge of beach location, ease of access and socio-economic constraints.

A significant number of studies indicate that visitors to both developed and undeveloped beaches give a high priority to environmental quality or perceived environmental quality, with water quality and beach cleanliness often rated as the most important characteristics of an ideal beach. Litter, sewage, and polluted water or sand are regarded very negatively, with sewage-derived contaminants having a greater impact than any other aesthetic pollution parameter on the enjoyment of a beach visit.

Perceptions of beach and water quality can be influenced by a variety of factors, including well-publicised hazard or pollution incidents, visual factors such as water discolouration and the quantity of litter, the proximity of facilities such as sewage treatment works, unexciting beach scenery and recollections of previously poor water quality.

Available studies suggest that physical characteristics of the beach, including wave conditions, presence or absence of dunes, beach width and the type and quality of the sand rate high in respondents' attributes of an ideal beach, but are far less significant in choice of beach to visit.

However, sand beaches are markedly preferred over other beach types, with lighter sand colours generally preferred. It is also apparent that physical and climatic attributes that affect physical safety (e.g. waves, currents, beach steepness) and comfort (e.g. warmer water and finer sand) are significant factors for users of developed beaches, but relatively insignificant for users of natural or undeveloped beaches. Users also tend to regard the presence of dunes as a "good" aspect, considering them to be natural, beautiful, and interesting.

The limited information available suggests that New Zealand is not perceived as a beach resort destination because of its "cold" climate. When beaches are mentioned, they are often described as remote, isolated, rugged, wilderness type beaches rather

than “lay back and take it easy” beaches. This suggests that beaches of high natural character are likely to be of more importance to overseas tourists than developed sites.

Accessibility is an important factor in beach choice for day users, with users tending to go where it is easier to go and prepared to trade off quality of the beach for convenience, with considerable decline in visitation with increasing distance from point of origin. This factor is far less significant for multiple day visitors. Length of travel is also closely related to the desires and expectations of the users, with people willing to travel greater distance to get to a relatively undisturbed beach environment with higher standards of tranquillity and cleanliness.

The main mode of transport for beach visitation is private cars and this can affect accessibility and use of beaches by low-income families without vehicles.

Familiarity and tradition appear to be significant factors in beach choice, with visitors tending to return to a beach they have had an association with in the past and have known and visited for many years. Generally, beach surveys have found that a high proportion of visitors, typically around 75%, have used the beach previously.

Most studies have found that beach users are not sympathetic to vehicles and/or dogs on beaches and want these activities controlled. In general, around 75% of the users of developed beaches oppose dogs on the beach, with opposition slightly lower at undeveloped sites.

Relatively few studies have explored public perceptions and response to coastal erosion.
Studies suggest that coastal erosion is almost universally characterised in western literature and art as a struggle between land and the sea, with similar attitudes also evident in Maori perspectives. This view can give rise to basic attitudes represented by “man subject to nature”, “man with nature” and “man over nature”.

Erosion is commonly perceived as being unnatural (a man-induced phenomenon) and often attributed to notable human activities in the area, though many also have a broader understanding that beach erosion hazard is not simply a result of natural processes or human action alone.

Beachfront residents appear to be generally well aware of the existence of coastal erosion and usually able to provide reasonably reliable estimates of magnitude, though occasional examples of over-inflated estimates occur. However, memories of hazard events fade and the more recent the experience, the greater the awareness. Respondents not living on the foreshore or who have not experienced erosion are often less aware. There is also some evidence that communities suppress knowledge of erosion hazard for various reasons.

Owners also commonly purchase beachfront property with full knowledge of the risks and history, finding the risk acceptable because they “want to be there”. These people generally demonstrate a high level of awareness of the interplay between risk, insurance, and other factors affecting the economic value of their property and have enough insurance to cover losses they might incur.

Some studies have also suggested an innate conservatism in people’s attitude, in that the coast is perceived as unchanging. This is often reflected in a desire to stop coastal erosion and to maintain coastal features as they have always known them**,** to keep things as they are.

In general, it appears that coastal erosion is more likely to engender responses than most other hazards. People are not only more aware of adjustment options, but also more likely to adopt them.

In general, property owners are not deterred by erosion and there is an emphasis on decreasing or preventing erosion rather than relocating. For those on the shoreline, the attraction of living in an environment of persistent appeal outweighs the costs involved.

While beaches are appreciated for their natural setting, most people prefer artificial structures to preserve the status quo, rather than the idea of allowing natural processes to do their work at the coast. For property owners, adjustments tend to be measured simply in terms of their success in preserving homes or land. This has significant implications for approaches such as “managed retreat” and the establishment of a resilient naturally functioning coastline, now being widely promoted by coastal managers.

Beachfront owners tend to use only those adjustments which they perceive as being possible, defined by experience, subjective economic efficacy criteria and legal guidelines. Individuals may not be aware of all strategies for dealing with a hazard and the usual pattern is to repeat remedial activities that have “worked” in the past.

In general, engineering adjustments tend to be preferred, particularly rock walls (“rocks, BIG rocks, THOUSANDS of rocks” as one respondent in a survey reported). It has been observed that beach frontagers have an almost infinite faith in boulder walls and feel remarkably secure once they reside behind one!

Protection decisions are often generated by crisis erosion conditions. In situations where coastal structures are poorly regulated, there is a lack of community cohesion and no informed technical opinion, affected individuals can tend to adopt a wide variety of ad hoc adjustments.

As yet, relatively few property owners have adopted or are prepared to consider non-engineering approaches. Nonetheless, there is evidence in some studies of community awareness of the adverse effects of seawalls and a willingness to adopt non-structural approaches, including minimising occupancy of the foreshore and protecting dunes.

In many areas, beach nourishment is also highly favoured by beachfront owners and the wider community, because of the enhancement of recreational values, property values and beach quality.

The available literature suggests that most oceanfront property owners have to be forced off their property by nature and find no incentive to relocate or demolish their houses. In the owner’s perspective, the house can be replaced, as long as enough land remains to build upon.

Available studies, largely within the US, suggest a general perception among beachfront property owners that various levels of government should largely pay for protection works, while the wider community emphasizes the responsibility of property owners.

However, all sectors of the community reject the view that government has no responsibility. In general, they tended to support post-disaster assistance and the use of zoning and other regulatory mechanisms to control development in hazardous areas.

The meaning that erosion holds for the community as a whole significantly influences how coastal erosion is managed and can be a very “political” process.

Therefore, to facilitate more effective management of coastal erosion, consideration should be given to integrating technical information about hazards with the interests and values of affected parties, including the wider public, in order to develop common solutions.

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Appendix I: Summary Of References

No.	Reference	Importance of Beaches/Economic Values	Beach Use and Activities	Development Status	Environmental Quality	Physical Characteristics	Accessibility/ Convenience	Personal Association and Familiarity	Social/Cultural/ Psychological Factors	Perception of Coastal Erosion	Natural Hazards Studies/Perception of Risks	Coastal Erosion: Adjustment Options/Management
1	ACNelsen* (2001)	(NZ)										
2	Alexander (1993).											
3	Agardy* (1993)											
4	Anonymous* (1998)											
5	*Aubrey* (1993).*											
6	*Barnett and Wolfe* (1993)*	(NZ)										
7	*Beatley* et al* (1994)*											
8	Bell* (1986)											(CVM/WTP)
9	*Bell and Leeworthy** (1985)	(CVM/WTP)										
10	Blaikie* (1997)											
11	Bonaiuto *et al** (1996)											
12	Breton *et al** (1996)											
13	Brotherton* 1982)	(R & L)										
14	Brown and Pollakowski* (1977)	(Hedonic Pricing)										
15	Burch* (1969)							(R & L)				
16	Burton and Kates* (1964)											
17	Burton *et al* (1968)											
18	Burton, Kates and White* (1993)											
19	Carlin* (1999)	(NZ)										
20	Carr* 1999)								(R & L)			
21	Carr and Williams* (1993)								(R & L)			
22	Chapman* (1989)											
23	Coastal Guide News (2002)			(NZ)	(NZ)							
24	Coastline Consultants (2002)											(NZ)
25	*Cofer- Shabica* et al* *(1990?)*											

No.	Reference	Importance of Beaches/Economic Values	Beach Use and Activities	Development Status	Environmental Quality	Physical Characteristics	Accessibility/ Convenience	Personal Association and Familiarity	Social/Cultural/ Psychological Factors	Perception of Coastal Erosion	Natural Hazards Studies/Perception of Risks	Coastal Erosion: Adjustment Options/Management
26	*Cmmittee on Bch Nrsh & Protection (1996)*											✓
27	*Cutter* et al ** (1979)*				✓	✓	✓					
28	*Cvetkovich and Earle** (1992)										✓	
29	Dahm 1999a											✓ (NZ)
30	Dahm 199b											✓ (NZ)
31	Dake* (1992)										✓	
32	David *et al* * (2000)											✓
33	Day *et al* (1977) – n/s											✓
34	Dean* (1999)											✓
35	De Ruyck *et al* * (1995)			✓	✓		✓	✓				
36	Dilley and Rasid* (1990)									✓		
37	Dinius* (1981)				✓							
38	Dunn *et al* (2000)											✓
39	Eastwood and Carter* (1981)					✓			✓			
40	Edwards* (1989).	✓ (Hedonic Pricing)										
41	Eiser *et al* * (1994)				✓							
42	Envirocare (2002)	✓ (NZ)										✓ (NZ)
43	Environment (2001)				✓ (NZ)							
44	Environment Waikato (1998)	✓ (NZ)										✓ (NZ)
45	Fabbri (ed.)* (1990)	✓										
46	Field and Cheek* 1974)		✓ (R & L)									
47	Finkl (1996)	✓										✓
48	Fiske* (1983)								✓			
49	Floyd *et al* * (1993)								✓			
50	Forsyte Research (2000)	✓ (NZ)			✓ (NZ)							
51	Furuseth and Ives* (1984)									✓		
52	Furuseth and Ives* (1987)									✓		
53	Granja and de Carvalho (1995)											✓
54	Green *et al* * (1991)										✓	
55	H. John Heinz III Centre* (2000)											✓
56	Heatwole and West* (1980).						✓					
57	Hecock* (1970)			✓		✓	✓					
58	Herring and House (1990) – n/s				✓							

No.	Reference	Importance of Beaches/Economic Values	Beach Use and Activities	Development Status	Environmental Quality	Physical Characteristics	Accessibility/ Convenience	Personal Association and Familiarity	Social/Cultural/ Psychological Factors	Perception of Coastal Erosion	Natural Hazards Studies/Perception of Risks	Coastal Erosion: Adjustment Options/Management
59	Houghton* (1989)	✓					✓					
60	Houston* (2002)	✓										
61	Ives and Furuseth* (1988)									✓		
62	Jackson (1989)								✓ (R & L)			
63	Journal of Coastal Research (1988)											✓
64	Kechington* (1993).	✓	✓									
65	Kraus (1988)											✓
66	Kriesel *et al* (2001?)	✓										
67	Koster and Hillen (1995)											✓
68	Lankford and Baca (1989)											✓
69	Leatherman* (1997)			✓ (Beach Rating)		✓						
70	Lencek and Bosker* 1998)	✓										
71	Lennon *et al* * (1996)											✓
72	Lindsay *et al* * (1992)	✓ (CVM/WTP)										✓ (CVM/WTP)
73	Martin *et al** (2001?)				✓							
74	McConnell* (1977)			✓ (CVM/WTP)								
75	Mercer* (1972).						✓					
76	Miller* (1992)									✓		
77	Mitchell* (1974)									✓		
78	Morgan* (1999a)			✓	✓	✓						
79	Morgan* (1999b)	✓ (Beach Rating)										
80	Morgan* (1999c)			✓(filmed panoramas)								
81	Morgan *et al** (1995)			✓	✓							
82	Morgan *et al* * (1993)			✓	✓				✓			
83	Morgan *et al* * (1997) - n/s					✓						
84	Morgan and Williams* (1995)								✓			
85	Morse *et al* * (1977)								✓			
86	NOAA (1998)	✓										
87	Nelson *et al* * (2000)	✓ (Beach										

No.	Reference	Importance of Beaches/Economic Values	Beach Use and Activities	Development Status	Environmental Quality	Physical Characteristics	Accessibility/ Convenience	Personal Association and Familiarity	Social/Cultural/ Psychological Factors	Perception of Coastal Erosion	Natural Hazards Studies/Perception of Risks	Coastal Erosion: Adjustment Options/Management
		Rating)										
88	NZ Tourism Research Institute (2000)					(NZ)		(NZ)				
89	Nicholas (1995)											
90	Nordstrom and Mitteager* (2001)											
91	Ohio Sea Grant* (2000)											
92	Pearce and Kirk* (1986).											
93	Pendleton* (2001)											
94	*Pendleton* et al * (2001)*											
95	*Peterson & Newmann (1969) – n/s*											
96	*Pilkey (1987)*											
97	Pilkey *et al** (1996)											
98	*Pilkey and Wright (1988)*											
99	*Platt and Beatley 1991).*											
100	*Pompe and Rinechart* (1995).*	(Hedonic Pricing)										
101	*Pompe and Rinechart* (1999)*											(WTP)
102	*Rasid and Hufferd* (1989)*											
103	*Resources Assessment Commission (RAC) (1993)*											
104	*Renn* et al *(1992)*											
105	*Rowntree* (1974)*											
106	*Samanta* (1997)*											
107	*Sam Smith and Piggot (1989)*											
108	*Schreyer* (1984)*							(R & L)				
109	*Shields* (1991)*											
110	*Silberman and Klock* (1988).*											(CVM/WTP)
111	*Slovic* (1987)*											
112	*Slovic* et al * (1980)*											
113	*Smith* (1996)*											
114	*Smith* (1994)*	(Hedonic Pricing)										
115	*Smith* et al* (1991)*											

No.	Reference	Importance of Beaches/Economic Values	Beach Use and Activities	Development Status	Environmental Quality	Physical Characteristics	Accessibility/ Convenience	Personal Association and Familiarity	Social/Cultural/ Psychological Factors	Perception of Coastal Erosion	Natural Hazards Studies/Perception of Risks	Coastal Erosion: Adjustment Options/Management
116	*Spaulding* (1973)*		✓				✓	✓				
117	*Steinberg (1997).*											
118	*Stronge (1995)*											✓
119	*Stronge* (2000)*	✓										
120	*Tobin and Montz* (1997)*										✓	
121	*Tourism Information (2000)*					✓						
122	Toy* (2000)									✓		
123	*Tunstall and* Penning-Rowsell* (1998)		✓	✓			✓	✓		✓		
124	van Herwerden et al* (1989)		✓	✓			✓					
125	*Vent and Davies-Colley* (1988) – n/s				✓							
126	Wertheim *et al* * (1992)	✓ (Hedonic Pricing)										
127	White* (1974)										✓	
128	Whitmarsh *et al* * (1999)											✓ (CVM/VOE)
129	Wiegel (1992)											✓
130	Williams *et al* * (1993)				✓				✓			
131	Williams and Morgan* (1995).	✓ (Beach Awards)										
132	Williams and Nelson* 1997)				✓							
133	Williams and Sothern* (1986).		✓				✓	✓				
134	Williams *et al* * (1992).					✓			✓			
135	Young *et al** (1996)			✓	✓							

Key:

*	Annotated bibliography
CVM/VOE/WTP	Contingent Valuation Method/ Willingness to Pay/ Value of Enjoyment studies
N/C	References not cited
NZ	New Zealand related studies
R & L	Recreational behaviour and leisure studies

Appendix II: Annotated Bibliography

ACNelsen (2001). **Me and the Marine**. Report prepared for Wellington Regional Council.
Qualitative summary of community survey in the Wellington Region examining connectedness and perceptions of the marine environment.

Agardy, M. T. (1993). Accommodating Eco-tourism in Multiple Use Planning of Coastal and Marine Protected Areas. **Ocean and Coastal Management**, 20, 219-239.
Examines growing demands and conflicts in coastal zone and use of multiple-use planning to resolve user conflicts and promote sustainable coastal management. Argues that well-planned nature-based or eco-tourism can be encouraged in coastal protected areas to promote sustainability and that such tourism provides economic and political incentives for management and conservation, and may bring additional benefits to local communities and regional economies.

Anonymous (1998). Fun at the Sea: Coastal Tourism, Recreation. **Sea Technology**, 39(10), 37-47.
Brief paper summarising importance of coastal tourism in the US, including economic value and implications for beach restoration and management.

Aubrey, D. G. (1993). Coastal Erosion's Influencing Factors Include Development, Dams, Wells and Climate Change. **Oceanus**, 36(2), 5-10.
This paper examines different global-change effects on coastal erosion including relative sea-level rise, human influence on local subsidence, coastal storms, altered sediment delivery to the coast and destruction of coral reefs and other biogenic sources.

Barnett, S. and Wolfe, R. (1993). **At the Beach: the Great New Zealand Holiday**. Auckland: Hodder and Stoughton.
A foray into many aspects of New Zealanders relationship with the beach. Includes an examination of the evolution of swimming costumes, holidays under canvas and in baches, surf-lifesaving and seaside picnics, beachcombing and messing about in boats. Extensive selection of photographs and drawings.

Beatley, T., Brower, D. J. and Schwab, A. K. (1994). **An Introduction to Coastal Zone Management**. Washington, D.C.: Island Press.
An introduction to the subject of coastal management, with examples and case studies from coastal management in the US. Includes a review of the (then) existing management framework at federal, state, and local levels, describing major federal programmes and leading state. regional, and special area programmes. The authors focus on coastal ecology and the physical attributes of the coastal zone, population trends and growth pressures confronting coastal areas, and policy issues and conflicts facing those in coastal management.

Bell, F. W. (1986). Economic Policy Issues Associated with Beach Re-nourishment. **Policy Studies Review**, 6(2), 374-380.
Attempts to define and quantify the recreational benefits of beach nourishment. The analysis used the willingness-to-pay method to estimate user value or consumer surplus for a saltwater beach in Florida. A total of 744 beach residents were interviewed by phone. The results indicated that benefits exceeded costs for all beach nourishment projects considered.

Bell, F. W. and Leeworthy, V. R. (1985). An Economic Analysis of Saltwater Recreational Beaches in Florida, 1984. **Shore and Beach**, 53(2), 16-22.

This paper presents estimates of the economic importance and the value of Florida's saltwater beaches measured in terms of total sales, wages, employment and state tax revenues generated by recreational use of the beaches. Found that recreational use of Florida's beaches is a multi-million dollar source of business, generating thousands of jobs and supplying over a billion dollars in income to Florida residents, and generating significant state tax revenues. Also examined willingness-to-pay for an annual beach pass, with resident beach users willing to pay $12.53 per person while tourist beach users were less willing but would pay, on average, $7.56 per year.

Blaikie, A. (1997). Beside the Sea: Visual Imagery, Aging and Heritage. **Aging and Society**, 17(6), 629-648.
This paper explores a range of visual images to examine how one might solve the riddle of what connects older people with British coastal towns.

Bonaiuto, M., Breakwell, G. M. and Cano, I. (1996). Identity Processes and Environmental Threat: The Effects of Nationalism and Local Identity upon Perception of Beach Pollution. **Journal of Community and Applied Social Psychology**, 6, 157-175.
A survey of 347 English students drawn from secondary schools in 6 UK seaside resorts (3 with polluted beaches, and 3 with unpolluted beaches according to the EU criteria). On the whole, students who were more attached to their town or nation tended to perceive their local and national beaches as less polluted. Traditional predictors of environmental evaluation (e.g. socio-demographic variables, environmental concern, use of the environment) did not play an important role in predicting beach pollution perception. Denial of physical assessments of pollution was interpreted as a strategy used to cope with the threat to place identity posed by the labelling of local beaches by a powerful out group (the EU).

Breton, F., Clapes, J., Marques, A. and Priestle G. K. (1996). The Recreational Use of Beaches and Consequences for the Development of New Trends in Management: The Case of the Beaches of the Metropolitan Region of Barcelona (Catalonia, Spain). **Ocean and Coastal Management**, 32(3), 153–180.
A survey carried out in four metropolitan regions of Barcelona to examine the recreational use of beaches and beach user perception. A total of 1,200 interviews (300 for each municipality) were conducted on each beach, together with field observations. The findings indicated that public demand on beaches is very diverse and that diversity is the most important aspect to be taken into account in beach management.

Brotherton, I. (1982). Visitor Frequency and Fidelity as Indicators of Rural Recreation Provision. **Journal of Environmental Management**, 15, 101-107.
A method is developed to assess whether the current countrywide supply of rural recreation resources is adequate from the point of view of recent users. The relative popularity of site types is also examined.

Brown (Jr), G. M. and Pollakowski, H. O. (1977). Economic Valuation of Shoreline. **Review of Economics and Statistics**, 59, 272-278.
Examines the choice of housing attributes, including water-related open space and proximity to bodies of water, in the metropolitan areas of Seattle. The process of implicit price formation is examined, employing market sales data for individual dwelling units. The results indicate that the value of a property falls with distance from the water.

Burch (Jr.), W. R. (1969). The Social Circles of Leisure: Competing Explanations. **Journal of Leisure Research**, 1(2), 125-147.
Illustrates some theoretical possibilities for research on leisure behaviour. Uses data on family camping to suggest that both familiarity and compensatory desires often converge

to shape behavioural choice of a specific recreational activity. Personal community is also identified as one of the sources of such convergence.

Burton, I. and Kates, R. W. (1964). Perception of Natural Hazards. **Natural Resources Journal**, 3 (January), 412-443.
The authors examine variations in the perception of natural hazards. The study demonstrated within group and between group variations in perception between resource users and technical/scientific personnel, noting that these divergences are significant and are likely to affect management policies.

Burton, I., Kates, R. W. and White, G. F. (1993). **The Environment as Hazard**. New York: The Guilford Press, p31-65.
This second edition of the authors' work (first edition in 1978) provides an overview of how people around the world view natural hazards and how they respond to such events. Case studies were drawn from a broad sample of countries, contrasting hazards in developing countries with those in developed countries.

Carlin, J. (1999). **Beach - New Zealand**. Auckland: David Bateman.
A collection of photographs examining the special relationship of New Zealanders with their coast. Explores the environment and sociology of the beach and New Zealanders preoccupation with it as they live, holiday, relax, play sport, pursue hobbies and participate in ceremonies. A short essay is also included in the volume providing an explanation of the importance of the beach to New Zealand.

Carr, N. (1999). A Study of Gender Differences: Young Tourist Behaviour in a UK Coastal Resort. **Tourism Management**, 20, 223-228.
Investigated the leisure activities of 200 young tourists (age of 16 to 35), equally divided by gender, in the beach resort of Torquay in Southwest England. The study found very few gender differences in terms of the leisure activities of young tourists.

Carr, D. S. and Williams, D. R. (1993). Understanding the Role of Ethnicity in Outdoor Recreation Experiences. **Journal of Leisure Research**, 25(1), 22-38.
An onsite survey of visitors to four sites on two neighbouring national forests in Southern California. The study examines the role of ethnicity in outdoor recreational behaviour, specifically the influence of ancestral, generational, and acculturation differences on meanings and preferences related to outdoor recreation and experiences and forest use.

Chapman, D. M. (1989). Human Users and the Beach/Dune Environment. *In*: Chapman, D. M. (ed.), **Coastal Dunes of New South Wales: Status and Management**. University of Sydney, Coastal Studies Technical Report No. 89/3, chapter 4, p57-84.
A major study examining beach user expectations and behaviour in the Hunter Region of New South Wales using site interviews at 52 beaches (5000 interviews of which 4,646 produced useable data) and a mail survey of a stratified sample of 2500, with 1,315 respondents. The fundamental question addressed in the beach/dune study was: "Who uses the beach and why"? Beach users were found to belong to a small number of identifiable classes. Noted that there are only a few beaches where a high level of amenity was desired and that, at most sites, given a minimal level of amenity, the provision of additional comforts is not only unnecessary but undesired by users.

Cofer-Shabica, S. V., Snow, R. E. and Noe, F. P. (1990?) Formulating Policies Using Visitor Perception of Biscayne National Park and Seashore. *In*: Fabbri, P., (ed.) (1990). **Recreational Uses of Coastal Areas**, Dordrecht, the Netherlands: Kluwer Academic Press, 235-254.
This work (undated) examined user perception of the services, facilities, and programmes offered at Biscayne National Park in Miami. This was one of the earliest studies to expand

the scope of the traditional management decision-making process by including public perception. The study examines public assessment and perceptions of the services, facilities, and programmes offered in the Park including management options for change and expanding the scope of the traditional policy and management decision-making by including public perception.

Cutter, S. L. Nordstrom, K. F. and Kuema, G. A. (1979). Social and Environmental Factors Influencing Beach Site Selection. *In*: West, N. (ed.). **Proceedings of the 5th Annual Conference on Resource Allocation Issues in the Coastal Environment**. The Coastal Society, 183-194.
This study examined the role of user preference as a determinant of beach site selection for five New Jersey beaches. A total of 601 responses were gathered. The results indicate no strong systematic relationship between the perception of the attributes of an ideal beach environment and the reason for selecting a particular beach for recreation, with many beach visitors apparently opting for a less than optimal beach environment. Other factors, such as accessibility, social interaction, and the kinds of facilities available are important and appeared to play a role in beach site selection.

Cvetkovich, G. and Earle, T. (1992). Environmental Hazards and the Public. **Journal of Social Issues**, 48(4), 1-20.
This article suggests that hazard managers and others are often perplexed by the diversity of people's conclusions about environmental hazards because they adopt an objectivist perspective, which views risk only as physical characteristics. The constructivist perspective adopted by social sciences holds that risk assessment reflects human judgements, which are influenced by various psychological and social factors, which the study reviews. Argues that the effective management of many environmental hazards depends on reconciliation of the objectivists and constructivist perspectives.

Dake, K. (1992). Myths of Nature: Culture and Social Construction of Risk. **Journal of Social Issues**, 48(4), 21-37.
This article examines the cultural context in which hazards are framed and debated, and in which risk taking and risk perception occur. The author argues that, while individuals perceive risks and have concerns, it is culture that provides socially constructed myths about nature – systems of belief that are reshaped and internalised by persons, becoming part of their worldview and influencing their interpretation of natural phenomena. Cultural patterns of risk perceptions in the context of hierarchy, egalitarianism, individualism, and fatalism are discussed.

David, S. D., Baish, S. and Marrow, B. H. (1999). Uncovering the Hidden Costs of Coastal Hazards. **Environment**, 14(8), 10-19.
Reports on the immediate hidden or unreported costs of coastal disasters, using Hurricane Hugo as the core example. These hidden costs are associated with the social impacts and costs to communities, and the losses of natural resources. This article is based on a report from the H. John Heinz III Centre for Science, Economics and the Environment.

Dean, C. (1999). **Against the Tide: The Battle for America's Beaches**. New York: Columbia University Press.
Dean presents the controversies surrounding the management of coastal hazards and calls for a rethink of Americans' efforts to hold back the sea.

De Ruyck A. M. C., Soares A. G. and McLachlan A. (1995). Factors Influencing Human Beach Choice on Three South African Beaches: a Multivariate Analysis. **GeoJournal,** 36 (4), 345-352.
This paper investigated three South African beaches, examining factors influencing beach choice at sites with different levels of development and the different characteristics

important in respondent's view of an ideal beach. Factors relating to level of beach development were the most important influences on beach choice at some sites, but traditional/historical, socio-economic factors and accessibility were more important at the less developed site, which was visited by people of a lower socio-economic level.

Dilley, R. S. and Rasid, H. (1990). Human Responses to Coastal Erosion: Thunder Bay, Lake Superior. **Journal of Coastal Research**, 6(4), 779-788.
This study analysed community awareness of and responses to coastal erosion hazard in a township on the Canadian shore of Lake Superior. The sample included 133 responses from lakeshore residents and inland property owners. Awareness was high among lakefront respondents, with the major responses being either to tolerate the hazard or to rely on inexpensive physical shore protection.

Dinius, S. H. (1981). Public Perceptions in Water Quality Evaluation. **Water Resources Bulletin**, 17(1), 116-121.
A visual perception test was conducted to examine the public's perception of water quality. Photographic slides were taken at 5 water sites where the level of visual pollution was artificially altered by the investigator. Increases in water discolouration and the quality of litter were viewed as increases in level of pollution. The public not only evaluated visually polluted sites lower for uses such as picnicking, but they also evaluated the quality of the actual water lower. Further analysis indicated that a combination of water colour, scenic beauty appreciation, quality of the surrounding environment and industry as a pollution source explained 73% of the variance in predicting overall pollution.

Eastwood, D. A. and Carter, R. W. G. (1981). The Irish Dune Consumer. **Journal of Leisure Research**, 13(4), 273-281.
A survey of 110 beach and dune users was conducted at Northern Ireland beaches to identify the standard coastal recreation "dune consumer", as opposed to the "non-dune" consumer. Results show certain significant idiosyncratic tendencies among those visitors who prefer dune-based activities. On average, most people were prepared to acknowledge that dunes serve some mildly useful purpose but there was little public recognition of the impact of recreational use on dunes and coastal erosion.

Edwards, S. F. (1989). On Estimating Household Demand for Outdoor Recreation from Property Values: An Exploration. **Northeastern Journal of Agricultural and Resource Economics**, 18, 140-148.
This paper explores the use of hedonic price analysis to estimate the surplus benefits of local outdoor recreation when distance to the recreational site is captured in property values. Equilibrium occurs when the reduction in the cost of a property due to a marginal increase in distance to the recreational area equals the associated loss in recreational surplus resulting from increased travel costs. The theoretical model is applied in an exploratory analysis of the "demand" for distance to the nearest public beach from which total surplus benefits are estimated.

Eiser, J. R., Reicher, S. D. and Pudpadec, T. J. (1994). Awareness of Bad News, Environmental Attitudes, and Subjective Estimates of Coastal Pollution. **Risk Analysis**, 14(6), 945-948.
A survey of 154 holiday-makers on English beaches conducted to assess awareness of local hazards or incidents associated with either the electricity supply industry or the water and sewage industry. The study examined the relationship between awareness and evaluation of the industry, current and future levels of pollution on the beach in question, and general levels of concern about environmental pollution. The findings suggest a cyclical relationship between risk awareness and concern. On the one hand, reports about environmental hazards may lead to generalised concern across specific contexts; on the other hand, greater levels of concern may sensitise individuals to such reports.

Fabbri, P., (ed.) (1990). **Recreational Uses of Coastal Areas**. Dordrecht, the Netherlands: Kluwer Academic Press.
This volume is a collection of 23 papers (most of them case studies) authored by contributors from many parts of the world. In his introductory essay, the author raises the fundamental question of the specific attributes of the coast that cause it to be a favoured environment among recreationists. As a whole, the contributions enforce the belief that coastal zones are key areas where careful land use controls and sound planning measures are needed for the benefits of the tourism industry and the well being of humans.

Field, D. R. and Cheek (Jr.) N. H. (1974). A Basis for Assessing Differential Participation in Water-Based Recreation. **Water Resources Bulletin**, 10(6), 1218-1226.
This paper describes an alternative framework whereby differences among recreational users can be identified. The work considers social groups as a structural variable that differentiates participation patterns in water-based recreation. A probability sample of 1,504 residents of Washington, Oregon and California regions were selected and interviewed by telephone. Additional information was collected by participant observation at coastal beach areas and several inland lakes during the autumn, spring and summer periods of 1971, 1972 and 1973. The human behavioural factors that determine participation patterns were examined. It was found that, when activities are considered in the context of a human group, differences in participation patterns can be discovered.

Fiske, J. (1983). Surfalism and Sandiotic: The Beach in OZ Popular Culture. **Australian Journal of Cultural Studies**, 1(2), 120-149.
Considers a beach in the Perth area, treating it as a text, a signifying construct of potential meanings operating at a number of levels. Examines the idea that though different people use the beach differently and find different meanings in it, there is a core of meanings that all users share to a greater or lesser extent. Suggests that the politics of pleasure may be the only means of building a culture that is in harmony with instead of in opposition to nature.

Floyd, M. F., Gramann, J. H. and Saenz, R. (1993). Ethnic Factors and the Use of Public Outdoor Recreation Acres: The Case of Mexican Americans. **Leisure Sciences**, 15, 83-98. This study investigated the effects of sub-culture, marginality, and perceived discrimination on the use of selected public outdoor recreation areas using data from telephone interviews conducted with 1057 households in Maricopa and Gila counties in Arizona. The analysis was conducted using a sub-sample of respondents of Mexican ancestry. The results support the socio-economic, or marginality, hypothesis. There was less support for the sub-cultural, or ethnicity, hypothesis.

Furuseth, O. J. and Ives, S. M. (1984). Community Responses to Coastal Erosion Hazard. **Southeastern Geographer**, 24(1), 42-57.
The research was conducted on a small, traditional coastal community on Carolina Beach, North Carolina, with a total of 91 permanent residents surveyed, slightly less than 5% of the year round residents. The study examined residents' perceptions of coastal erosion hazard, their attitudes towards adjustments to beach erosion, and their perception of the role of government in mitigating coastal erosion. This research found that Carolina Beach residents were aware of the erosion hazard facing their community and tended to view it as a continuous, natural process, while also realising that erosion risk was increased by human actions involving encroachments onto the foreshore. Having experienced an array of unsuccessful engineering solutions, a majority of the community now favours non-structural adjustments.

Furuseth, O. J. and Ives, S. M. (1987). Individual Attitudes Toward Coastal Erosion Policies: Carolina Beach, North Carolina. *In*: Platt, R. H., Pelczarski, S. G., and Burbank, B. K. R. (eds). **Cities on the Beach: Management Issues of Developed Coastal Barriers**. The University of Chicago, Department of Geography, Research Paper no. 224, p 185-196.
This research, the second phase of an empirical analysis of community and individual responses to coastal erosion hazard in Carolina Beach, focuses on the variation in individual attitudes toward erosion management options. The analysis considered the effect of 11 locational, tenure, and socio-economic characteristics on the responses to erosion mitigation options, to test the hypothesis that individual attitudes are influenced by the social and residential characteristics of the respondents. The study found no single characteristic or set of characteristics that affects the perception of all erosion policies and that response to alternative erosion mitigation strategies varies with the type of policy. Community attitudes toward government assistance and police power policies were relatively consistent, with no noteworthy attitudinal differentiation based on community characteristics. However, for engineering or physical approaches to erosion, there was considerable variance in response.

Green, C. H., Tunstall, S. M. and Fordham, M. H. (1991). The Risks from Flooding: Which Risks and Whose Perception? **Disasters**, 15(3), 227-236.
This study considers risk perception among four main groups (engineers, emergency planners, the public and researchers) in relation to the risk from flooding. It is argued that the groups vary significantly in their selection and definition of risks from flooding as a focus of concern and that their definition of risk influences their expectations about future events and the appropriate response to those events.
H. John Heinz III Centre for Science, Economics and the Environment (2000). **The Hidden Costs of Coastal Hazards: Implications for Risk Assessment and Mitigation**. Washington, D. C.: Island Press.
Explores vulnerability, risk, and the true costs of coastal hazards, using a panel of experts from different disciplines, to help develop new strategies to identify and reduce the costs of weather-related hazards associated with coastal development. The volume considers the costs of coastal hazards to natural resources, social institutions, business, and the built environment. The authors also examine government policies that have failed to discourage practices that exacerbate the hazard problem and offer a policy model that may better serve the country.

Heatwole, C. A. and West, N. C. (1980). Mass Transit and Beach Access in New York City. **Applied Geography**, 70(2), 210-217.
This study examined access to New York beaches and involved 1,670 user interviews at 3 of the 10 New York City beaches. The data suggest that people were inclined to use the subway or bus when it provides direct access to the beach, but that they would otherwise generally use other transport. Available mode of access also explained “poor” and “rich” beaches, since poorer individuals tended to rely on public transport and were generally not able to access beaches that were difficult to reach by this means.

Hecock, R. D. (1970). Recreation Behaviour Patterns as Related to Site Characteristics of Beaches. **Journal of Leisure Research**, 2(4), 237-250.
An investigation of the relationship between beach use and various beach attributes, including accessibility, facilities, development status and physical attributes, at 10 Cape Cod beaches, with 90 interviews conducted at each site. Results suggest that considerable variation in the attractive power of different beaches, with some people more strongly attracted to some areas than others. For instance, beach location relative to Cape Cod canal was important in explaining the patterns of day users but entirely different criterion of accessibility were relevant to other visitors. Higher attendance was associated with the availability of beach facilities and the development of nearby areas.

Houghton, D. S. (1989). Some Aspects of Beach Use in the Perth Metropolitan Area. **Australian Geographer,** 20(2), 173-184.
This study, based on a survey of beach use in the Perth metropolitan area, examines travel patterns associated with beach usage. The most popular beaches were found to draw people from throughout the metropolitan area, with many people prepared to travel relatively long distances to visit a particular beach. Moreover, although a distance-decay effect is apparent, there is little relationship between the pattern of trip generation in Perth and other demographic or status differences between suburbs.

Houston, J. R. (2002). The Economic Value of Beaches – A 2002 Update. **Shore and Beach**, 70(1), 3-10. You can also find the article on the web site: **www.asbpa.org**
Examines the economic significance of US beaches as an employer, an earner of foreign exchange, and in the travel and tourism industry. Also examines the economic return obtained from the nourishment of Miami Beach. Noted that foreign tourists at Miami Beach pay more in Federal taxes than the Federal Government spends nationally on beach nourishment and argues that the US needs to spend more on restoration and protection of beaches to maintain international competitiveness.

Ives, S. M. and Furuseth, O. J. (1988). Community Response to Coastal Erosion: The View From Two Carolina Beach Areas. **Ocean and Shoreline Management**, 11(3), 177-193.
This study compared the response to coastal erosion of two communities in North Carolina, US, with 91 interviews at one site and 133 at the other. The results suggest that residents of both communities are aware of the hazard, and view it as a natural process with which they must cope. Both communities recognised that erosion risk is increased by human action and were strongly supportive of non-structural approaches and only moderate support for engineering approaches. Both also supported post-disaster assistance from federal and state governments, but provided only weak support for subsidised hazard insurance.

Kechington, R. (1993). Tourism in Coastal and Marine Environments – a Recreational Perspective. **Ocean and Coastal Management**, 19, 1-16.
This study examines the impact of recreation and tourism on coastal environments. It argues that, in the long-term interests of the environment and all usage sectors, environment and resource management in the coastal zone should be conducted on a multiple-use strategic basis and incorporates specific recreation and tourism objectives and strategies.

Leatherman, S. P. (1997). Beach Rating: A Methodological Approach. **Journal of Coastal Research**, 13(1), 253-258.
A beach rating system was devised and implemented between 1989-1991 to rank the major public recreation beaches along the US open marine coasts (about 650 beaches) based on 50 criteria in an attempt to quantify the elusive quality factor. Initially, the top 10 beaches were always found In Hawaii and Florida because the survey was developed for swimming beaches. However, the addition of other categories (e.g. scenic, walking, wild, sports) resulted in top rankings for beaches from Maine to Washington.

Lencek, L. and Bosker, G. (1998). **The Beach: The History of Paradise on Earth**. New York: Viking.
This volume depicts the story and history of the beach, how the beach has become the symbolic place where each wave of inhabitants can make real its own idea of paradise. The authors chart the evolution of the seaside from a wasteland at the margins of civilisation to its present role as a staging ground for escape and recreation. Embedded in the story are the histories of sexuality, health, fashion, and sport, as well as accounts of

the development of beach architecture (and beachwear) and the rise of great beach resorts, whose very names – Brighton, St. Tropex, Newport, Miami Beach – are synonymous with pleasure.

Lennon, G., Neal, W. J., Bush, D. M., Pilkey, O. H., Stutz, M. and Bullock, J. (1996). **Living with the Carolina Coast**. Durham, North Carolina: Duke University Press.
A text primarily directed towards the coastal dweller and developer, covering everything from a history of the development of South Carolina's coast to recommendations on how to select an island home-site. Aims to increase community awareness of how barrier islands and beaches operate, of coastal hazards and how to avoid or reduce their impact.

Lindsay, B. E., Halstead, J. M. and Tupper, H. C. (1992). Factors Influencing the Willingness to Pay for Coastal Beach Protection. **Coastal Management**, 20, 291-302.
Examines coastal beach visitors' willingness to pay for a beach erosion programme. A Tobit model was developed utilising data obtained from interviews of 1100 recreational beach users at Maine and New Hampshire beaches. The significant factors influencing a beach user's willingness to pay for coastal protection works were the number of years visiting a particular beach, income level, familiarity with beach protective laws, state of residence, and the presence of sand dunes.

Martin, N., Pendleton, L. H. and Program in Environmental Studies, University of Southern California (2001?). Perceptions of Environmental Quality and Risk in Beach Recreation.
URL**: www-rcf.usc.edu/~linwoodp/cv.pdf**
This study examines how the personal characteristics of Southern California residents affect perceptions of environmental quality and risk. The study focuses on four potential determinants of risk and quality perceptions: information, past experience, culture, and socio-economic characteristics. Survey results indicate that media sources of information and past experience contribute to an individual's perceptions of ocean water quality and the environmental health risks associated with bathing in polluted waters, but the individual's cultural background was not a significant factor. The findings suggest a greater role for public education programmes, both in communicating potential risk sources and in providing the public with accurate information about water quality.

McConnell. K. E. (1977). Congestion and Willingness to Pay: A Case Study of Beach Use. **Land Economics**, 53(2), 185-195.
This paper develops and applies a model for estimating the demand for congested recreation sites in densely populated areas. A direct interview approach was undertaken to measure willingness to pay, interviewing a total of 229 individuals on 6 Rhode Island beaches. Results suggested that congestion reduced the individual's recreational benefits (consumer surplus). Also, that congestion has different effects at different beaches and therefore planners can increase the social value derived from these resources by setting different standards at different beaches.

Mercer, D. C. (1972). Beach Usage in the Melbourne Region. **Australian Geographer,** 12 (2), 123-139.
This study analyses the travel patterns of beach users in the Melbourne metropolitan area, based on data from a large-scale (15,000 interviews) survey of beach use conducted on Port Philip Bay. Results suggested that non-coastal residents have a preference for relatively lower-crowding and/or pollution levels, with recreational day-trips also oriented very markedly away from the central business district. It was suggested that various factors play a role in determining recreational patterns and not just travel distance alone.

Miller, C. (1992). On the Brink: Coastal Location and Relocation Choices. *In*: Platt, R. H., Miller, H. C, Beatley, T., Melville. J. and Mathenia, B. G. (1992). **Coastal Erosion: Has**

the Retreat Sounded? University of Colorado, Boulder, United States: Institute of Behavioral Science, p167-189.
This study examine financial and personal factors that influence private beachfront owners in two US coastal communities vulnerable to storm surge and coastal erosion hazards. Interviews were conducted with federal, state, and local officials; property owners whose homes were threatened by coastal erosion; realtors; insurance agents; and others involved with management and development in the coastal zone. Found that property owners were well aware of the risk but had no intention of moving unless a natural catastrophe makes their land unbuildable. Also, that existing programmes designed to encourage retreat provided little to no real incentive for owners to relocate or demolish their homes.

Mitchell, J. K. (1974). **Community Response to Coastal Erosion**. Chicago: The University of Chicago, Department of Geography Research Paper No. 156.
A survey of 5 communities along the east coast of the US with recognised coastal erosion problems, interviewing a total of 130 individuals who occupy and manage land adjacent to the ocean. The study examined how individual beach frontagers perceive and adjust to coastal erosion and how their responses differ from those facing other environmental hazards. The links between processes of individual decision-making and broader aspects of collective behaviour were also examined with respect to the selection of adjustments to coastal erosion.

Morgan, R. (1999a). Preferences and Priorities of Recreational Beach Users in Wales, U.K. **Journal of Coastal Research**, 15(3), 653-667.
Beach user preferences and priorities for 50 beach aspects were investigated via surveys at 23 Welsh beaches. Results from 859 questionnaires indicated that landscape or scenery was the most important single factor, followed by bathing safety, and a variety of factors associated with beach environmental quality (e.g. bathing water quality, absence of sewage debris, litter and unpleasant odours. Various aspects concerning beach facilities were generally allocated a lower priority. There were also observed differences in beach user preferences in terms of development level. A contrast was suggested between those wishing to enjoy the natural characteristics of a beach and those who preferred traditional beach resort qualities.

Morgan, R. (1999b). A Novel, User-Based Rating System for Tourist Beaches. **Tourism Management,** 20(4), 393-410.
A novel beach rating system was designed based on beach-user opinions and taking into account all measurable aspects of importance. A checklist was derived based on beach survey data, with weightings derived from the survey. This checklist was used to assess and generate percentage-rating scores for 70 popular tourist beaches in Wales. The system also took into account the differing desires of beach users (i.e. those preferring to visit commercialised beaches and those preferring less developed sites).

Morgan, R. (1999c). Some Factors Affecting Coastal Landscape Aesthetic Quality Assessment. **Landscape Research**, 24(2), 167-184.
Video panoramas of 70 beaches in Wales were used to investigate beach scenery preferences. The survey involved 3 groups of judges: coastal managers, students in environmental sciences, and technical staff with no environmental training. The results indicated a strong preference for undeveloped beaches over those where anthropogenic preferences were prominent and for beaches with high relative relief. Beach commercialisation level had an independent effect only on scores from the student group (suggesting social variance such as age could be a factor shaping preferences). Results suggested that coastal managers may assess beach landscape quality according to different criteria than those used by people with no environmental training.

Morgan, R., Bursahoglu, B., Hapoglu-Balas, L., Jones, T. C., Ozhan, E. and Williams, A. T. (1995). Beach User Opinions and Beach Ratings: A Pilot Study on the Turkish Aegean Coast. *In*: Ozhan, E. (ed.). **Medcoast '95**: Proceedings of the 2nd International Conference on the Mediterranean Coastal Environment, October 24-27, Tarrangona, Spain. Ankara, Turkey: METU, 373-383.
A questionnaire survey of 245 beach users at 5 beaches on the Turkish coast was conducted to assess beach user preferences and priorities, using a checklist consisted of 45 beach aspects. This beach quality rating system take into account aspects of beaches that are important to beach users, enabling beach users and coastal mangers to rate beaches objectively and has implications for Mediterranean tourism and coastal zone management.

Morgan, R., Jones, T. C. and Williams, A. T. (1993). Opinions and Perceptions of England and Wales Heritage Coast Beach Users: Some Management Implications from the Glamorgan Heritage Coast, Wales. **Journal of Coastal Research**, 9(4), 1083-1093.
Beach users at 4 intensively zoned beach areas on the Glamorgan Heritage Coast in Wales were interviewed in regard to their opinions and perceptions of the beach environment. The respondents, 50 persons at each site plus 21 children at one of the beaches, were also classified using the Eysenck Personality Inventory. A relationship was found between personality traits and preferences for beach type. Users perceptions of water quality, including factors influencing opinions about water quality were also examined. A close link was suggested between perceptions of water quality and suitability of the beach for swimming.

Morgan, R., Junyent, R., Micallef, A., Ozhan, E. and Williams, A. T. (1997). The Development of a Beach User Climate Index and Its Application to Euro-Mediterranean/Black Sea Coastal Tourism Areas. In Ozhan, E. (ed.), **Medcoast '97**, Ankara, Turkey: METU, p605-620.
A climate index was devised based on beach-user preferences for thermal sensation and bathing water temperature together with factors such as wind speed, duration of sunshine and absence of rainfall.

Morgan, R. and Williams, A. T. (1995). Socio-Demographic Parameters and User Priorities at Gower Beaches, Wales, U. K. *In*: Healy, P. and Doody, P. (eds.), **Directions in European Coastal Management**. Cardigan, U.K.: Samara Publishing Ltd, p83-89.
This study investigated the preferences and priorities of beach users and examined the relationship of socio-demographic parameters to these preferences and priorities. Four Welsh beaches were studied, with 50 interviews at each site. Interviewees prioritised 50 selected beach qualities on a point scale of 1-5.

Morse, S. J., Peele, S. and Richardson, J. (1977). In-Group/Out-Group Perception Among Temporary Collectives: Cape Town Beaches. **South Africa Journal of Psychology**, 7, 35-44.
A study of stereotypes and in-group/out-group feelings in which a total of 328 persons at 10 Cape Town beaches were interviewed regarding their perceptions of each of the beaches. Many rated their own beach more positively than others rated it. Users of any particular beach were also less likely than others to believe that most people were there "to be seen".

Nelson, C., Morgan, R., Williams, A. T. and Wood, J. (2000). Beach Awards and Management. **Ocean and Coastal Management**, 43, 87-98.
A study of UK Welsh beach resorts examining the influence of the three major UK beach award systems (Blue Flag, Seaside Award and Good Beach Guide). At two major beach resorts, open questionnaires were used to assess 700 beach users' knowledge of beach awards, their opinion, the influence of award status on destination selection and the

relevance of award criteria to beach users. The majority (72%) of beach users asserted that award status was an important basis for beach selection, but findings suggested poor levels of knowledge of the awards and associated criteria. Further research at 23 beach sites found that aspects included in the Blue Flag and Seaside Awards accounted for only one-third of users' total beach rating. The authors argue a need for beach awards to take proper account of the desires of beach users. Also, that awards should be appropriate to undeveloped as well as commercialised beaches, thereby reducing the temptation to add possibly undesired facilities to pristine beaches for the purpose of award qualifications.

Nordstrom, K. F. and Mitteager, W. A. (2001). Perceptions of the Value of Natural and Restored Beach and Dune Characteristics by High School Students in New Jersey, USA. **Ocean and Coastal Management**, 44, 545-559.
High school science students from four New Jersey schools were surveyed to assess knowledge and attitudes about natural habitats and dune restoration on a human-modified coast, with 810 questionnaires completed. Students mentioned natural attributes most frequently when asked about the importance of a beach. However, cumulatively, the many recreational attributes of a beach (recreation, have fun, relax/escape) were more frequently mentioned. Students preferred dunes to no dunes and wide beaches to narrow beaches but had no clear preference about raking to remove beach debris. A large majority (72%) of all students said that lost natural dunes and vegetation should be restored.

Ohio Sea Grant (2000). The Economics of Lake Erie Beaches: 1998 Lake Erie Beach User Survey Results.
URL**: www.sg.ohio-state.edu/pdfs/fs-082.pdf**
The results of a 1998 Ohio Sea Grant survey of 1,587 visitors to different Lake Erie beaches. The fact sheet presents demographic, travel, and expenditure information, how visitors spent their time during their trip, and how visitors responded to several questions relating to their perceptions of the beaches and beach quality.

Pearce, D. G. and Kirk, R. M. (1986). Carrying Capacities for Coastal Tourism. **Industry and Environment**, 9(1), 3-7.
Examines the impacts of coastal tourism and the concept of carrying capacity, including social, physical and environmental capacities.

Pendleton, L (2001). Exploring the Gap Between Measured and Perceived Quality.
URL**: www-rcf.usc.edu/~linwoodp/gap.pdf**
This paper explores the gap between measurable water quality attributes and the perceived quality of coastal ocean waters in Southern California, U.S. The analysis focuses on the relative accuracy of perceptions of water quality and the factors that influence accuracy. Specifically, a telephone survey of 403 households asked respondents water quality of two randomly chosen, well-known beaches in Southern California. The results found that even when information is made available through public campaigns, people may still retain inaccurate perceptions of environmental quality. Fewer than half were able to correctly rank the two randomly chosen beaches in terms of water quality. A logit analysis of the rankings revealed systematic factors underlying the accuracy of people's perceptions. It is also demonstrated that failure to fully account for omitted variables in revealed preference valuation models may lead to false findings of statistical relationships between measured environmental quality and consumer choice.

Pendleton, L., Martin, N. and Webster, D. G. (2001). Public Perceptions of Environmental Quality: A Survey Study of Beach Use and Perceptions in Los Angeles County. **Marine Pollution**, 42(11), 1155-1160.
URL**: www.usc.edu/dept/economics/usclace/survey.PDF**

Summary results of a survey of 400 randomly chosen households in Los Angeles County are given. Respondents were asked about their beach use and perceptions of environmental quality: both coastal water quality and air quality. The survey found that, despite documented successes in the battle to clean up the coastal waters of Southern California, Los Angeles County residents continue to view the ocean more as a place of pollution than a vibrant and healthy place for bathing and swimming. The residents tend to hold perceptions of marine water quality that are at odds with data on bacteriological measures of water quality collected by local sanitation districts. The results suggest that perceptions of coastal water quality may be influenced less by coastal education campaigns and more by the media and other factors.

Pilkey (Jr.), O. H., Neal, W. J., Pilkey (Sr.), O. H. and Riggs, S. (2nd ed.) (1996). **From Currituck to Calabash: Living with North Carolina's Barrier Islands**. Durham, North Carolina, US: Duke University Press.
The book was written to assist North Carolina residents to learn to live in harmony with nature at the shoreline and to understand fully the consequences of doing otherwise.

Pompe, J. J. and Rinechart, J. R. (1995). Beach Quality and the Enhancement of Recreational Property Values**. Journal of Leisure Research**, 27(2), 143-154.
This study used the hedonic pricing method to examine the contribution of beach quality, as measured in terms of beach width, to property values at two South Carolina coastal towns. Using two separate models, the study estimates the value of wider beaches to vacant lots and single-family homes, both with and without water frontage. The results suggest that increasing beach width increases the value of developed and undeveloped lots. The willingness to pay for wider beaches is a reflection of the additional storm protection and recreational values produced by wider beaches.

Pompe, J. J. and Rinechart, J. R. (1999). Establishing Fees for Beach Protection: Paying for a Public Good. **Coastal Management**, 27, 57-67.
This study uses a hedonic model to estimate the effect of beach width on developed and undeveloped property values on Seabrook Island, South Carolina. The authors argue that costs of controlling shoreline erosion are not allocated equitably. Based on the calculations of the value of beach width, the results provide guidelines for setting fees to pay for beach protection. It was suggested that this method is also applicable to other areas that require beach maintenance.

Rasid, H. and Hufferd, J. (1989). Hazards of Living on the Edge of Water: The Case of Minnesota Point, Duluth, Minnesota. **Human Ecology**, 17 (1), 85-100.
This study surveyed 175 lake and bayside residents in a community on the shore of Lake Superior, with regard to the perceived causes of lake level fluctuations and shore property hazards. The study found that, despite significant differences in property setting and the nature of flood and erosion hazards between the lakeside and bayside areas, the majority of the respondents perceived that their property hazards were primarily caused by human manipulation of lake levels.

Rowntree, R. A. (1974). Coastal Erosion: The Meaning of a Natural Hazard in the Cultural and Ecological Context. *In*: White, G. F. (ed.) **Natural Hazards: Local, National, Global**. New York: Oxford University Press, p70-79.
This study reports an analysis of individual and community perceptions of cliff erosion hazard and adjustment options in a Californian coastal near San Francisco. The sample included the wider community and not just the landowners adjacent to the sea, with 120 interviews conducted with heads of households located in high, medium and low hazard locations.

Samanta, A. (1997). Cyclone Hazards and Community Response in Coastal West Bengal: An Anthropo-Historical Perspective. **Economic and Political Weekly**, September 20, 2424-2428.
The study investigates how the residents in Coastal Bengal, an area exposed to repeated cyclones, cope with the hazards. It was found that residents of the region refused to migrate elsewhere unless forced or rendered completely homeless. Though social tensions do arise due to discrimination in the relief work, cyclone disasters generally tend to act as a social leveller and a social cement, enabling the victims to reside in the land of their deceased predecessors.

Schreyer, R., Lime, D. W. and Williams, D. R. (1984). Characterizing the Influence of Past Experience on Recreation Behavior. **Journal of Leisure Research**, First Quarter, (1), 34-50.
Data from a national survey of river recreationalists was used to study the effects of previous experience on variables related to participation. The extent of previous participation in recreational pursuits can serve as an indicator of the amount and type of information a person draws on to make decisions concerning leisure behaviour. Differing patterns of participation may suggest variation in the reasons for engaging in the same type of activity. Significant differences were observed in onsite behaviours, motives for participation, subjective perceptions of the environment and of the trip, perceptions of conflict, and support for managerial intervention.

Shields, R. (1991). **Places on the Margin: Alternative Geographies of Modernity**. London: Routledge, p73-116.
The main theme of this volume is space and spatial practice. It demonstrates the mutual relevance of sociology and geography, and outlines a social theory of the spatial in making up culture through four case studies of the role of space in supporting social activities. Chapter Two of the volume analyses the cultural positioning of Brighton as a seaside resort, demonstrating that its position was constructed within the broader framework of the spatialisation of British culture.

Silberman, J. and Klock, M. (1988). The Recreation Benefits of Beach Nourishment. **Ocean and Shoreline Management**, 11, 73-90.
This paper presents a methodology for direct estimation of recreational benefits associated with beach re-nourishment utilising a contingent valuation method. The survey was designed to measure the recreation and existence value of beach nourishment along a 12-mile stretch of New Jersey beach that has experienced such substantial erosion that beach recreation is limited. Interviews were conducted with current beach users who were asked to place a value on the existence of the beach renourishment and whether or not they would use the beaches themselves. The study found that the estimated benefits are more sensitive to the estimated increase in visitation associated with beach re-nourishment than to the estimated increase in willingness to pay. The study argues that more emphasis needs to be placed on visitation estimates in cost-benefit analysis of beach nourishment. Estimates of the existence value of beach re-nourishment were also provided.

Slovic, P. (1987). Perception of Risk. **Science**, 236, 280-285.
This paper discusses the importance of understanding risk perception. Such an understanding is important as it provides a basis for understanding and anticipating public responses to hazards and improves the communication of risk information among lay people, technical experts, and decision makers.

Slovic, P., Fischhoff, B. and Lichtenstein, S. (1980). Facts and Fears: Understanding Perceived Risk. *In*: Schwing, R. and Albers, W. A. (eds.). **Societal Risk Assessment: How Safe is Safe Enough?** New York: Plenum Press, p181-216.

The paper provides an analysis of the biases exhibited by lay people and experts when they make judgements about risk. The similarities and differences between lay and expert evaluations are examined in the context of a specific set of activities and technologies. Finally, some special issues are discussed, including the difficulty of reconciling divergent opinions about risk, the importance of catastrophic potential in determining perceptions and triggering social conflict, and the need to facilitate public participation in the management of hazards.

Smith, A. W. (1996). Response of Beachfront Residents to Coastal erosion Along the Queensland Gold Coast, Australia. *In*: Finkl, Jr., C. W. and Department of Geology, Florida (eds.). Coastal Hazards: Perception, Susceptibility and Mitigation. **Journal of Coastal Research,** Special Issue No 12, p 17-25.
During the period 1971-1976 the author acted as the interface between the Gold Coast City Council and beachfront residents for matters concerning coastal erosion and remedial measures. During this period, the Gold Coast was affected by five cyclone storm events, each of which generated significant coastal erosion, and much damage was done to the local beaches. During these events, the writer met the owner or tenant of every beachfront building that was damaged or threatened on the Gold Coast, with a total of nearly 400 people interviewed. This commentary represents an attempt to record the writer's recollections of these meetings, together with what conclusions he believed might reasonably be drawn from these on-site discussions.

Smith B H. (1994). Coastal Setback and the Impact of Water Amenities. **Geographical Analysis**, 26 (4), 364-369.
This article analysis the impact of a larger water body – Lake Michigan – on residential property values using two models that incorporate a coastal setback term. Results suggest that Lake Michigan and the setback width from the Lake significantly impact property values. Property values fall with distance from the water and rise with setback size.

Smith, D. G., Cragg, A. M. and Croker, G. F. (1991). Water Clarity Criteria for Bathing Waters Based on User Perception. **Journal of Environmental Management**, 33, 285-299.
Perception of bathing water quality was studied using a survey of bathers and bystanders. Bathing water quality assessment was strongly related to visual cues and, in particular, water clarity. However, perception of water clearness appears to markedly affect a site's overall suitability for bathing only at low water clarities.

Spaulding, I A. (1973). **Factors Related to Beach Use**. University of Rhode Island Marine Technical Report Series, no. 13, Kingston.
This study interviewed 400 users of a relatively isolated Rhode Island beach to determine selected characteristics of the users and the benefits they received from using the beach. The study found that about half of the users were family groups and that groups in which the average age of members was from 20-22 years were most numerous. Among reasons for going to the beach, weather and personal feelings ranked high with the latter also ranking high as a factor encouraging beach use. Work and time were seen as the most prevalent factors limiting beach use. Most users travelled either less than 12 miles or between 28-42 miles to reach the beach, with 30-90 minutes being the most common travel time. Nearly all of the respondents had used the beach previously and lack of knowledge was the reason given most frequently by those who not previously visited. Among reasons given for visiting the beach, the lack of crowds was reported most frequently. The greatest benefits received from use of the beach were cited as experiencing the solitude of the setting, involvement with the natural environment, and the sensations experienced while in this setting.

Stronge, W. B. (1995). The Economics of Government Funding for Beach Nourishment Projects: The Florida Case. **Shore and Beach**, 63(3), 4-6.
This paper proposes social and economic arguments for public funding of beach replenishment projects, using Florida as a case example.

Stronge, W. B. (2000). The Economic Benefits of Florida's Beaches: Local, State and National Impacts.
URL**: www.coastalcoalition.org/ACCarticles/stronge.htm**
This paper presents estimates of the statewide impact of Florida's beaches derived from the results of microeconomic studies and was the first assessment of the impact of the state's beach system on the economy. Results indicated that the beaches created almost $16 billion in property values in the state, $8.8 billion in spending, almost 250,000 jobs and $4.7 billion in payrolls. The beaches also contribute $320.6 million in local government revenues, $260.1 million in state sales tax revenues, and $428.6 million in personal and corporate federal income tax revenues. The beaches attract 2 million international tourists who spend about $1.1 billion annually in the state.

Tobin, G. A. and Montz, B. E. (1997). **Natural Hazards: Explanation and Integration**. New York: The Guilford Press.
This volume provides an overview of what is known about the geophysical and human aspects of natural hazards, and presents a cross-disciplinary framework for managing such events. Unlike traditional texts that utilise a hazard-by-hazard approach, the work integrates perspectives from the physical and social sciences to identify and describe general principles to enhance understanding of the physical, social, technical, and economic forces inherent in hazard events. The authors also examine the physical characteristics of hazards and individual and community perceptions of these events and explore the effects of different attitudes on behaviour and response.

Toy, V S. (2001). A Creeping Sensation for Fire Island Owners. **New York Times**, October 14, 2001.
Discusses the relationship between the Fire Island National Seashore and the homeowners of the island battling to protect their properties. Article emphasises the desire of the property owners to hold onto their beachfront properties rather than retreat or relocate.

Tunstall S. M. and Penning-Rowsell E. C. (1998). The English beach: Experiences and Values. **Geographical Journal**, 164(3), 319-332.
Reports on a decade of empirical research on the experiences and perceptions of English beach users, including surveys at 15 locations and interviews with nearly 4000 people. The research indicates that the dominant meanings of beaches for those interviewed are linked to concepts of naturalness and their own personal experiences in childhood and earlier years, while the values relate to the associations that beaches have, and to the games and other activities carried out there. There is a strong conservative tendency to see the coastal status quo maintained, despite the fact that the typical English beach resort is actively managed and a product of intensive human intervention.

van Herwerden L., Griffiths, C. L., Bally, R., Blaine, M. and du Plessis, C. (1989). Patterns of Shore Utilization in a Metropolitan Area: The Cape Peninsula, South Africa. **Ocean and Shoreline Management**, 12, 331-346.
Reports on a survey undertaken to determine the patterns and intensities of human utilisation over a one-year period along the intensively used coastline on the western shores of False Bay, Cape Peninsula, South Africa. The work was part of monitoring the impact of proclaiming 3 small marine reserves in the area. It was found that only 6% of all visitors to the shore were exploiters (anglers and bait gatherers). The majority of visitors

were engaged in non-exploitive recreational activities, concentrated on sandy beaches. Temporal patterns of shore utilisation were also discussed.

Wertheim, P., Jividen, J., Chatterjee, D. and Capen, M. (1992). Characteristics That Affect the Market Value of Beach Lot Property. **The Real Estate Appraiser**, August, 59-64.
The study used regression analysis to examine the relationship between the market value of beach lot property in North Carolina and nine property characteristics hypothesised to affect market value. Results indicated that the physical characteristics of beach lot property which can influence its market value are the distance of the lot to the beach, a view of the ocean, the average value of surrounding lots, the shape of the lot, and the length of beach frontage.

White, G. F. (ed.) (1974). **Natural Hazards: Local, National, Global**. New York: Oxford University Press.
Reports collaborative research among geographers and related disciplines in more than 23 countries over a period of 6 years. Includes research conducted on individual and community response to natural hazards from different parts of the world, decision processes in response to hazards, and national reviews of natural hazard policies. Also, includes a site (Opotoki) in NZ where residents' perceptions of the risk of future flooding and protective works were examined.

Whitmarsh, D., Northen, J. and Jaffry, S. (1999). Recreational Benefits of Coastal Protection: A Case Study. **Marine Policy**, 23(4), 453-463.
This paper reports the results of a study that applies the value of enjoyment elicitation method to assess the recreational benefits of coastal protection at Lee-on-the-Solent seaside resort, Hampshire, UK. The approach is based on a variant of contingent valuation methodology, and involves the estimation of the gains and losses in the value of enjoyment by beach users associated with different project scenarios – including the option of allowing erosion to occur. The work involved both a beach user survey, and a resident survey (those who live within 2 miles of the beach survey area), with approximately 500-600 respondents. In order to elicit the value of enjoyment from a day visit, beach users were shown schematic diagram of the seafront area in its current state, its eroded stated and how it might look if it were modified with each of the two coastal protection schemes.

Williams, A. T., Gardner, W., Jones, T. C., Morgan, R. and Ozhan, E. (1993). A Psychological Approach to Attitudes and Perceptions of Beach Users: Implications for Coastal Zone Management. *In*: Ozhan, E. (ed.). **MedCoast '93**, Ankara, Turkey: METU, p218-228.
This study reports a survey of 200 beach users conducted at four sites on the Glamorgan Heritage Coast to assess how personality and socio-demographic factors influenced the opinions and perceptions of a wide range of aspects of the beach environment. Of the 7 variables (gender, extroversion, anxiety/neuroticism, planned length of stay, distance travelled, socio-economic status and age) analysed with respect to the perception of beach aesthetics and facilities, four (anxiety/neuroticism, gender, socio-economic status and planed length of stay) were found to influence the choice of a beach to visit.

Williams A. T. and Morgan R. (1995). Beach Awards and Rating Systems. **Shore and Beach**, 63(4), 29-33.
Several beach rating systems in the UK are analysed and their main characteristics discussed. The authors argued that the bulk of the schemes are inappropriate as they are based on one or only a few of the parameters beach users value. The authors propose an alternative rating system that takes into consideration beach-user needs, arguing that such a scheme offers much more objectivity with regard to giving a quantitative value to a beach.

Williams A. T. and Nelson, C. (1997). The Public Perception of Beach Debris. **Shore and Beach**, July, 17-20.
Field experiments were conducted at Barry Island, Wales, UK, to assess how the public viewed three selections of beach debris comprising sewage related debris, general debris and mixtures of the two. Responses were categorised according to gender, age, socio-economic status, and locals versus visitors. The results indicated that females were more sensitive to debris than males, and that the lowest tolerance to debris was associated with a mix of sewage related and general debris. Retired people showed the highest resilience to debris perception, while people in their thirties seemed to be most sensitive. Visitors had a higher threshold of debris perception than locals. Most people rated water quality as the most important aspect of a beach.

Williams, A. T. and Sothern, E. J. (1986). Recreational Pressure on the Glamorgan Heritage Coasts, South Wales, United Kingdom. **Shore and Beach**, January, 30-37.
Reports a survey conducted at three sites on the Glamorgan Heritage Coast in UK to gather information on usage. Visitors were interviewed as they exited the study area. Factors examined included demography/origin, social economic groupings and mode of transport. The majority of visitors arrived in the afternoon by car after a drive that took less than an hour, with the highest number of visitors staying for 2-3 hours. Most visitors belonged to higher socio-economic groupings and came in small (car-) sized groups.

Williams, A. T., Winiarski-Jones, T. C., Davies, P. and Curr, R. (1992). Psychological Profile of the Beach/Dune User in South Wales, U. K. **Shore and Beach**, April, 25-30.
This study compared the psychological profile of 59 beach and dune users in South Wales, UK. The statistical analysis indicated a difference between the users of these two areas. Of 13 possible variables investigated, the key discriminating variables between beach and dune users were extroversion, journey length, local habitation, locus of control, gender and number in the party.

Young, C., Barugh, A., Morgan, R. and Williams, A. T. (1996). Beach User Perceptions and Priorities at the Pembrokeshire Coast National Park, Wales, U. K. *In*: Taussik, J. and Mitchell, J. (eds.), **Partnership in Coastal Zone Management**. Cardigan, U.K.: Samara Publishing Limited, p7-13.
The authors interviewed 240 Welsh beach users regarding their preferences and priorities relating to beaches. The four sites included beaches with different levels of development. Beach users were asked to rate the importance of 51 aspects on a scale ranging from 0-9. The identified priorities were the absence of oil contamination, the absence of sewage debris and litter, bathing water quality and the presence of clean toilets. Those from higher socio-economic groupings placed more emphasis on escaping urban noise, odours and commerce and were concerned with pollution in general. The average length of stay was 4.5 hours and mean adult age was 38 years. The banning of dogs was a common preference across the entire spectrum of users.