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VISITOR IMPACT ON THE ENVIRONMENT:
PERCEPTIONS AND MISCONCEPTIONS

A thesis presented in partial
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of Master of Business Studies
in Management at
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ABSTRACT

Ever since the Brundtland Report there has been strong focus on the need for effective environmental management to achieve sustainability and this has intensified since Agenda 21.

Changes caused by increasing visitor numbers and easier access are causing concern in traditional recreational areas such as the chosen case study. Piha is easily accessible to almost one million people in the Auckland metropolitan area. In this fragile coastal environment there are many different perceptions of visitor impact. Conflict amongst user groups and residents is unavoidable unless the issues concerning environmental impacts are clarified.

The key issue is the necessity for baseline environmental assessment that takes into account the perceptions of all stakeholders. Once any conflict of interest has been identified there is a better chance that conservation and development will be balanced and visitor impacts controlled.

A method rarely used in the context of environmental planning is Trochim's Concept Mapping System. This project shows how the system can be applied to clarify environmental perceptions using stakeholder focus groups to clarify and rank important environmental issues. A traditional survey based on issues revealed by the concept mapping process and targeting a different population is used to test the concept mapping findings.

The results of this study show concept mapping to be a useful resource planning tool not only for issue identification but also for providing a readily understood visual system to allow stakeholders to understand the complete picture in order to reach the understanding needed for useful involvement in a planning process. Used alone or alongside other planning techniques, it is shown to have a useful place in a planning system.

Limits of Acceptable Change is a possible community-based planning framework for using the Concept Mapping system to incorporate stakeholders' perceptions. An adaptation of this framework may help achieve sustainable visitor impact management.

DECLARATION

I certify that this thesis does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any university; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person where due reference is not made in the text.

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CHAPTER 1

INTRODUCTION

1.1 General

1.1.1 *The Issue*

Visitor impact is often inferred from the way visitors' activities interact with the environment. People's perceptions of the importance of those interactions vary according to their own experience. The writer's long involvement at a community level in visitor-related planning issues on Auckland's west coast has provided the incentive for the present research. The challenge has been to find a more scientific (i.e. more quantifiable) method that planners could use to consult with the community in order to better inform decision-making.

Consequently the primary objective of this research is to assess the use of Concept Mapping (Trochim, 1989) as a tool for gathering stakeholders' perceptions of environmental issues. A useful means of facilitating decision-making in the business sector, Concept Mapping (CM) uses statistical techniques to produce visual diagrams of stakeholders' perceptions for analysis. Secondary objectives stemming from this are firstly, to provide a means of including stakeholders' perceptions in the planning framework in order to achieve more sustainable development/management and secondly, to assess the effectiveness of CM to generate issues for discussion or to help in the production of other research instruments.

1.1.2 *The Significance of this Research*

Although many local, district, and regional authorities in New Zealand now refer to Agenda 21 (see pp 6, 8) in their strategic planning documents, only a few (e.g. Waitakere City Council, Waimakariri District Council) have actually made environmental issues and community consultation priorities as legislated for in the Resource Management Act 1991 (RMA). The initial analysis of tourism planning frameworks (Apogee Research, 1995) revealed the lack of a clearly defined process for including stakeholder consultation. There is growing awareness, however, that stakeholders must be involved from the outset if planning is to be effective (Daborn & Dickie, 1997; Gordon, 1997). The search has been for a rigorous method for involving stakeholders in issue clarification that uses quantitative as well as qualitative techniques.

Trochim's CM process presents itself as a more rigorous method to use for community consultation than the largely qualitative and well-known Delphi method (Babbie, 1992). Like the Delphi method, CM involves people being asked to address a problem anonymously. After being presented with the results of the first set of comments they are asked to reconsider the issue and comment again. This process continues until consensus (or near consensus) is achieved.

It is the visual representation of the whole picture that makes the CM system superior to the Delphi method. CM enables an individual or group to lay out their ideas on any topic in a picture or map. By using a computer package that employs statistical techniques such as cluster analysis CM processes responses into diagrams of stakeholders' perceptions and their priorities (Campbell, 1997; Page and Wilson, 1996; Trochim, Cook and Setze, 1994; Trochim, 1989). Participants are then able to see considerably more information at a glance than they can glean from text or outlines (Trochim, 1989).

Organisations can use CM as a first step in strategic planning, to develop a new marketing strategy, or as a framework to help set up a new personnel evaluation system (Trochim, 1989). Writers in the area of psychiatric care (Campbell, 1997; Trochim, Cook and Setze, 1994) have shown the usefulness of CM in evaluating the quality of care. CM has also proved useful in identifying differences in gender perceptions (Page and Wilson, 1996). Although Trochim (1989) states that a community or neighbourhood organisation could use the process to "plan for more co-ordinated community services, assess public opinion on a topic, or develop a mission statement", it is hard to find any account of these uses in the literature.

Consequently this thesis evaluates the ability of CM to identify the issues perceived by stakeholders to be important for the management of the coastal environment. This process gauges and provides diagrams of the relative importance of those issues to each stakeholder group and makes possible the comparison of common concerns. With the sustainability mandate of Waitakere City in mind, a method of integrating the use of this tool into a suitable planning framework will be suggested.

1.2 Definitions

In this study visitors' and residents' perceptions of environmental issues are revealed by using the CM system. Consequently the meanings of the terms "visitors" and "residents" are discussed as follows:-

1.2.1 *Visitors*

Appropriate definitions for related terms "visitors", "excursionists", and "tourists" have been debated by academics for many years. As pointed out by Collier (1989) the term "visitors" includes two distinct types of travellers, "tourists" who stay at least 24 hours in the destination and "excursionists" who stay less than 24 hours. Both types of traveller are people who visit a place away from home for the purpose of experiencing a change (Smith, 1989).

For the purpose of this study the term 'visitors' includes all types of tourists and excursionists. In other words a visitor is a non-ratepayer who is visiting for a short time and normally resides outside the focus area, the Piha coastal village.

1.2.2 *Residents*

Not all Piha ratepayers are resident at Piha and neither are all residents at Piha ratepayers. Further difficulties are experienced when it is understood that only a small proportion of ratepayers are permanent residents and the far greater proportion of ratepayers are second home owners who are weekend and holiday residents (Joyce, 1991).

For the purpose of this study, residents include permanent residents and part-time residents (weekend/holiday second home owners).

CM is the method being assessed in this study to compare visitors' and residents' and other stakeholders' perceptions of the relative importance of environmental issues in the coastal environment of Piha on Auckland's west coast. It is useful then to consider the meanings of the terms "environment", "environmental quality" and "coastal environment".

1.2.3 *Environment*

A clear understanding of the term "environment" is needed to identify interactions between visitors and the environment and plan for their management. It has been

stated that defining 'environment' is a complex task (Simmons, 1993) and the RMA (1991) definition includes "(a) ecosystems and their constituent parts, including people and communities; (b) all natural and physical resources; (c) amenity values; (d) the social, economic, aesthetic, and cultural conditions which affect the matters stated in (a) to (c) of this definition or which are affected by those matters."

For the purpose of collecting measurable data some simplification was needed. In this study the following levels of the environment are observed: physical (natural); physical (built); socio-cultural; economic. Justification for this simplification comes from a variety of sources but is best illustrated below:

Taken together, these aspects of the environment make up the 'sense of place', and can be viewed as the basic environmental resources which attract tourists. (Hunter and Green 1995, p.12)

It is generally accepted that increasing visitor numbers can affect all dimensions of the environment adversely or otherwise. What constitutes environmental quality therefore needs clarification.

1.2.4 Environmental Quality

In the New Zealand Government's 1994 Environment 2010 Strategy: a Statement of the Government's Strategy on the Environment, the Glossary of Terms states that environmental quality includes:

- *sustainable management of natural and physical resources;*
- *maintenance of biodiversity, including protection of intrinsic values;*
- *retention of the features which give New Zealand its unique character, including landscapes, the natural character of the coast, wild and scenic rivers;*
- *access to natural areas for recreation (maintenance of access, free public access, provision of facilities);*
- *protection of cultural and historic values;*
- *mitigation of natural hazards; and*
- *aesthetically attractive and healthy urban environment.*

(Ministry for the Environment 1994, p. 56)

This study is specifically concerned with the visual representation of stakeholders' perceptions of environmental quality in a coastal setting. Consequently the special characteristics of the coastal environment and the difficulty in definition must be understood to put the relevance of this study into perspective.

1.2.5 Coastal Environment

Although New Zealand's RMA under Section 6(a) states that "the preservation of the character of the coastal environment is of national importance", the term "coastal environment" is not defined so it has been left to the Courts and the decision-makers to make ad hoc decisions about suitable definitions. Beech and Daya-Winterbottom (1997) also point out that the New Zealand Coastal Policy Statement (NZCPS) lacks a comprehensive definition. The draft NZCPS of 1992 contained a comprehensive definition that was abandoned because the coastal environment would vary from place to place depending on the extent to which it affects or is affected by coastal processes and the management issue concerned.

Taking into account the local difficulty with a suitable definition, this thesis looks to the three dimensional model contributed by the International Geographical Union Commission on Marine Geography:-

- *landwards, up to that distance from the coastline, currently or potentially involved by human presence, provided that it is relevant to sustainable coastal management.*
 - *seawards, up to the outer edge of the continental margin or, sensu stricto, up to the continental shelf (physical delimitation), or else the outer limit of a national jurisdictional zone (continental shelf).*
 - *upwards, including the atmospheric layers concerned with chemical and physical processes involving the ocean and the land.*
- (Vallega 1996, p.54)*

Not only are the understanding of these terms ("environment", "environmental quality" and "coastal environment") basic to this study but also the way visitors impact on the environment. There is therefore a need to consider interactions between visitors and the environment, the complexity of those interactions, and the difficulty in assessing the impacts.

1.3 Interactions between Visitors and the Environment

1.3.1 *Dimensions of the Environment affected by Visitors*

Visitors impact on all of the dimensions of the environment described in 1.2.3, but the physical environment constitutes the most conspicuous dimension (Glasson et al, 1996; Butler, 1996; Collier, 1991; Pearce, 1987; Pearce, 1981). Amongst the negative physical impacts are land degradation, loss of biodiversity and lowered water quality.

The same writers state that important but less obvious dimensions of the environment affected by visitors are the socio-economic and socio-cultural. Positive visitor impacts involve economic benefits and the conservation of cultural heritage but the more negative consequences of visitor impact: are overcrowding, loss of amenities to residents, and social problems.

1.3.2 *Complexities of Visitor Impact and Difficulties of Assessment*

This thesis evaluates Concept Mapping to clarify people's perceptions of the importance of the various impacts. The study of the impact of visitors on host communities has preoccupied theorists and researchers from a broad range of disciplines (particularly environment and tourism management studies, geography and development, social and behavioural sciences) since the early 1970s. As a result tourism impact literature is both extensive and diverse but it is possible to focus on some general themes.

Variables perceived as affecting visitor impact involve demand (actual, potential and deferred) as well as the availability of transport and the carrying capacity of the destination. The nature and severity of actual impacts depend on the intensity of site use, the transformational potential of the visitor development, the resilience of local ecosystems and the rapidity of development (Hunter and Green, 1995).

Conceptual frameworks for presenting some of the major variables of visitor impact and their interrelationships are suggested by writers such as Mathieson and Wall (1982), Pearce (1987), Inskeep (1991), and Glasson et al (1996). Emphasis is placed on the idea that impacts linger and interact and that they operate continuously but change with changing demands. It is also pointed out that a complex process of interchange between visitors, host community, and destination environment is involved.

Summarised below are some of the major difficulties involved in stakeholders' assessment of the importance of visitor impacts. In the context of the present study "recreation" should replace the term "tourism":

- *tourism is an amalgam of inter-linked activities and it is often difficult to distinguish impacts arising from individual activities;*
- *tourism activities may be pursued both by tourists and by the host population and occur together with other economic activities, again presenting problems for those attempting to separate impacts arising from tourism alone;*
- *environmental change occurs naturally, making tourism-induced change more difficult to quantify;*
- *a lack of detailed knowledge of environmental conditions prior to the advent of tourism in an area frequently limits the viability of post-development investigations;*
- *in addition to direct environmental impacts, tourism may have indirect impacts and induce further development and associated impacts, which may be difficult to identify and not amenable to straightforward assessment;*
- *some tourism impacts will only manifest themselves over the long term, making the establishment of causality links more difficult; and,*
- *components of the environment are inter-linked, and so a tourism activity which impacts on one aspect of the environment may produce an indirect impact on another. (Briassoulis 1991, p.1)*

An awareness of these major difficulties in assessing visitor impact is necessary so that impacts can be managed before the effects of impacts become irreversible. The Concept Mapping process is used to aid clarification of user groups' perceptions of the relative importance of present and expected impacts. A suitable framework that includes these perceptions will be described so that visitor impact management can take place in the wider sustainable management context.

1.4 Sustainable Management

It is now generally agreed that the goal of sustainable management is to maintain access to resources (ecosystem services) for the present and future generations (Howarth, 1997; Howe, 1997). This focus which goes beyond individual disciplines was first formulated in the Brundtland Report: "Our Common Future" of the United Nations Conference on the Human Environment in Stockholm in 1972. Sustainable management involves the concept of "sustainable development" which seeks to combine environment and economic development to "meet the needs and aspirations of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987, p.43). This focus on the continuance of human wellbeing recognised the interconnectedness of economic activity and the natural environment as well as the complexities involved, although it has been open to a wide range of interpretations (Common, 1995).

The concept of sustainability was further developed with the declaration on sustainability from the WECD in 1991 and particularly at the United Nations Conference on Environment and Development (the "Earth Summit") held in Rio de Janeiro in 1992. Out of this Earth Summit came the Rio Declaration on Environment and Development:

"Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature" .p2

A principal outcome of the conference was Agenda 21, a 'comprehensive action plan for the 1990s and beyond', (Robinson, 1993). It is Agenda 21 that directs the necessity for community consultation and sets the scene for community based planning. Most pertinent to this thesis therefore is the clause in Agenda 21:

"Encouraging participation - sustainable development is not achievable unless people from all sectors of society are actively involved and there is broad, well-informed public participation in decision-making." p

Although unanimously adopted by the Earth Summit, Agenda 21 is a non-binding blueprint for sustainable development. The United Nations subsequently set up the Commission on Sustainable Development with a mandate to examine progress in the implementation of Agenda 21 at all levels at "Pathways to Sustainability" in Newcastle, Australia in 1997 and at "Earth Summit Plus 5" in June 1997. Disappointment at the slow rate of global progress focused partly on the varied interpretations of "sustainable development", partly to do with difficulties presented

by a change of time scale from year-to-year planning to the time scale of human generations; and partly to do with an economic attitude that sees “sustainability” as maintaining economic growth rate driven by market forces (Simonovic et al, 1997; Forman, 1995). Progress towards sustainability has been unevenly spread amongst developed countries whereas little progress can be reported in developing countries.

Even though sustainable development has had broad support in countries such as Canada, this support has not served to translate sustainability into concrete policy initiatives (Rabe, 1997). Other writers (Price and Probert, 1997; Norton and Toman, 1997; Myers and Macnaughten, 1998) call for a more integrated approach to sustainability in developed countries and more incentives for sustainable development in developing countries.

In New Zealand the Resource Management Act (1991) seeks to address the environmental impacts of planning decisions. In this Act ‘sustainable management’ means

“managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety while (a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and (b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and (c) avoiding, remedying or mitigating any adverse effects of activities on the environment.”

With New Zealand’s Ministry for the Environment’s “2010 Strategy” (1994) which takes account of Agenda 21’s objectives there is now stronger focus at local government level on the need for effective environmental management to achieve sustainability. Obstacles to effective management may be removed by implementing a more community-based planning approach. This would allow stakeholders’ perceptions (including those of the planners) to be better understood and taken into account.

The key issue guiding this research therefore is the need to develop a baseline assessment of stakeholder perceptions. The CM process promises to make this possible for a case study chosen to illustrate the sustainability problems of Piha’s fragile west coast environment in West Auckland where improved access has resulted in rapidly increasing visitor numbers (Joyce, 1991; Waitakere City Council, 1993).

1.5 Tools to achieve Sustainable Management

Planning for the management of visitor impact comes under the heading of tourism planning although elements of visitor impact are addressed in environmental planning and planning in general. In this section an outline of the basic planning process is followed by a survey of concepts and general principles that have been developed in the search for the sustainable management of visitor impact. Carrying capacity and ecological footprints are closely related ideas that lead to a discussion of conceptual frameworks for managing the effects of visitor impact.

1.5.1 *The Planning Process*

Planning is needed to manage effectively the diversity and fragmented nature of visitor impacts. According to Inskip (1991) the basic planning process follows these successive steps:

- study preparation
- determination of development goals and objectives
- surveys
- analysis and synthesis
- plan formulation
- recommendations
- implementation
- monitoring.

Planning now integrates the physical and aesthetic design of land and structures with social, economic and political action. Planning also recognises that the values of the community play a very big part and that the values of the planner are inevitably involved. The emphasis is on integrated development, a continuous process which enables new conditions to be incorporated (Gunn, 1988).

Effective regional/community planning is therefore “continuous and incremental, systems-oriented, comprehensive, integrated, and environmental, with the focus on achieving sustainable development and community involvement.” (Inskip, 1991). Irwin (1996) points out that planning for visitor impact management is a flexible process that depends on changing circumstances while still striving to achieve the basic objectives.

Planning aims to optimise the benefits and prevent or at least lessen the problems caused by visitor impacts (McKinnon, 1994; Inskip, 1991) and to match markets and products without compromising environmental and socio-cultural objectives

(Isara, 1997; Sociological Association of Aotearoa, N.Z., 1995). In Marcouiller's (1995) opinion planning aims to determine the optimum type and level of recreation to minimise environmental degradation so that the right type of planning framework can ensure that natural and cultural resources for recreation are indefinitely maintained. Lastly, planning can provide a rational basis for development staging and project programming which is important for both the public and private sectors to use in their investment planning (Wallingford, 1995).

Planning for the management of visitor impact involves the evaluation of some concepts that are fundamental to current thinking about sustainability. The next section deals with two related concepts.

1.5.2 *Concepts and General Principles*

Many writers have applied the concept of *Carrying Capacity* to visitor impact management (Blockley, 1996; Glasson, 1995; Brown, 1994; Carpenter and Maragos, 1989; Pearce, 1981; Lewsey, 1978; London, 1975; Maserang, 1972; Tivy, 1972). Originally a biological concept used for an agricultural model (the absolute number of livestock a particular acreage will support without serious deterioration), *Carrying Capacity* has been applied to visitor impact assessment since the early 1980s (Blockley, 1996). *Carrying Capacity* is defined by writers such as Pearce (1981) and Carpenter and Maragos (1989) for the physical/built, natural environment, and perceptual or psychological capacity of a destination; or in terms of the number of individuals that an environment can support. Blockley (1996) defines it as "the level of recreational use an area can withstand while providing a sustained quality of recreation".

Although this concept calls for perceptions of the capacity of the destination it is too difficult to measure and quantify these thresholds when carrying capacity depends on so many interrelated factors (Manning and Dougherty 1995; Jenner and Smith 1992). These factors include the way each attribute of the environment responds to different levels of use, the differing rates of the impact of human activity, the linkages between environments, and the differing impacts of varied types of uses. Few of these things can be either defined or forecast with any precision (Manning and Dougherty, 1995).

Ecological Footprints: Although referring to cities and urban economics, writers such as Wackernagel and Rees (1995) argue that in the light of global ecological change there is a need to revise economic ideas regarding sustainability. Since most of the land 'occupied' by residents lies far beyond a city's borders, the

resulting 'ecological footprint' is the total area of land required to sustain an urban region. This idea is very closely related to the concept of Carrying Capacity but is of limited use when applied only to visitor impact management but could be of much greater use when applied to visitor impact management in the wider context of environmental management.

In the case of Greater Auckland the ecological footprint takes in distant 'elsewheres' that might not be ecologically or geopolitically stable or secure. The locations of all the resources needed to fulfil the needs and wants of all the residents in this large urban area contribute to the size of the ecological footprint generated. Piha supplies the needs (i.e. the ecosystem services) of an increasing number of recreationists who have continuing effects on the ecology of the area. Piha supplies recreation requirements, the need for second homes, for homes within commuting distance of Auckland, as well as the needs of visitors from outside the region and outside the country.

If sustainability depends on the conservation of certain biophysical entities and processes (resources), Rees (1992) points out that the risks associated with their depletion are unacceptable. Each generation should inherit an adequate stock of natural capital assets that should not be less than that of the previous generation. This means that people must learn to live on the "interest" generated by the remaining stocks of natural capital.

Rees further argues that calculating the "carrying capacity" for a given area is less useful than finding out "how much land in various categories is required to support the region's population indefinitely at a given material standard". How much of the natural capital of an area is at risk can then be calculated. The concept of ecological footprints could be used to determine the cumulative effect on the ecology of the area currently being researched as well as adding another dimension to stakeholders' perceptions of the effects of visitor impacts.

1.5.3 Conceptual Frameworks

The search has been for a suitable planning framework that incorporates a step that demands quantifiable community consultation, an attribute of Concept Mapping that cannot be found in any parallel tool such as the Delphi technique (Babbie, 1991). Environmental Impact Assessment, because of its universal use in New Zealand planning, is the only framework considered here that does not have such a step. Visitor Experience and Resource Protection is a mixture of the Limits of Acceptable Change framework and Visitor Impact Management which is based on the concept of Carrying Capacity. The discussion of these frameworks leads on to the

consideration of a more holistic management system related to the present case study into which a suitable framework using Concept Mapping could be incorporated.

Environmental Impact Assessment (EIA) The typical eight step EIA process does not have any obvious place for perceptual analysis of stakeholders but has become important in evaluating the effects of large developments. This process has been described by such writers as Manning and Dougherty (1995) and Ward (1994). EIA sets out to identify factors that may affect the ability to build a desired development and assesses the effects of the proposed activity. The reality in many areas such as the present case study area, is that a large number of small and informal developments are not big enough nor important enough to warrant an EIA. This is the scenario for 'disaster by creeping increments' (Manning and Dougherty, 1995).

A much more useful planning framework for using Concept Mapping is *Limits of Acceptable Change (LAC)*, described by Stankey, McCool and Stokes (1984) and Stankey and Cole et al (1985) in the context of the Bob Marshall Wilderness Complex in the U.S.A. Originally developed by the Canadian Forest Service for recreational impacts on wilderness conditions, it has been shown to have wider application. The technical report summary (Stankey and Cole et al, 1985) states that it is "a framework for establishing acceptable and appropriate resource and social conditions in recreation settings."

The basis of LAC for strategic planning is a detailed systems approach within which decisions can be made about the kinds of conditions that will be permitted to occur in an area (Rumble, 1996). A basic premise is that change (environmental and social) is a natural, inevitable, and a consequence of recreation use. LAC combines a rational planning approach which focuses on desirable future conditions with quality management which assesses qualities and selects and monitors quantitative indicators, and public involvement throughout the process. (Blockley, 1996).

There are two important implications of this approach: it directs attention from use level as the key management concern to the environmental and social conditions desired (managing for the desired conditions); and it places the issue of capacity in a prescriptive as opposed to a technical context. The emphasis is therefore focused on personal judgment rather than scientific measurement. Acceptability is judged from the viewpoints of a range of stakeholders including managers and researchers as well as citizens.

The implementation of the LAC framework in the wilderness context involves nine steps:

- (1) *Identify area issues and concerns. In addition to legal guidelines and organisational policy, management of an area needs to reflect area-specific features and values in order that the role of the area at both regional and national levels can be assessed.*
- (2) *Define and describe wilderness recreation opportunity classes. Opportunity classes represent subunits of the area where different conditions are provided, thereby increasing the diversity of the area.*
- (3) *Select indicators of resource and social conditions. These indicators should be capable of quantitative measurement.*
- (4) *Inventory existing resource and social conditions. These data are recorded and mapped, and serve as the basis for step 5.*
- (5) *Specify standards for resource and social conditions in each opportunity class. Basing the standard on inventory data helps ensure realism and also clarifies the nature and extent of management activity that will be required to achieve standards.*
- (6) *Identify alternative opportunity class allocations reflecting area-wide issues and concerns and existing resource and social conditions.*
- (7) *Identify management actions for each alternative. This requires an analysis of the various costs and benefits of each alternative in terms of environmental impacts and impacts on visitors as well as administrative costs.*
- (8) *Evaluation and selection of a preferred alternative. This final selection will reflect the responsiveness of the alternative to the issues and concerns identified in Step 1 and the management requirements identified in Step 7.*
- (9) *Implement actions and monitor conditions. Monitoring is particularly important as it provides feedback on the effectiveness of the management actions employed, alerting managers to the need to consider more rigorous application or the use of other measures.*
(Stankey, McCool et al 1984, pp 35-37)

Stankey, McCool et al (1984) suggest that by identifying desired conditions in a precise, measurable way, LAC is more specific about desired conditions and therefore of valuable practical use in a wilderness situation. The potential for the application of this system by the New Zealand Department of Conservation has been explored in an internal report prepared by Tyson (1989). In his opinion LAC would provide a process for resolving existing and potential conflicts and problems. It would avoid ad hoc decision making and would also provide a forum

for promoting effective public participation in the management of protected areas. This report stresses that the LAC planning framework is “responsive to change, is built on a process of public participation with ongoing public input into management decision making, and requires management objectives which set measurable performance and implementation criteria” (Tyson, 1989, p.50).

Although writers (including Tyson, 1989; Blockley, 1996; Waterson, 1996) have pointed out the strengths of LAC especially when associated with existing planning systems such as Recreation Operation Planning System (ROS), there has been some useful criticism. Krumpke (1989), Tyson (1989), Blockley (1996), and Waterson (1996) have all pointed to some serious weaknesses. Waterson (1996) expresses discomfort with the language and jargon of LAC and concern at the difficulties of explaining the processes involved to partners as well as to members of local communities. Tyson maintains that Step 9 (implement actions and monitor conditions) of the Stankey model is too simplistic while Blockley (1996) points out the high costs of specifying and collecting data on biological change and recreational use.

Blockley (1996) considers that undue emphasis is given to those aspects of quality that are easily measured and points out that there may be practical limits on the number of impacts and/or qualities that can be handled. Regarding community involvement, Blockley is concerned about the difficulty of “finding accountable representatives for informal activities that are not organised, the difficulty of dealing with new impacts if the task force is not adaptable, and the difficulty of sustaining public involvement over time.” (p. 22). Waterson (1996), in reflecting on the application of LAC to the Ironbridge Gorge Management Trust, expresses concern that LAC would not derive a carrying capacity for the countryside in question, and that there was a strong sense that the apparent complexity, time and resource requirements were unnecessarily demanding for a small Trust with limited resources.

Despite these criticisms, the LAC approach undoubtedly promotes a rational debate about assessing and managing change, and forces managers to be specific about objectives and standards; directs research and evaluation towards quality management. Monitoring can be selective with management directed to quality improvement; while acceptance and support for conservation and recreation management are improved. (Blockley, 1996, p 22).

The challenge is to adapt this management system to a coastal area that is the playground of a large metropolitan region. Step 1 (Identifying issues and concerns) is the subject of this thesis. Concept Mapping illustrates the relative importance of

the issues and concerns identified by the main stakeholders. The identification of site-specific recreation opportunity classes (Step 2) and the subsequent steps in this management process could be the basis of further research.

Visitor Experience and Resource Protection (VERP) is a hybrid of LAC, the U.S. Forest Service's planning initiative, and VIM (Visitor Impact Management), the National Parks and Conservation Association's (NPCA) model for implementing carrying capacities, which seeks to protect primitive values in federal wilderness areas, (Hof, 1995).

VERP was initiated in a pilot visitor management programme at Arches National Park in 1992 (Wilkinson, 1995). As far as can be ascertained, this programme has not been implemented anywhere else. It involves three steps: re-examining the legislation that created the park to check for the intent of Congress, the completion of a biological inventory and identification of plants or animals to serve as indicators of change, and a visitor survey to gain an accurate reading of visitor expectation.

The VERP model identifies what is acceptable in terms of visitor impacts on the resource and sets out a strategy for measuring and monitoring those impacts. It maintains that management decisions are based on science rather than the "hunches" it ascribes to LAC. A range of management zones are established to deliver differing degrees of solitude and visitor services at the same time setting in place inviolate thresholds that protect the physical and scenic environment. It is not yet possible to assess VERP's applicability to the present study because of the limited amount of accessible literature. However the VERP model also includes the basic first step of identifying issues and concerns.

These rather narrowly visitor impact focused frameworks should also be seen as part of a more holistic management system. Integrated Coastal Management provides such a system that relates well to the present case study.

1.5.4 *Integrated Coastal Management - a Holistic Management System*

While Concept Mapping provides a way of incorporating stakeholders' perceptions into a framework for managing visitor impact, it is desirable to incorporate visitor impact management into a more comprehensive planning framework. The Integrated Coastal Management (ICM) system that has evolved from coastal planning in vulnerable places such as The Netherlands provides such a framework. Today ICM is referred to as Integrated Coastal Zone Management (ICZM) as well as Integrated Coastal Area Management (ICAM). There is no real distinction

between ICZM, ICAM, and ICM (Hildebrand, 1997).

Table 1 shows a stage model constructed by Vallega (1996) to illustrate the evolution of ICM from use management of single environmental issues socially perceived as important to the shoreline to the present day full-blown Integrated Coastal Area Management (ICAM) which involves comprehensive use management and the management of the coastal ecosystem. The geographical extent of the coastal zone now extends landward according to local criteria and seaward to the outer limit of the existing widest national jurisdictional zone. (Vallega, 1996, p. 25).

The U.S.A. has seen the extension of park and recreation expertise to coastal problems. Theoretical and practical concepts relating to ICM were debated at the Congress on Coastal and Marine Tourism: A Symposium and Workshop on Balancing Conservation and Economic Development held in Honolulu in 1990. Miller and Kaae (1993) explain that these concepts include environmental monitoring, marine park and ecosystem management, native tourism, community-based tourism development, marine and nature education, wilderness evaluation, limits of acceptable change, recreational fishery development, commercial interpretation, marine conservation regimes, visitor appreciation, natural and human carrying capacity and adaptive management. The Netherlands has set up a Coastal Zone Management Centre and an Internet facility (NetCoast) which enables international access to ICZM documents, tools and data as well as 'on-line' help and user-group discussions (Netherlands Ministry of Transport, Public Works and Water Management, 1997).

Agenda 21, the list of actions for sustainable development into the 21st Century, agreed by all 180 nations at the Rio "Earth Summit" in June 1992, and further supported by the June 1997 19th Special Session of the United Nations General Assembly (UNGASS) billed as "Earth Summit Plus 5", stresses the importance of the involvement of people at every level of society using a "bottom-up" approach and multi-stakeholder "grassroots" participation (Earth Council, 1997). It is for this kind of community-based planning (the "bottom-up" approach) that Concept Mapping offers a valuable method of identifying issues and incorporating stakeholders' perceptions of the importance of those issues.

Requiring a knowledge of the interactions between human activities and the physical functioning of the zone and its biotic components, ICZM involves providing 'multidisciplinary' coastal zone resource information, (Robson et al, 1996) but does not always involve people's perceptions of the effects of these

interactions.

Table 1 Stage-based model of coastal area management

Source: A. Vallega, 1996

STAGE	OBJECTIVE	COASTAL USES UNDER MANAGEMENT	GEOGRAPHICAL COVERAGE
<i>Sixties:</i> rise	Use management facing a single environmental issue socially perceived as important.	One or a few uses (e.g. seaports and recreational uses).	The shoreline.
<i>Seventies:</i> implementation	Use management and environmental protection.	Few uses (e.g., seaports, manufacturing plants, recreation and fishing).	Various alternative extents: i. the shoreline ii. a coastal zone delimited according to arbitrary criteria. iii. " according to administrative criteria.
<i>Eighties:</i> maturity	Use management and environmental protection.	Multiple use management.	Various alternative extents characterised by the proclivity to move seawards to extend management to the national jurisdictional zones.
<i>Nineties:</i> international primacy	Integrated coastal area management (ICAM).	Comprehensive use management. The management of the coastal ecosystem.	A zone extending: - <i>landward</i> according to various criteria; - <i>seaward</i> up to the outer limit of the existing widest national jurisdictional zone.

The concept of planning for sustainable development must involve the use of an effective approach to evaluating the perceptions (as well as the reality) of a destination's resources and the long-term effects of visitor impact. A comprehensive planning and management approach is needed (Gordon, 1993). This will include the identification of opportunities and constraints as well as a general analysis of physical elements (Inskeep, 1991).

1.5.5 *Summary and Conclusion*

The assessment of the effectiveness of the CM system as a tool for gathering stakeholders' perceptions of environmental issues is the main focus of this study. This involves evaluating the system's usefulness for generating issues for discussion as well as suggesting a place for using the CM system in an effective planning framework for managing visitor impact in a coastal setting.

This overview of the context in which the CM system is to be evaluated has involved discussion of the main components of this study. These components are firstly the community with "visitor" and "resident" stakeholders; secondly the environmental component with "environment", "environmental quality" and "coastal environment"; thirdly "interaction between visitors and the environment" with emphasis on the complex nature of visitor impact and difficulties of assessment; fourthly "sustainable management" with emphasis on sustainable development; and lastly, the tools available to achieve sustainable management of visitor impacts.

This last component has involved an overview of ideas, concepts, and planning frameworks which are relevant to visitor impact management. The implication is that an integrated approach (i.e. a multi-disciplinary approach) to coastal management would involve some or all of these ideas and this thesis sets out to show that the CM system has a place in Integrated Coastal Management by making possible more effective community involvement. An overview of these ideas, concepts, and frameworks can be seen in Table 2.

The methodology used in this thesis is set out in Chapter 2. Firstly the case study approach is used to describe the significance of the setting in which the CM study took place; secondly the CM process is described in detail; and finally the Survey process is set out. The Survey targeted a different population of visitors and residents from that used in the CM process with the object of evaluating the ability of the CM process to identify a similar broad range of issues and its ability to assess the relative importance of those issues.

The results of the CM process, including analyses of the concept maps and a summary of responses, are contained in Chapter 3. Chapter 4 analyses the survey results and compares the results of the two surveys, while Chapter 5 assesses the effectiveness of the CM process with the Survey method for identifying and comparing the perceived importance of issues related to visitor impact. Finally, Chapter 6 discusses and evaluates the potential for using the CM system for community-based planning for the management of visitor impact.

Table 2 A summary of techniques described for managing visitor impacts

Technique	Use	User	Strengths	Weaknesses	Success rating	Combines with
Carrying Capacity (CC)	To determine the level of use an area can withstand without loss of quality to the type of use.	Government agencies	Provides a rough guide.	Leaves out perceptions. Complex, interrelated impacts not easily assessed.	Hard to rate but widely used.	VERP VIM ICM
Ecological Footprint (EF)	Estimate of the amount of land per person required to ensure a sustained standard of living	People concerned with the sustainability of the earth's resources.	Tries to balance inputs (resource use) and outputs (e.g. pollution).	Still a rough measure.	Many govts around the world are using it.	ICM possibly
Environmental Impact Assessment (EIA)	Evaluates the environmental effects of large developments.	Developers.	Clear 8 step strategy.	Leaves out stakeholders' perceptions - omits the "creeping increments" of small developments.	Broad issues recognised. A precautionary tool.	CC ICM
Limits of Acceptable Change (LAC)	Establishes acceptable and appropriate resource and social conditions.	U.S. Forest Service - Tourism and Recreation Planners (Wilderness areas).	Community-based planning for acceptable conditions.	Can be a costly process if monitoring is ongoing.	Adaptations are being assessed	VERP CC ICM
Visitor Experience and Resource Protection (VERP)	Aims to protect primitive values in wilderness areas.	NPCA in the USA	Model to implement CC.	Still experimental.		LAC VIM CC ICM
Visitor Impact Management (VIM)	Aims to manage visitor impact.	US Forest Service.	Combines baseline data with biological indicators of change.	Still experimental.		CC ICM
Integrated Coastal Management (ICM)	Aims to provide a holistic framework for the management of coastal areas and zones.	Government planning agencies worldwide.	A multi-disciplinary approach to sustainable mgmt.	Still being developed for more effective community involvement.	Still seeks effective techniques	All techniques and frameworks

CHAPTER 2

METHODOLOGY

The main focus of this thesis is the assessment of the effectiveness of the Concept Mapping (CM) system as a tool for gathering stakeholders' perceptions of environmental issues involved in visitor impact management. The aim of the chosen methodology is therefore to evaluate the system's usefulness for generating and ranking issues that are important for community-based visitor impact management. Three types of methodology have been chosen: the case study as a framework for the other two processes, the CM process (the subject of this thesis), and the traditional survey method to test the findings of the CM process. Both the CM process and the subsequent (follow-up) survey were carried out in the context of a coastal case study. The methodology followed by this research is summarised in Figure 1:-

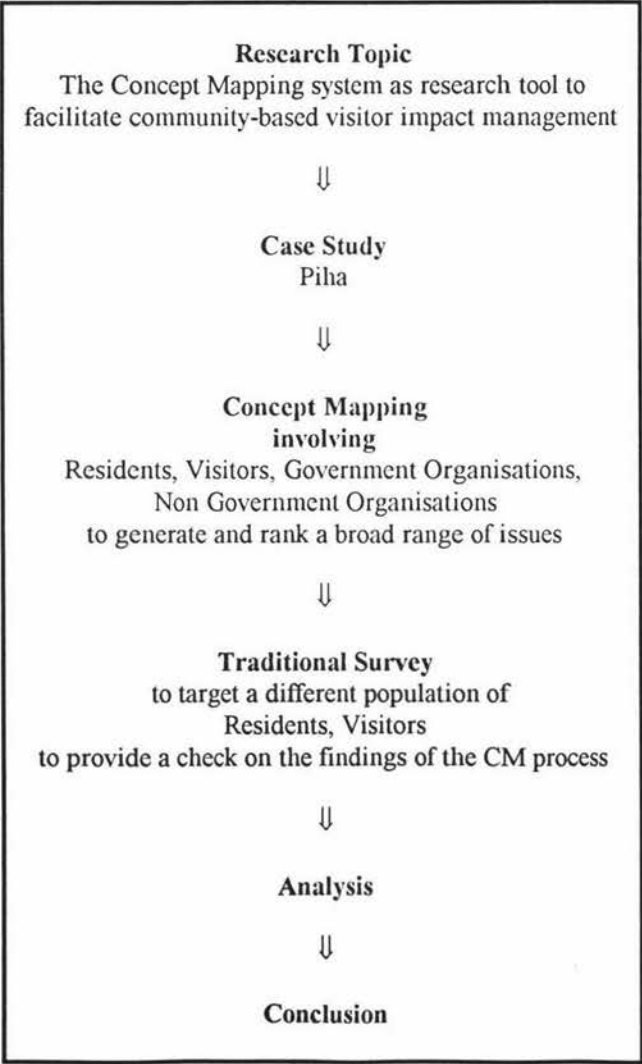


FIGURE 1 Methodology

2.1 The Case Study Approach

The case study (or bounded system) approach was chosen because the outcomes could be used as a basis for further coastal village studies in Waitakere City. A case study is useful in the way it can show up a broad range of influences which can be authenticated by the use of existing documents (Cocklin and Battersby, 1987; McCausland and Hall, 1985; Openshaw, 1984).

A case study is an empirical enquiry that investigates a contemporary phenomenon in its real life context when the boundaries between phenomena and context are not clearly evident and in which multiple sources of evidence are used. (Yin 1984 p. 23)

The possibility of making generalisations that could be used as the basis for further visitor impact research suggests that a case study would provide the appropriate framework for an analysis of the research topic. As Kemmis (1984) points out a strength of the case study approach is that it attempts to deal with 'justified true belief'.

More particularly this case study approach makes use of the writer's in-depth knowledge of local participant groups, the issues involved, and the planning context. It is acknowledged that this depth of involvement could lead to bias without conscious measures to avoid such bias happening. It is suggested however that the advantages of this approach outweigh the disadvantages.

2.1.1 Choice of a Case Study

Piha coastal village is situated in the Waitakere Ranges and West Coast region of Waitakere City, one of the four cities that makes up the Auckland Metropolitan area in the North Island of New Zealand. (Figs 2 and 4)

Piha was chosen as a case study to evaluate the use of CM process as an appropriate and reliable coastal planning tool within the larger conceptual framework of ICM. Piha is a useful focus not only because of the writer's personal involvement but also because it shares the following characteristics with a large number of coastal settlements in New Zealand and overseas.

- Increasing visitor numbers
- Increasing permanent population
- A vulnerable ecosystem

- Present facilities under stress
- Close to a large urban area
- Community resistance
- Conflict between user groups, recreation activities, the natural environment and the visitor, and the cultural (built) environment and the individual.

While the stakeholders in this case study area relate to two main user groups (visitors and residents), these can be further subdivided because of the complex nature of the community. For the purpose of the CM process, visitors were divided into three groups: visitors (mainly representatives of surf clubs, tramping clubs, school and youth groups), members of non-governmental organisations (e.g. Royal Forest and Bird, Greenpeace, Piha Environmental Group, Waitakere Ranges Protection Society, Te Kawerau a Maki Trust), and members of government organisations (e.g. Waitakere City Council, Auckland Regional Council, Ministry for the Environment, Department of Conservation). Although a question (see Appendix E: Question 19) was included in the Visitors' survey to make such a subdivision possible, the number interviewed belonging to those groups was too small to be significant.

For the purpose of the CM process, residents included in the cluster group represented a variety of age, sex, and interest groups as well as representing permanent residents as well as second home owners. The Residents' survey also made no distinction between the two types of residents. Although it is possible to identify further interest groups, the decision was made to keep to these broad groupings in order to lessen the possibility of ambiguity. Even so, there was still the possibility of participants claiming membership of several stakeholder groups.

In addition there are many issues that have caused disagreement between stakeholders. Examples of disagreement include conflict between small property owners who would like to preserve the special character of Piha and owners of large holdings who would like to be able to subdivide; conflict between dune conservationists who strive to replace and protect native dune grasses and surfers who regard work on the dunes as being the cause of poor surf conditions; and conflict between permanent residents who have fought for sealed roads, who would like formed footpaths, and weekend cottage owners who would like Piha to remain as it was forty or fifty years ago. Other issues are visitor related and include the provision of carparking, picnic areas, toilet and rubbish facilities, beach access and the desirability of commercial development.

The following provides a contextual background for this case study.

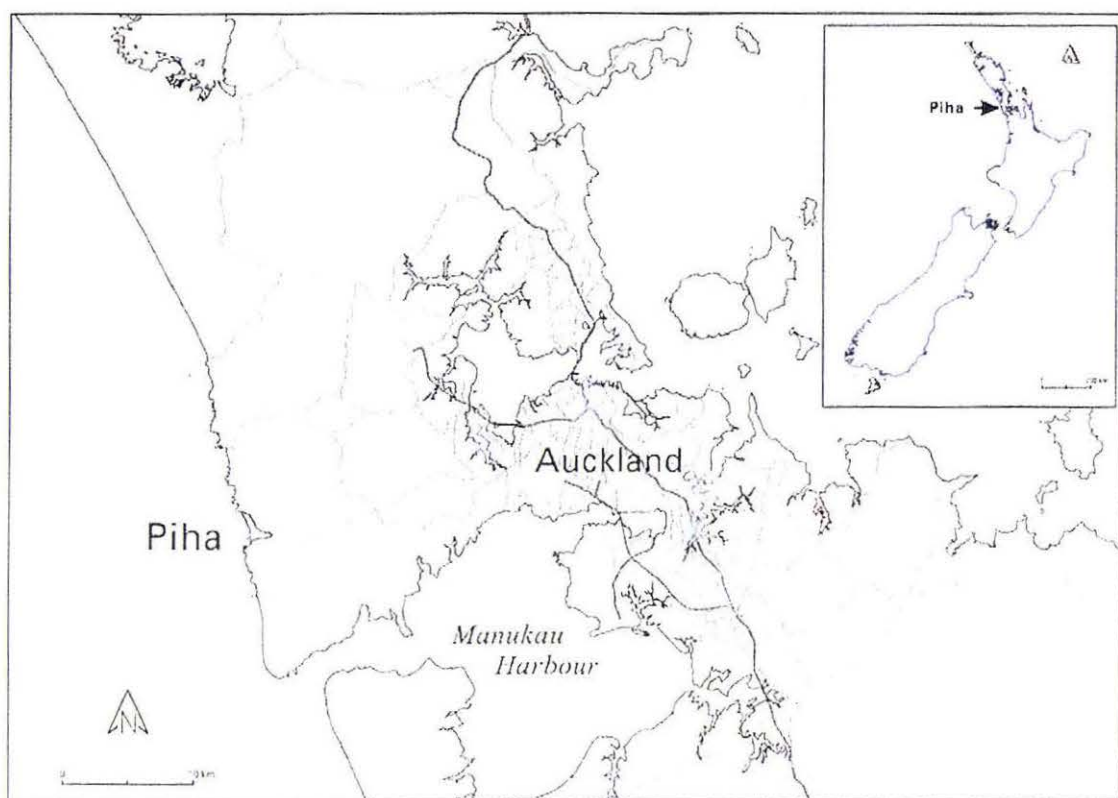


Figure 2 Location map of Piha.



Plate 1 Piha viewed from the Piha Road lookout.

Piha has had a long history of Maori settlement. The 'tangata whenua', 'Te Kawerau a Maki', have been a distinct tribal entity since the early 1600's (Murdoch, 1990). Piha became a reserve in 1859 and was subsequently sold, milled for kauri, and farmed. Many of Piha's residents are related to these early settlers.

Its popularity as a beach resort commenced in the 1890s when a sanatorium for tuberculosis patients was opened. Bach (weekend cottage) building began in 1925 when the kauri milling ended and subdivision began. Since then, recreational activities that centre on beach, surf, and bush have had continuing popularity. Their threat to the fragile coastal environment was initially small because of Piha's relative isolation which kept large numbers of visitors away. Its only link with the city was via a winding, unsealed and treacherous road that was dusty and corrugated in summer; slippery and still corrugated in winter. The adventurous and enthusiastic, often surfers and trampers, were undaunted but their number was very small. Many became weekend cottage owners; but the rough access road deterred many would-be day trippers (Logie 1991, p. 2).

Now only forty-five minutes from central Auckland by sealed road, it is an increasingly popular recreation mecca for the one million or so people of the Greater Auckland area. In summer and during weekends throughout the year, day visitors compete for parking and picnic space.

This wild, rocky, and largely 'unspoilt' coastal area has had a turbulent geological history. In early Miocene times, 19 to 25 million years ago, this area consisted of active volcanic islands and undersea volcanoes of the Waitakere Arc on the western boundary of the deep, marine Waitemata Basin (Hayward, 1975; Ballance, 1993). Periodic advances of the polar ice-cap with consequently changing sea levels led to massive erosion of the andesitic and basaltic lavas. The eroded material has since been uplifted and the resulting high plateau eroded to form the present-day landscape of rugged hills and valleys that make up the Waitakere Ranges. Black sand surf beaches have resulted from the weathering of volcanic rock (see Plate 2).

Today the surf, the bushclad hills, the streams, the waterfalls, as well as the reminders of past eras such as the remains of dams and bush tramways, attract mainly repeat visitors seeking to escape city life (Hayward, 1996).



Plate 4 Piha Beach (South Piha): before dune restoration in 1991.



Plate 5 Piha Lagoon at the mouth of the Piha Stream: pollution has made the lagoon unsafe for swimming.

Piha, like the other coastal villages of Karekare, Bethells (Te Henga), Whatipu (and Muriwai in the Rodney district), is surrounded by Regional Parkland which provides a green buffer zone that protects it from the encroachment of suburbia. Today Piha with its 'Lion Rock' (Plates 1 and 2) is described as Waitakere City's "Jewel in the Crown" by tourism marketing literature targeted at both domestic and international tourists. A Tourism Background Paper (Waitakere City Council, 1993) suggests that it might be appropriate to provide a range of visitor facilities at Piha where the existing development pattern is more intensive than elsewhere on the coast.

The present facilities, although undergoing improvement, are under stress because of increased usage by both visitors and residents. There are no motels or hotels; there are two camping grounds (one a private club) offering only tent and caravan sites; and one or two bed and breakfast establishments. Stedfast Park provides basic accommodation for large groups on the site of the former sawmill in Piha Valley. Piha was better served last century when the isolated Kauri milling centre boasted a guest house and a fashionable sanatorium (Joyce, 1989).

Piha is poorly served by the infrastructure demanded by many visitors. Despite city-level rates there is no sewerage system so there is general reliance on septic tanks and pit toilets with the constant danger of contaminated ground water. There is no piped water supply except for a private scheme that supplies around 60 households in North Piha so that most people have to rely on rainwater tanks. The Council provides a weekly rubbish collection and a mowing programme for roadside strips and picnic areas.

The village is served by telephone and electricity; it has a general store, and a fast food outlet at Piha Beach. Since the summer of 1995/6 a mobile food van has also been granted a licence, and this operates during the summer season, usually opposite Lion Rock. A library is run by a voluntary committee, and a Post Office continues to open on three mornings a week after being successfully fought for by the local Ratepayers' and Residents' Association. There are four public toilet blocks provided by the Waitakere City Council, but there are no toilets provided at the North Piha carpark on Auckland Regional Council parkland. Plate 3 illustrates weekend parking problems while Plates 4 and 5 show some of the effects of increasing visitor numbers.

A helicopter pad is provided for the use of the Rescue Helicopter and there is a twice weekly bus service on Fridays and Sundays. A community hall houses a preschool. Piha Surf Lifesaving Club patrols Piha Beach at the south end of Piha;

the north is served by United Surf Lifesaving Club. While there is an active Neighbourhood Watch network, the nearest Police Station is at least twenty minutes away. A Volunteer Fire Brigade has its headquarters near the general store, but assistance is at Waiatarua, 15 kilometres away at the other end of the winding access road. Taking all this into account, it is obvious that the area at present is not really equipped to handle large visitor numbers.

The Piha area falls chiefly under the management of the Waitakere City Council (WCC) but the Auckland Regional Authority (ARC) controls those sections of Piha that are part of the Waitakere Ranges, to the North, South and East, as well as Lion Rock. The ARC provides rangers to manage their territory but there is no ranger to oversee that part of the area under the control of the WCC which works through the Community Board and the Piha Residents' & Ratepayers' Association.

As outlined at the beginning of this section, when so many groups are involved there is considerable potential for conflict and misunderstanding. To reduce these problems a holistic view of what the problems are and their relative importance is paramount. As suggested by the LAC system, step one is to identify these interests and their potential conflicts in order to prevent or at least mitigate those conflicts. This thesis explores the effectiveness of concept mapping in identifying issues. It further explores the effectiveness of concept mapping in facilitating the assessment of the relative importance of those issues to each of the stakeholder groups.



Plate 2 Piha: distinctive features viewed from North Piha Beach (from left to right): Lion Rock, the Camel and Nun Rock. Black sand and surf.



Plate 3 Piha: Parking problems.

2.2 Concept Mapping

The Concept Mapping system (CM) was developed by William M.K. Trochim of Cornell University in 1989. CM is a process that can be used to help a group describe its ideas on any topic of interest and was used initially for planning and programme evaluation mostly in the area of psychiatric care (Campbell, 1997; Trochim, Cook and Setze, 1994) but it has been used in fields that range from the investigation of gender differences in managers (Morrison, 1994) to managers' perceptions of what constitutes 'good management' today (Page, Wilson et al, 1994). Accounts of the CM being used for environmental decision-making have not been found so the present application is experimental. The present study involves adapting the usual one to two-day timeframe to a timeframe that covers the several weeks needed to suit dispersed participants.

Trochim's CM system was chosen for issue identification because it presents itself as a more rigorous method to use for community consultation than the largely qualitative and well-known Delphi method (Babbie, 1992). Like the Delphi method, CM involves people being asked to address a problem anonymously. After being presented with the results of the first set of comments they are asked to reconsider the issue and comment again. This process continues until consensus (or near consensus) is achieved.

It is the visual dimension of CM that makes it superior to the Delphi method. CM enables an individual or group to lay out their ideas on any topic in a picture or map. By using a computer package that employs statistical techniques such as cluster analysis CM processes responses into diagrams of stakeholders' perceptions and their priorities (Campbell, 1997; Page and Wilson, 1996; Trochim, Cook and Setze, 1994; Trochim, 1989). Participants are then able to see considerably more information at a glance than text or outlines can (Trochim, 1989).

Organisations can use CM as a first step in strategic planning, to develop a new marketing strategy, or as a framework to help set up a new personnel evaluation system (Trochim, 1989). Writers in the area of psychiatric care (Campbell, 1997; Trochim, Cook and Setze, 1994) have shown the usefulness of CM in evaluating the quality of care. In other management fields CM has also proved to be a useful tool (Page and Wilson, 1996). Although Trochim (1989) states that a community or neighbourhood organisation could use the process to "plan for more coordinated community services, assess public opinion on a topic, or develop a mission statement", it is hard to find any account of these uses in the literature.

Consequently this thesis evaluates the ability of CM to identify the issues perceived

by stakeholders to be important for the management of the coastal environment. This process gauges and provides diagrams of the relative importance of those issues to each stakeholder group and makes possible the comparison of common concerns. With the sustainability mandate of Waitakere City in mind, a method of integrating the use of this tool into a suitable planning framework will be suggested

The process typically requires the participants to brainstorm a large set of statements relevant to the topic of interest, individually sort these statements into piles of similar ones, rate each statement, and interpret the maps that result from the data analyses. The nine steps are therefore shared between researcher and participants as follows:

TABLE 3 The 9 Steps of Concept Mapping

RESEARCHER	FOCUS GROUPS	RESEARCHER AND FOCUS GROUPS
Step 1: Generation of focusing question		
Step 2: Identification of focus groups		
		Step 3: Brainstorming sessions
	Step 4: Ranking of statements	
	Step 5: Sorting of statements	
Step 6: Data input		
Step 7: Map generation		
		Step 8: Labelling and interpretation
Step 9: Analysis		

Trochim’s software programme was originally a DOS version, but is now available for Windows. It analyses the data using a two-dimensional, multidimensional scaling (MDS) of the unstructured sort data, a hierarchical cluster analysis of the MDS coordinates, and the computation of average ratings for each statement and cluster of statements. The maps that result show the individual statements in two-dimensional (x,y) space with more similar statements located nearer each other. They also show how the statements are grouped into clusters that partition the space on the map. Participants are led through a structured interpretation session

designed to help them understand the maps and label them in a substantively meaningful way.

These concept maps (see Figure 3) reveal the importance placed on particular issues by the number of tiers belonging to each cluster. Immediate priority is given to those issues with five tiers and of far less immediate importance are those islands with only one tier. The closer the clusters on the map, the closer the perceptual linking of ideas in those clusters.

The analysis produces a map of idea clusters showing islands of related issues, with the depth of the island denoting its average rated importance (the average of the items contained in the cluster) so that Clusters 18 and 19 on Fig. 3 have less importance than Cluster 13 and Clusters 8 and 14 have the most importance. The distance between the islands indicates the perceived relatedness of the ideas contained in the clusters. This means that Cluster 8 consists of ideas that are closer to Clusters 14 and 13 than to 18 and 19.

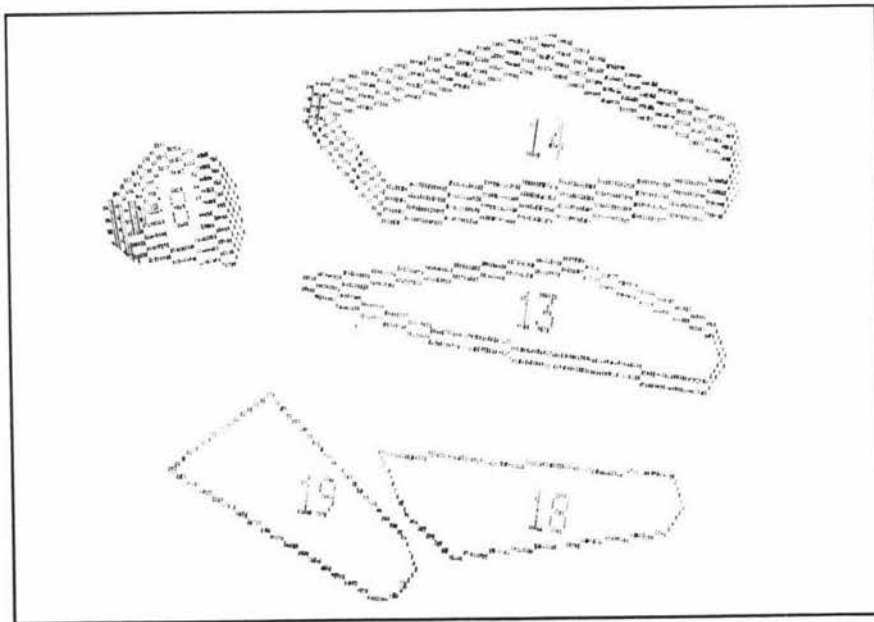


Figure 3 Concept Map Components: Islands (clusters of related ideas)

The following principles apply when interpreting a concept map:

- Each 'island' represents a cluster of ideas that were generated at a brainstorming meeting and later ranked and sorted.
- The greater the number of layers/tiers, the more importance has been placed on the issue by the focus group.
- The closer together the 'islands', the closer the ideas contained in those islands (clusters of ideas) are linked.
- The greater the distance between islands, the more distant the relationship between those clusters of ideas.
- The smaller the island, the smaller the degree of variance within that cluster of ideas.
- The larger the island, the greater the degree of variance within that cluster of ideas.

Reliability can be assessed with the split half method, which involves randomly dividing the participant group in half and calculating the correlation between the two groups. Another method uses a correlation between each item and the total score across all items in the test. In addition, reliability can be estimated by the average of the correlations among items on a scale, or the average interim correlation. It is possible to perform this calculation on both the sorting and rating data. In all cases, calculations need to be corrected for by using the Spearman-Brown Prophecy Formula or equivalent. A study using 38 concept mapping projects found that concept mapping gave reliable results (Trochim, 1993).

Feedback from participants indicates that the added visual dimension provided by the CM system is a positive help in providing an overview of all aspects of an issue so that informed decisions can be made (Morrison, 1994; Page, Wilson et al, 1994). It is difficult to find any criticism of the technique in the literature; all indications lead to the conclusion that this is a useful technique which can be used alongside others for the facilitation of effective decision-making. It would be helpful, however, if a composite map could be generated for all of the participating groups. The programme is not able to do this.

2.3 Application of Concept Mapping to the Case Study

2.3.1 *The Concept Mapping Process*

Focus groups for the CM process were generated from interest groups that could be easily identified because of the writer's extensive knowledge of the area.

Furthermore choice was guided by consultation with spokespersons for those groups as well as with the Piha Ratepayers' & Residents' committee. The government focus group was included since members of this group are responsible in the end for decisions that are made regarding the management of visitor impact.

It is conceded that subjectively selected groups could bias the sample but this method of selection ensures a representative cross-section of participants. The following steps describe the way the concept mapping process was carried out for the Piha study:-

Step 1: *Generation of Focusing Question*

A question was needed that would generate statements about visitor impact on Piha:

What are the effects of increasing visitor numbers to Piha?

Step 2: *Identification of Focus Groups*

The stakeholders fall into two main groups, Residents and Visitors. However, in order to achieve a more accurate representation of perceptions, three stakeholder groups of visitors were recognised:-

- (1) *Residents* This category included ratepayers who are permanent residents as well as weekend and holiday residents.
- (2) *Non- Governmental Organisations* concerned with the environment
- (3) *Visitors* (including anyone not paying rates in Piha, residing outside Piha and visiting Piha)
- (4) *Government Organisations:* the Department of Conservation (DOC), Waitakere City Council (WCC), Auckland Regional Council (ARC), and The Ministry for the Environment (MfE)

Step 3: *Brainstorming Sessions* The brainstormed lists are attached in Appendices A, B, C, and D.

- *Residents' session* Between January and March 1996 information about this study was placed in the store at Piha, in the "Piha News" and presented at a meeting of the Piha Ratepayers' & Residents' Association. In addition pamphlets advertising the residents' brainstorming meeting were placed in the Post Office and one hundred were deposited in residents' boxes. Expressions of interest were received from a large number of people and twelve (mostly permanent) residents voluntarily attended the focus group meeting.
- *Non-Governmental Organisations' session* Nine members of Non Governmental Organisations (mostly related to the environment) were invited to attend a Sunday morning meeting in a private home. The resulting brainstormed list was sent on to representatives who were unable to attend, in particular to the representative of the local iwi (Te Kawerau a Maki), in order to achieve the fuller representation.
- *Visitors' session* The Saturday morning Visitors' meeting at the Arataki Visitors' Centre on the Scenic Drive was attended by eight participants each representing a different type of visitor.
- *Government session* The Government evening meeting unfortunately clashed with other events so that the brainstormed list generated by the six participants was sent on to missing representatives for additional ideas. This resulted in a useful number of participants.

Steps 4 and 5: *Ranking of statements and sorting of Statements*

The computer-generated numbered statements were mailed out to participants for sorting into groups and ranking. This step usually takes place at a follow-up meeting, but due to the difficulties of getting the groups back together, it was decided that the mail-out would be more appropriate and equally valid. This procedure is considered by Trochim (1989) as well as Page, Wilson et al (1994).

Steps 6 and 7: *Data input and map generation*

Data input took place for each cluster group and a “map” was generated and printed out. (See Appendix H and Figs 5.1 to 5.4)

Step 8: *Labelling and interpretation*

The resulting “map” together with the cluster statements for each group was shown to participants in order to explain, verify and label each “island” according to the statements making up each cluster.

Step 9: *Analysis*

An analysis of each “map” and a comparison of similarities and differences was then conducted.

Step 10: *Evaluation*

An informal evaluation of the attractiveness and effectiveness of this technique took place at the same time that members of each group were involved in Step 8 (labelling and interpretation).

2.3.2 *Advantages*

- (1) This type of visual representation may be more easily understood by those with little or no experience of statistical analysis and mathematical tables.
- (2) This type of visual representation adds another dimension for analysis and enables better synthesis for the mathematically competent.

2.3.3 *Limitations*

Stratified sampling was used for Concept Mapping for three groups and the fourth (Residents) was obtained by volunteer selection. Stratified selection was chosen for the Concept Mapping focus group meetings involving Non Government Organisations and Government Organisations as well as regular Visitors. The latter group involved tramping club and surf club members. In the case of the Residents’

focus group, invitations and information was placed in the local store as well as being placed in post boxes and mail boxes so that selection for this group was voluntary. While it is recognised that this mixture of sampling methods could affect the validity of the results of this project, care has been taken to use random sampling for the surveys. It is acknowledged that volunteer selection and stratified sampling are less reliable than equal probability of selection methods (EPSM). (Babbie, 1991). However, by making sure that this sampling was based on sound local knowledge, it was considered a sufficiently practicable and reliable way of achieving broad representation.

2.4 Survey

2.4.1 *Purpose of survey*

The aim of the survey was to compare the effectiveness of the CM process with the effectiveness of traditional survey methods in assessing the relative importance of issues related to visitor impact. In other words the issues generated by the CM process were taken to a different population to find out to what extent the results correlated.

2.4.2 *Relationship to the concept mapping process*

Two survey instruments, one for residents and one for visitors, were designed to elicit responses relevant to perceptions of visitor impact on Piha. The residents survey (particularly Questions 9, 10 and 11 in Appendix F) corresponds with the residents' clusters/islands resulting from the concept mapping process. The visitors survey (particularly Questions 10, 11 and 12 in Appendix E) corresponds with the visitors', non-governmental organisations', and government organisations' clusters/islands resulting from the concept mapping process. The visitors group for the concept mapping process had been subdivided (Visitors, members of Non-Governmental Organisations, and members of Government Organisations; i.e. non-residents/ratepayers) to obtain a broad picture. It is impossible to survey large numbers of each of these groups because NGOs and GOs have far fewer members.

2.4.3 *Survey design* The Visitors' questionnaire is Appendix E and the Residents' questionnaire is Appendix F.

The main parts of the two questionnaires consisted of scaled response items derived from the labelling and interpretation of the concept maps. Additional open-ended questions enabled a wider range of responses concerning the present and future effects of increasing visitor numbers on Piha's environment.

1. *Pilot survey*

Thirty visitor questionnaires were tested over two weekends at each of the venues targeted using sequential sampling. Consequently some small changes were made. Twelve resident questionnaires were similarly tested over a period of ten days. The unexpected difficulty in finding occupied houses made a mailout survey the only practical method of ensuring random selection.

2. *Residents*

The pilot test indicated that a mailout survey would be the best method for both ensuring random selection and achieving a reasonable response rate. Accordingly the Waitakere City Council's list of ratepayers was used to contact potential respondents. Computer generated random numbers were used to select 300 ratepayers. No distinction was made between permanent residents and weekend/holiday residents as it was felt that a mix of issues relating to both groups would be useful.

Questionnaires were mailed out in November 1996 from a computer database accompanied by an explanatory letter and a return, franked envelope. A total of 162 useable surveys were returned representing a 54% response rate indicating that residents are interested in this issue. Ten surveys were returned "not known" while a further seven were returned too late to be included.

3. *Visitors*

Visitor questionnaires were bundled into groups of twenty and attached to a clipboard with an explanatory statement attached. Coding was completed subsequently.

Between the beginning of November 1996 and January 1997, a sequential survey of 270 visitor interviews was completed. Since it had been observed over a period of more than five years (Piha News since 1989 and local observations) that most visitors spend half a day to a whole day at Piha, mostly on Sundays, this survey was conducted at weekends and during the holiday period between Christmas and New Year. Bad weather affected visitor numbers on 50% of these days so progress was slow. At each Piha venue (See Fig. 4) every fifth person was approached. Only one person over the survey period declined to be interviewed.

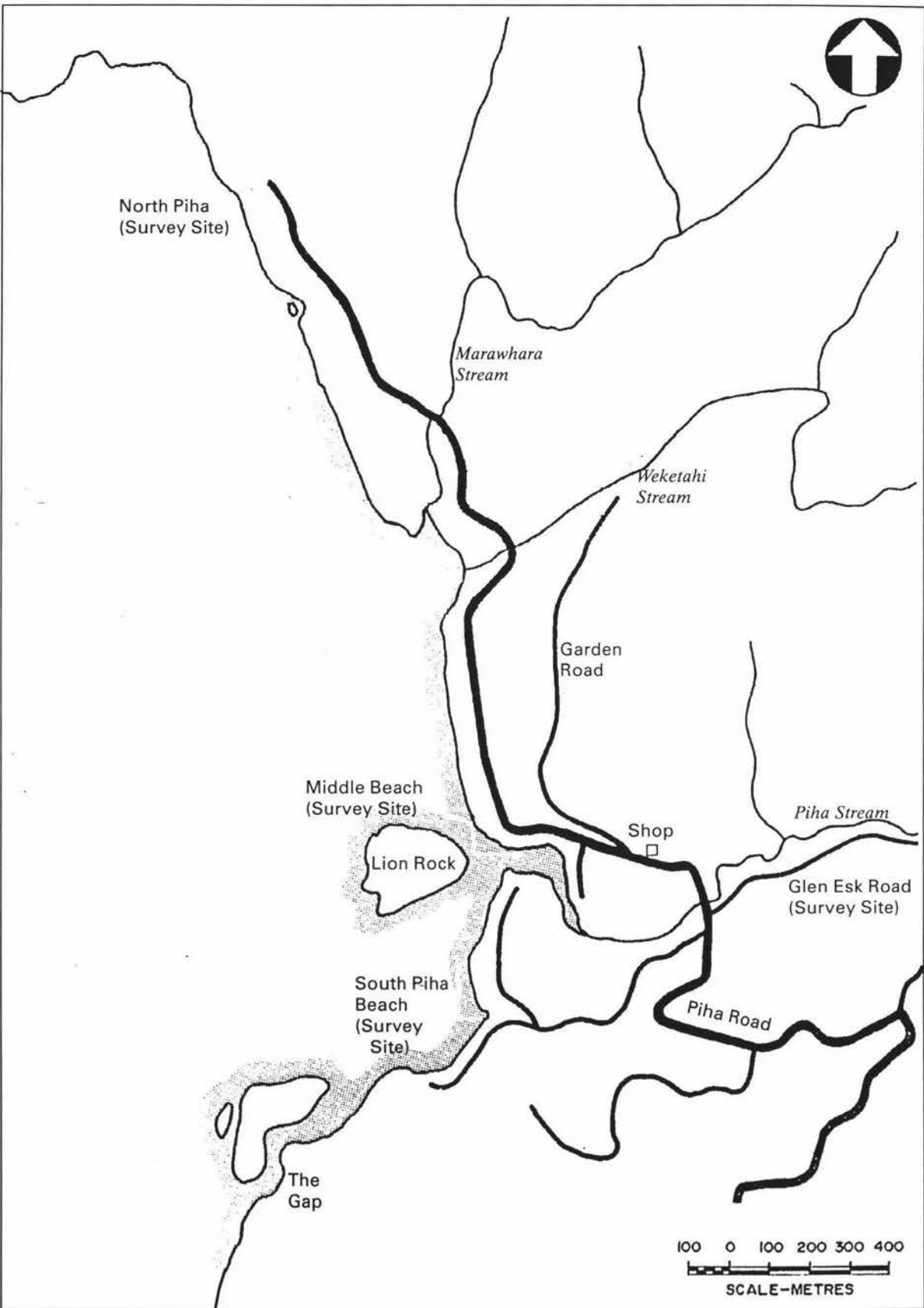


Figure 4: Piha: Visitor Survey Sites

2.4.4. *Statistical procedures*

Statistical analysis was carried out to achieve a statistically valid sample to provide substantiation for the issues perceived to be important by the CM focus groups. The sample size chosen for each group was the number which provided the minimum required sample size.

For each survey group data entry was followed by frequency counts and means, factor and cluster analysis using SPSS.

2.4.5. *Limitations*

Selection of Participants: Simple random selection was used. It was recognised that the sample size affects the credibility of research results since the larger the sample size taken from the target population the smaller the margin of error (Babbie, 1992). Using Equal Probability of Selection (EPSM) methods helps avoid conscious bias in sampling the target population for mailed surveys and conscientiously selecting every Nth person in the field does the same.

Time and cost factors: Sufficient time was needed for follow-up mailouts as well as for follow-up telephone calls. Supplementary interviewers were needed as well as time for coding, data entry and processing. On-the-spot interviews were considered appropriate for surveying visitors while mailouts were considered more appropriate for reaching residents for reasons given earlier.

Seasonality of survey: Because of time constraints this research was conducted over one summer season and is therefore a descriptive snapshot subject to error.

2.5 Strengths and Weaknesses of the research

Each part of this research involves a blend of qualitative and quantitative data. The strength of the CM system is the ability to transform words and ideas into numerical (quantitative) data as well as visual data that is easy for participants to comprehend. The follow-up survey again provides data to test the effectiveness and potential usefulness of the CM technique as an efficient planning tool. Comparisons can then be made of the effectiveness of the two techniques.

The validity of this research could be affected by the small number of participants in each concept mapping cluster group and the voluntary nature of the Residents' cluster group. The CM process usually takes place at one venue with participants from within an organisation to enable the process to take place over one day. In the present study, and with the support of the advisor, the only possible way to complete the process was to vary the method and the time frame for the sorting and ranking steps.

CHAPTER 3

CONCEPT MAPPING RESULTS

3.1 Analysis of Concept Maps

A concept map was generated for each of the focus groups after following the process described in Chapter 2. The resulting maps are reproduced in Figures 5.1, 5.2, 5.3, and 5.4.

Before discussing the Concept Mapping results it would be useful to review exactly what concept maps show and what that really means. The participants brainstormed what they considered to be the “effects of increasing visitor numbers on Piha”. This process generated a number of statements, each of which was then rated as to its importance to the overall environmental wellbeing of Piha by each participant. The items were sorted into what each person considered to be related groups. The statements, their ratings, and the groupings for each participant were entered into the Concept Mapping programme (Trochim, 1989) to produce a ‘map’ of each group’s concept of the effects of increasing visitor numbers.

The islands, or clusters, draw together the statements most often sorted together and distance statements that were hardly ever, or never, sorted together. The size of the cluster indicates the degree of variance with which the items contained within the cluster were sorted into other clusters as well, so that small dense clusters indicate general group agreement, while large clusters with widely spaced items are more ambiguous issues for the group. The distance between clusters indicates the extent to which items contained within those clusters were often sorted together, implying conceptual similarity (close proximity), or were hardly ever or never, sorted together, implying conceptual dissimilarity (distanced). The number of tiers indicates the rated importance of a cluster (an average rating of the items contained within the cluster), with five tiers depicting great importance, moving through fewer tiers to indicate reducing importance.

Central clusters do not indicate a central or key issue, but indicate that the items within that cluster were often sorted with many other surrounding items, indicating that this could be a cluster containing items associated with many others, or a bridging cluster, (Page and Wilson, 1996).

Government organisations: (Figure 5.1): Participants were represented by members of the Waitakere City Council, the Auckland Regional Council, and the Ministry for the Environment. The analysis produced 16 clusters. The statements contained within each cluster are provided in Appendix A. The map shows Government Organisations' concept of the effects of increasing visitor numbers on Piha. Four distinct yet linked areas are described below:-

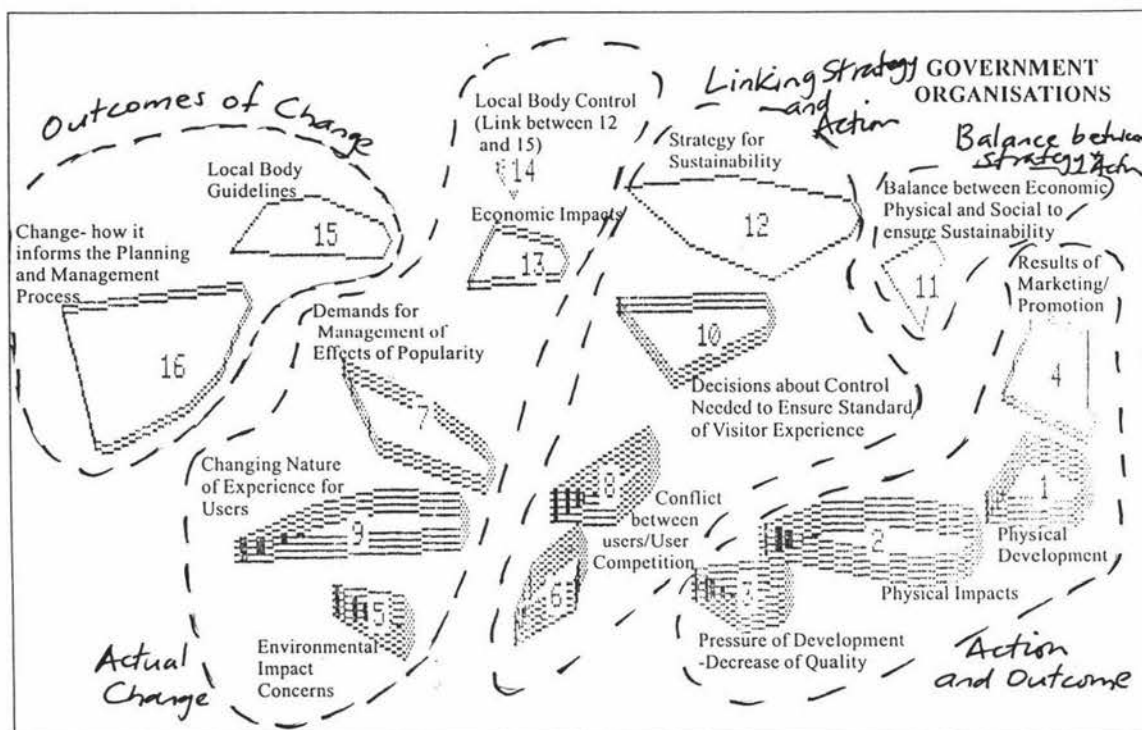


Figure 5.1 Concept Map: Government Organisations

1. The two clusters 15 and 16 entitled Local Body Guidelines and Change - how it informs the Planning and Management Process are somewhat distanced from the other clusters. These clusters contained statements that ranged from "limiting visitor numbers" to "changing visitor expectations" which reveals that this area is about issues which are the outcomes of change. These clusters like the others analysed below reflect the perspectives expected of those who seek solutions to management problems.

2. The clusters 5, 9 and 7, Environmental Impact Concerns, Changing Nature of Experience for Users and Demands for Management of Effects of Popularity together with clusters 13 and 14, Economic Impacts and Local Body Control

contain statements such as “degradation of environment”, “increased stress on ecosystems”, “increased pressure on facilities”, and “change of character”. These all relate to actual change and relate to the problems associated with managing change.

3. Moving to the right again there are two highly ranked clusters 8 and 6, Conflict between users/User Competition, which together with clusters 10 and 12, Decisions about Control Needed to Ensure Standard of Visitor Experience, and Strategy for Sustainability make up a group of clusters linking strategy and action. Statements contained in these most highly ranked clusters range from “more septic tanks”, “increased demand for water”, and “congestion”. Again, these are all about management: managing conflict and ensuring the sustainability of visitor experience.

4. In the top right hand corner, 11, Balance between Economic Physical and Social to ensure Sustainability provides a balance between strategy and action. The clusters to the far right of the map labelled Action and Outcome include clusters 1, 2, 3, and 4, Physical Development, Physical Impacts, and Pressure of Development that results in decrease of quality (all highly ranked) together with the results of Marketing/Promotion. These are concerned with actions needed to provide a balance between conservation and development to ensure sustainability.

It is also possible to interpret the map by suggesting that those clusters of ideas having the greatest number of tiers represent the most negative impacts (e.g. 9 and 8: Changing Nature of Experience for Users, Conflict Between Users); those clusters having the fewest tiers (smallest depth) represent the most positive impacts (e.g. 11: Balance between Economic, Physical and Social to ensure sustainability).

The results of marketing the area are seen to be more possible to control because it is possible to define how to market the area and therefore there is less concern, and the impact could be more positive. Environmental impact generated the greatest concern. Conflict between users because of different values was seen as important because it is very difficult to manage and is very resource dependent, implying the need for the employment of local rangers. Demands for the management of the effects of popularity necessitate the drawing-up of rules and regulations.

Clusters of ideas related to outcomes or solutions are seen in the islands of least concern. Some of these ideas clusters are seen to be indicating the need for a strategic framework - a recognition of the need for management of the economic, physical, and social impacts in order to achieve sustainability. Local body control is seen as a link between a strategy for sustainability and local body guidelines.

Non-Governmental Organisations: (Fig. 5.2) Participants included members of the Waitakere Ranges Protection Society, the local branch of the New Zealand Royal Forest & Bird Society, a member of the Te Kawerau Trust, and the Piha Environment Committee. The analysis produced 15 clusters for the Non Government Organisations group. Appendix B shows the statements contained in each cluster. The resulting map shows Non Government Organisations' concept of the effects of increasing visitor numbers on Piha. Three distinct areas linked by Strategic/Future Infrastructure Concerns can be identified:

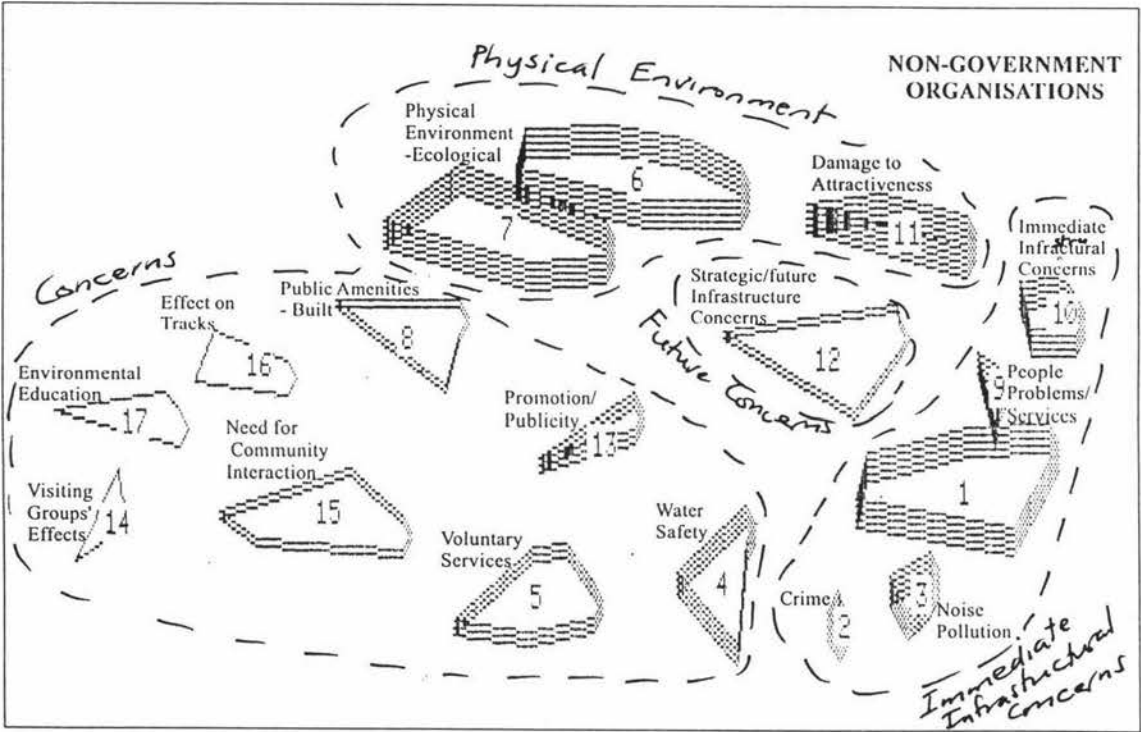


Figure 5.2 Concept Map: Non Government Organisations

1. The three clusters with low ratings (and low occurrence) on the left of the map, Visiting Groups' Effects (14), Environmental Education (17), and Effect on Tracks (16) are given less emphasis than expected. These are associated with concerns which are perceived to be more important: Need for Community Interaction, Public Amenities, Promotion/Publicity, Voluntary Services, and Water Safety. This grouping labelled 'Concerns' relates most closely to the 'Actual

Change' grouping of the Government Organisations' map, but unlike the Government Organisations more attention is paid to the detail of those concerns and none to the outcomes of those concerns (seen as changes on the Government Organisations' map).

2. Three highly rated clusters in the upper section of the map (6,7 Physical Environment - Ecological and 11, Damage to Attractiveness) reveal some of the greatest concerns for Non Government Organisations with strong focus on the likely effects on the natural environment. Statements contained in this group of statements range from "shellfish disappearing", "desecration of the mauri (life force) of forest, sea", "increased threat to native birdlife" and "more sand dune erosion". These impacts on the physical environment correlate with the 'Action and Outcome' grouping on the Government Organisations' map and have just as much emphasis.

3. The remaining area in the right hand section of the map contains ideas about infrastructure and services: Immediate Infrastructural Concerns (10), People Problems/Services (9), and Noise Pollution (3). Statements contained in this group of clusters range from "rubbish disposal problems", "more dogs and dogs' damage", "demand for suburban-type facilities", "more subdivisions", and "increased rates to fund increased services". Again, there is more concern with details of the outcomes of change than can be seen from the Government Organisations' map which indicates more of an overview of problems concerned with the management of change.

The spread of concerns shows strong emphasis on the details of the effects of increasing visitor numbers on the physical environment as well as on the details of immediate infrastructural and social concerns. In this there is a high level of agreement with the Government Organisations. However it is clear that there is a big difference in perspective between the Non Government Organisations' group and the Government Organisations' group; that is from a concern for the detail of impacts (Non Government Organisations) and concerns about how to manage the effects of those impacts to achieve planning objectives (Government Organisations).

Residents: (Figure 5.3) Mostly permanent residents, this group consisted of a wide range of age groups, including the semi-retired and members of young families. The analysis produced 14 clusters for the Residents group. Appendix C shows the statements contained in each cluster. The map shows the Residents' concept of the effects of increasing visitor numbers on Piha.

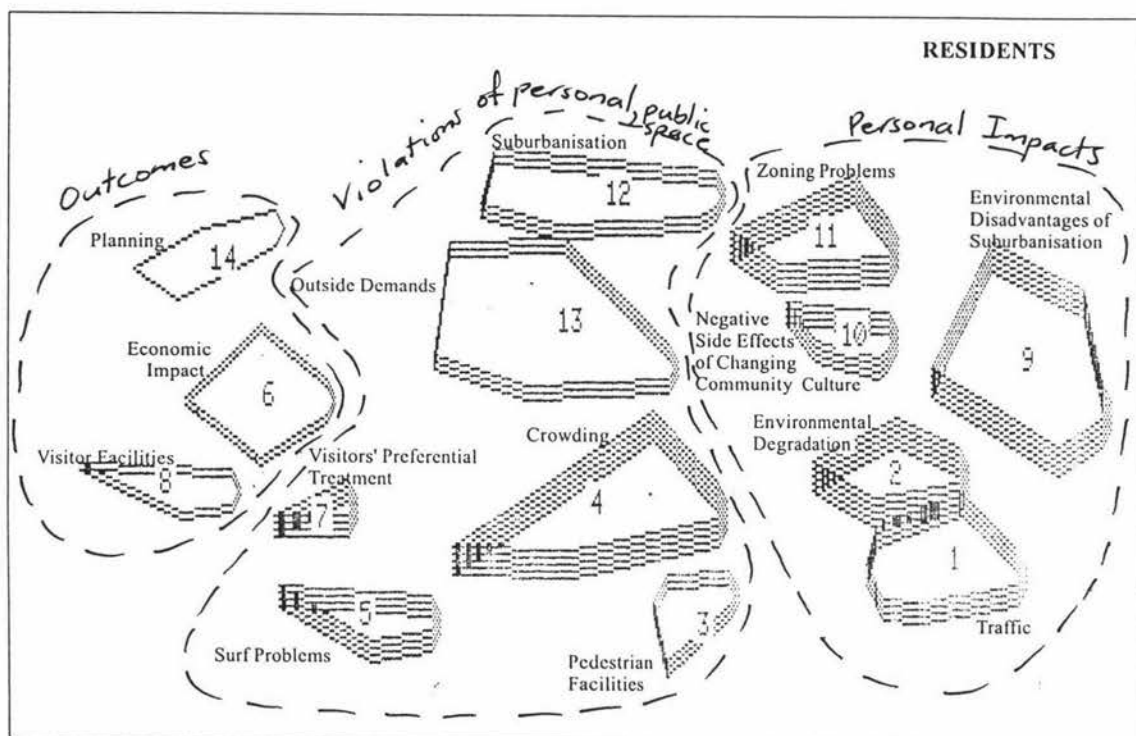


Figure 5.3 Concept Map: Residents

Three distinct but linked areas can be identified:

1. The area on the left of the map shows a group of outcomes of visitor impact that includes Planning (14), Economic Impact (6), and Visitor Facilities (8). Statements included in this area include "more cafes", "increased film crew nuisance", and "need for visitor education". There is some relationship here with the Actual Change grouping of the Government Organisations' map but more with the Immediate Infrastructural Concerns of the Non Government Organisations' map.
2. The area in the central area of the map includes Surf Problems (5),

Crowding (4), Pedestrian Facilities (3), Outside Demands (13, and Suburbanisation (12). Concerns include crowded swimming areas between the flags with consequently more drownings, the necessity for making the roads safer for pedestrians, together with fears about increasing suburbanisation. Statements included in these clusters range from "more need for footpaths", "more strain on lifeguards", "more dangerous in the surf because of overcrowding", to "overtaxed facilities", "more problems with sewage", "fewer low income people", "increased pressure on Council to change zoning", "more commuters", to "increased demand for medical facilities".

What is obvious from these statements is that the issue of visitor impact is seen from the perspective of those personally affected by the results of increasing visitor numbers. In this grouping there is more emphasis on the sociological implications of change than in either of the two previous concept maps.

3. The far right sector of the map contains clusters which show greatest concern for personal impacts. The Environmental Disadvantages of Suburbanisation (9) is linked to Environmental Degradation (2) which is closely linked to Traffic (1). Also included with this group are Zoning Problems (11), and the Negative Side Effects of Changing Community Culture (10). There was greatest concern here for uncontrolled change because of pressure from the Greater Auckland area. Statements included in these clusters range from "more parking problems", "more dangerous driving", "more fire risk", "deterioration of sand dunes", to "more feral cats" and "more runoff because of fewer trees and cover".

These Personal Impacts, like the Violations of Personal and Public Space in Grouping 2, contain statements that are more subjective than those of the Non Government Organisations' Concerns (including Immediate Infrastructural Concerns) and far more subjective than the overview of the outcomes of change presented by the Government Organisations' map.

The Residents' map shows deep concern for environmental degradation linked closely to increased traffic, changing community culture, and zoning problems. The emphasis on concern for environmental degradation and impacts on the physical environmental is shared by the three groups analysed so far. There is more emphasis by the Residents, however, on the effects of increasing traffic and changes to the character of the community than on other outcomes of change caused by the effects of increasing visitor numbers. These include the Government Organisations' concern about the quality of visitor experience and the need to manage the effects of popularity and the Non Government Organisations' concern about damage to attractiveness.

Visitors: (Figure 5.4) Trampers, surf club members, several secondary and primary school teachers and an artist were included in this group. The analysis produced 19 clusters for the Visitors' group. Appendix D shows the statements contained in each cluster. The resulting map shows the Visitors' concept of the effects of increasing visitor numbers on Piha.

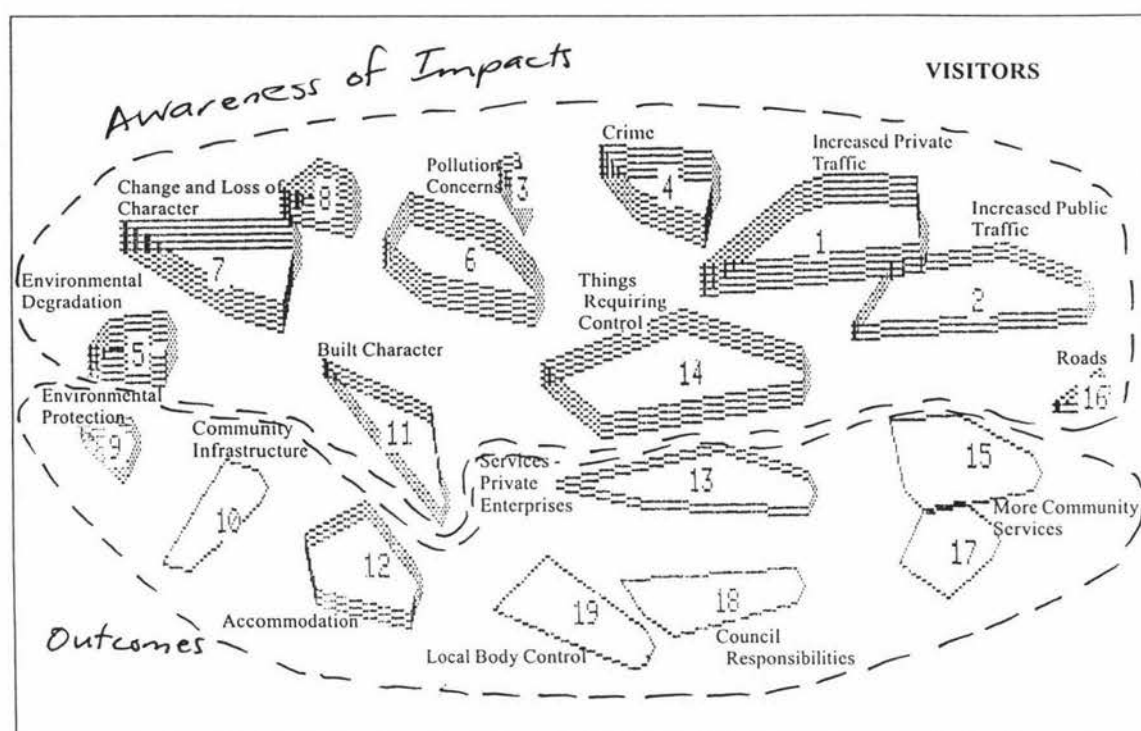


Figure 5.4 Concept Map: Visitors

Two distinct but linked areas can be identified:

1. The upper portion of the map contains clusters that show strong awareness of visitor impacts: Change and Loss of Character (8), Environmental Degradation (7), Environmental Protection (5), and Pollution Concerns (9) are as important as Built Character (11), Things Requiring Control (14) Increased Traffic (1 and 2) and Roads (16). Statements included in these clusters range from "increased damage to wildlife", increase in introduced plant life", "change to people's perceptions of Piha", "cultural and heritage problems", to "increased pressure to clear bush", "protection of seaweed", and "more dogs - pollution". Other statements are concerned more with social concerns and range from "decreased road quality", "increased time to reach Piha because of traffic jams", "more full-time summer and

weekend traffic control”, “more car turning bays” to “increased car conversion”, “more burglary”, “decreased safety of persons and property”.

It is understandable that the Visitors’ concerns are largely to do with the physical and built environments since these help make up the distinctive and attractive character of the place. Because they see a danger of Piha losing its distinctive character they see a need for controlling the causes of that loss of character. To a degree this concern for control/management is shared by the Government Organisations group but their emphasis is not so much on character but about balancing all aspects of the environment in a strategy that will achieve balance and sustainability. The concern about traffic and increased crime is shared by the Residents’ group but traffic concerns are linked with environmental degradation and they show more concern than the Visitors’ group for improved pedestrian facilities. The Non Government Organisations’ concern for damage to attractiveness is also linked to character loss but in their eyes the effects of increasing visitor numbers on the physical environment rather than on the built environment.

2. In the lower portion of the map are Visitors’ perceptions of the outcomes of increased impacts. Clusters include two closely linked More Community Services (15,17) together with Local Body Control (19) and Council Responsibility (18). There is also a link here with Services-Private Enterprises (13). Environmental Protection (9), Community Infrastructure (10) and Accommodation (12) are other outcomes. The focus here is on the increased need for community services provided either by the Council or by private enterprise. Statements range from “increased infrastructure”, “water monitoring”, “control of visitor numbers”, “tighter control by Council” to “hiring companies” and “beach massage people”. Other statements concerning outcomes vary from “need for more first aid”, “need for more police”, “more lifesaving equipment” to “more pressure to build on unstable land”, “bed and breakfast accommodation”, and “commercial accommodation”.

There is obviously more emphasis here on improving visitor facilities, the provision of community services and infrastructure and the increasing need for tighter control. Understandably there is less concern for the effects on residents that is illustrated by the Residents’ map. This grouping shares the Government Organisations’ Necessity for Managing Change and Control needed to ensure Standard of Visitor Experience but compared with the Government Organisations’ map, this is a rather one-sided view.

To summarise, the Visitors’ concern with the degradation of the natural environment is shared with all the other groups. Both the Visitors’ and the

Residents' group fear that increasing crime will change Piha's character, but the two groups do not share the same perception of "character". For the Residents' group Piha's character is as much shaped by socio-economic considerations as the physical environment; but Visitors' see that increasing visitor numbers threaten the traditional "wild and remote" character of Piha. Like the Government Organisations' group the Visitors' group considers that more control and improved infrastructure will be needed with increasing visitor numbers but the more complete overview of the effects of increasing visitor numbers shown by the Government Organisations' map is missing from this map.

3.2 Summary of Responses

Table 4 shows how the issues related to the effects of increasing visitor numbers on Piha are shared among the four cluster groups. These range from the most common concerns to those only mentioned by one group. This table reveals the following:-

1. Greatest importance to all groups: Natural Environment and Management/Control had the most emphasis by all four groups with the Natural Environment receiving the most emphasis.
2. Important to all four groups: Piha's Character, Conflict, and Roads/Traffic.
3. Important to three groups: Development, Change, Infrastructure, and Economic Impacts were included by three groups. The Non Government Organisations' group omitted Development, Change, and Economic Impacts. The Government Organisations' group omitted Infrastructure.
4. Important to two groups: Marketing/Promotion was included by two groups: by the Government Organisations and the Non Government Organisations groups.
5. Important to one group: Sustainability was only included by the Government Organisations group which is to be expected. The absence of this concept from the other groups indicates this concept needs increased awareness.

Together with concern that Piha's essential character will change, this table reveals that all participants acknowledge the need for managing the effects of increasing visitor numbers on the natural environment. Increasing traffic and road problems are seen to be both potential sources of conflict and catalysts for change.

Difficulties illustrated by Table 4 include the omission of important ideas from more than two groups (e.g. "the need for sustainability" is only included by Government Organisations). This narrowness of focus could reflect emphasis on issues of immediate concern to that interest group and the lack of concern for the 'bigger picture'. The mention of "sustainability" suggests professional knowledge and could suggest that public behaviour could be usefully affected by wider public education. The infrastructural needs of residents for example seem of little concern to non-residents/visitors.

What is particularly highlighted is the ability of the CM process to enable all these foci to be taken into account to obtain the 'big picture' for planning purposes. What cannot be shown by Table 4 are the different perspectives of each group regarding these issues. This is where the maps produced by the CM process have an important advantage over any other method of issue clarification currently known to the writer. The concept map analyses show that each map portrays different perspectives on each issue and that each map shows that each group combines issues in different ways. What also becomes clear is the difference in understanding of important concepts. The analyses of the concept maps showed differences in the interpretation of concepts such as the "character" of Piha which involved the Visitor Experience for the Government Organisations' group, the "attractiveness" of the environment for the Non Government Organisations' group, the socio-economic as well as the natural environment for the Residents' group, and the combination of the built and the natural environment for the Visitors' group. Even this summary is only a broad attempt at comparing the perspectives of the four groups regarding character. Close examination of the range of statements in each cluster brings more subtleties to the surface. Because it is these different perspectives that are often the source of conflict, the CM process offers a way for each group to reach an understanding of other groups' perspectives about complex issues.

Although the perspective of the analyst cannot be entirely divorced from the issues being analysed this is not really a shortcoming. Background knowledge is useful in interpreting these maps after there has been a neutral, unarguable grouping of ideas in the clusters. It has been particularly interesting for each group to see the relationships between the clusters of ideas generated by the process and the overall perception of each group's ideas about the effects on Piha of increased visitor numbers. While some maps were quite complex no real problems in understanding were encountered with any of the participants who viewed the final maps. One comment that was repeated several times suggested that it is a pity that the system cannot generate a composite map that includes all perspectives. If that were possible, however, it is suspected that such a map would mask the differences in perspective that are so valuable for the planner. These differences in perspective must be understood by all participant groups before any agreement or compromise is likely to be reached.

Table 4 Concept Mapping: Summary of Responses

Government Organisations	Visitors	Residents	Non Government Organisations
Environment:			
Environment Physical Impacts Environmental Impact concerns	Environment Pollution concerns Environmental degradation Environmental protection; increased private traffic; increased public traffic	Environment; Environmental degradation; Environmental disadvantages of suburbanisation	Environment; Noise pollution; Physical environment - ecological; damage to attractiveness; Environmental education; Effect on tracks
Management/Control:			
Demands for management of effects of popularity; Decisions about control needed to ensure standard of visitor experience; Change - how it informs the planning and management process; Local body guidelines; Local body control	Things requiring control; Council responsibilities; Local body control	Zoning problems; Planning	Strategic/future infrastructure concerns; Immediate infrastructure concerns
Roads/Traffic:			
(implied - control)	Increased private traffic; Increased public traffic; Roads	Traffic; Pedestrian facilities	(implied - noise)
Character:			
Changing nature of experience for users	Change and loss of character; Built character	Negative side effects of changing community culture	Damage to attractiveness
Conflict:			
Conflict between users; User competition	Crime	Visitors' preferential treatment; Outside demands	Crime; Visiting groups' effects
Development:			
Physical development; Pressure of development - decrease of quality	Services - private enterprises	Suburbanisation; Pedestrian facilities; Visitor facilities	
Change:			
Changing nature of experience for users; Change - how it informs the planning and management process	Change and loss of character	Negative side effects of changing community culture	

Table 4 continued

Government Organisations	Visitors	Residents	Non Government Organisations
Infrastructure:			
	Community infrastructure; More community services; Accommodation; Services - private enterprises	Planning	Immediate infrastructural concerns; Strategic/future infrastructural concerns; Voluntary services
Economic impacts:			
Economic impacts	Services - private enterprises	Economic impact	
Marketing/Promotion:			
Results of marketing/promotion			Promotion/publicity
Sustainability:			
Balance between economic, physical and social to ensure sustainability; strategy for sustainability			

CHAPTER 4

SURVEY RESULTS

As stated in Chapter 2 the purpose of this survey was to take the issues identified by the CM process to a different but parallel population of interest to find out to what extent the findings of the CM process were supported. The results of the survey were expected to show up strengths and weaknesses of the CM process in comparison with the more usual and more costly process represented by the survey. To have provided a truly parallel process the survey could have been the first step in the Delphi process described on page 2. Justification for using the survey only, lies in the fact that in practice decisions in many organisations are informed chiefly by the analysis of the results of surveys.

Two separate questionnaires, one each for Visitors and Residents, were prepared with advice from the Waitakere City Council who supported this research. The Visitors' Questionnaire is found in Appendix E; the Residents' Questionnaire is found in Appendix F. Although the questions that focused on the results of the CM process were placed centrally in both questionnaires (Questions 9, 10, and 11 in the Residents' survey; Questions 10, 11, and 12 in the Visitors' survey), these questions were surrounded by open-ended questions (Questions 5, 6, 14, and 15 in the Visitors' survey; Questions 4, 5, 8, 13, and 14 in the Residents' survey). The purpose of these open-ended questions was to provide opportunities to raise issues not identified by the CM process. Since careful scrutiny of the responses to these open-ended questions revealed no additional issues, data analysis was restricted to the questions based on the CM findings (Questions 10, 11, and 12 in the Visitors' survey; Questions 9, 10, and 11 in the Residents' survey).

Although the survey title reflects the CM focus: "the effects of increasing visitor numbers on Piha", the survey restates this focus in the CM generated questions as "issues that affect the enjoyment of Piha" and "issues seen as concerns regarding the future of Piha". Respondents were asked to rank the issues that affected their present enjoyment of Piha before ranking issues likely to become important with increasing numbers of visitors to Piha. Consequently the responses to Question 12 in the Visitors' survey and the responses to Question 11 of the Residents' survey are the most suitable for analysis.

4.1 Data Analysis

For the purpose of comparing the results of the survey with those of the CM process concerning the “impact of increasing visitor numbers on Piha” an analysis of frequency counts was followed by factor analysis (using SPSS) to identify significant factors, and cluster analysis (using SPSS) to reveal the significant clusters of factors. This sequence of analysis was chosen because it parallels the sequence of analysis used in the CM system. Responses to Question 12 in the Visitors’ survey and Question 11 in the Residents’ survey were the focus of analysis since these questions correspond most closely with the CM focus question. It was expected that there would be strong correlation between the results of the two processes.

4.1.1 *Frequency Counts*

The results of this analysis are summarised in Appendix A and the most important issues are illustrated by comparative column graphs in Figures 6 and 7 on pages 59 and 61. The issue considered most important with increasing visitor numbers was Pollution/environmental degradation which is also related to “Natural Character” which was one of the important issues raised by the CM process. As shown by the column graphs in Figure 6 (Comparison of the importance of environmental issues) Residents and Visitors’ concerns were very similar. This result supports the importance given to this issue by the CM groups. It is interesting to observe that while the survey shows in Figure 6 that more than one-third of Residents and Visitors consider Environmental Education to be a very important outcome of increasing visitor numbers, Environmental Education only figured on one concept map, that of the Non-Government Organisations’. This may have been because this issue was considered by the CM groups to be a positive outcome and not a concern.

On the concept maps the character of the built environment appears as a concern to the Visitors’ group (Figure 5.4), although this was not supported so strongly by the Government Organisations’ map (Figure 5.2) nor by the Non Government Organisations’ map. Aspects of the built environment appear as part of several of the Residents’ issues (Figure 5.3) and the survey supports this breadth of concern in Figure 6 (page 60) which shows that Residents have far more concern than Visitors for the likely effects of increasing visitors on the built environment.

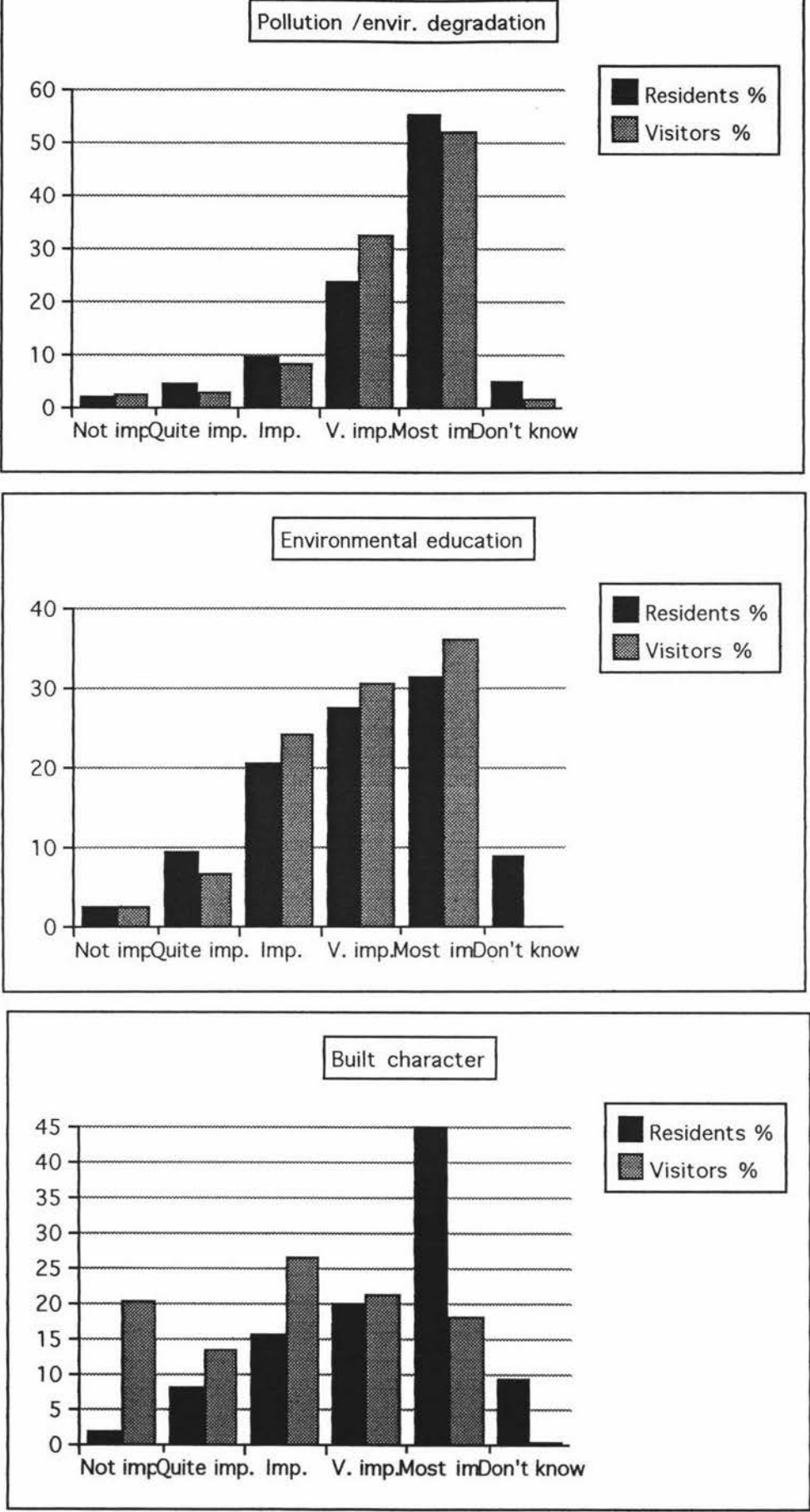


Figure 6 Comparison of the importance of environmental issues (natural and built) to Residents and Visitors

As illustrated by the CM process, the Residents' CM group showed more concern for socio-economic changes likely to be brought about by increased visitor numbers. Figure 7 (Comparison of the importance of socio-economic issues) shows that crime is rather more of a concern to Residents than to Visitors in the survey, although Visitors rated crime an important concern. Scrutiny of the statements that make up the crime-related issues shown on the concept maps reveal differences in perceptions of the type of crime that might increase. Understandably, the CM process shows that residents are more concerned about increasing numbers of burglaries and break-ins than to car-related crimes such as car conversion, breaking into cars, and theft of petrol. This is the kind of detail that is not revealed to the same extent by the survey.

Roads and traffic, considered important effects by all the CM groups, was felt to be most important by the Residents' survey. More than half the Residents surveyed (Figure 7) were concerned by future traffic increases, while less than a quarter of Visitors felt that this issue rated "very important" or "most important". Again it is interesting to note that the Residents' group in the CM process expressed concern about provisions for pedestrians and increasing danger to pedestrians, whereas the Visitors' group were concerned about increasing carparking problems and future traffic congestion. Again this difference in perception was not made clear by the survey.

Although Figure 7 shows that concerns about the increasing need for improved infrastructure was not considered to have quite the same importance as other socio-economic issues, it is obvious that this is an important concern for both Visitors and Residents. There is perhaps more emphasis on infrastructural concerns shown by the CM process, especially by the Non Government Organisations and the Visitors. Less direct emphasis is seen on the Residents' map and direct reference to infrastructure is missing from the Government Organisation' map, although some of the statements refer to infrastructural issues.

Neither Residents nor Visitors regarded Promotion/Publicity likely to have much importance as a future issue, with 40% of Residents and 37% of Visitors expressing the opinion that it would not have any importance. This issue only appeared on two of the concept maps: as a fairly important concern by the Non Government Organisations' group and, as "Results of Marketing/Promotion", of minor concern to the Government Organisations' group. It is interesting to note that most participants felt that it would be impossible to control the publicity that Piha attracts.

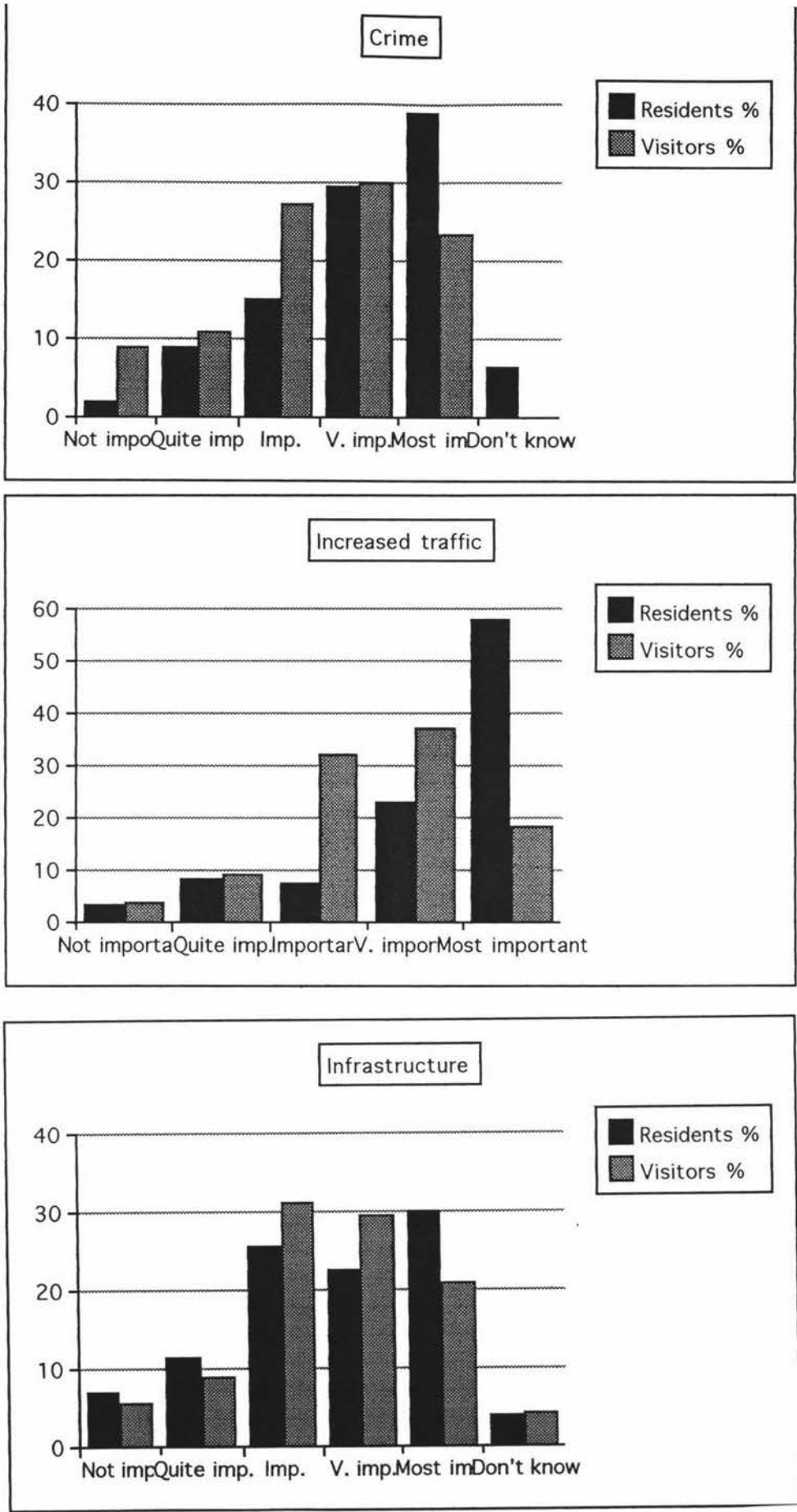


Figure 7 Comparison of the importance of socio-economic issues to Residents and Visitors

4.1.2 *Factor analysis and box plots*

An initial comparison was made of the mean ranks of variables found to be significant for both surveys ($p = <0.05$). As a result of this analysis, it was found that there was high correlation between variables such as natural environmental concerns (environmental degradation and pollution, environmental education), visitor facilities (toilets and changing facilities, provision of rubbish bins), infrastructure, roads, tracks (bush safety), and promotion/publicity. There was less agreement between the groups about parking facilities and beach access; and less agreement about visitor directions, parks and beaches, picnic areas, crime and increased traffic, all of which were rated more important by Visitors than by Residents. Educational programmes were rated less important by Visitors.

To explore the potential structure underlying the ratings of likely effects of increasing visitor numbers, several separate factor analyses were conducted (on Questions 11 and 12 of the Visitors' survey and Questions 10 and 11 of the Residents' survey) for Visitors and Residents separately as well as for the Visitors and Residents combined. The inclusion of the question related to present conditions may have given a more useful range of components. Because the analysis was exploratory, all factors yielding eigen values greater than one (Appendix H) were retained prior to orthogonal rotation. For all of these, four factors emerged, accounting for 48% of the variance for Visitors and Residents. The order of emergence was identical across both groups. These four factors were: 1. visitor-related facilities (related mainly to present conditions); 2. future concerns about the natural, built, and social environment; 3. access and parking; and 4. changes to character caused by future popularity.

To test for equality of covariance between Visitors and Residents box plots were generated for each of these four factors (Figures 8.1, 8.2, 8.3, 8.4). Although these show some differences in emphasis, there are no real surprises. While there is no significant difference between the extent of the inter-quartile ranges (IQR) for the two groups shown for the first three factors, Factor 4 (changes to character caused by future popularity) shows a much wider range for Visitors than for Residents.

For visitor-related facilities (Factor 1) the median for Residents is more than zero compared with the median for Visitors which is less than 0 indicating less satisfaction with visitor-related facilities for Visitors than for Residents. For future concerns about the natural, built, and social environment (Factor 2), the Residents' median is nearer 1 and the Visitors' median is almost zero indicating a higher level

of concern on the part of the Residents. Visitors show more concern for access and parking (Factor 3) with a median above zero while Residents have a median closer to -1. Visitors and Residents share the same median (zero) for changes to character caused by future popularity (Factor 4) but the wider IQR of the Visitors' box plot indicates a wider range of concern.

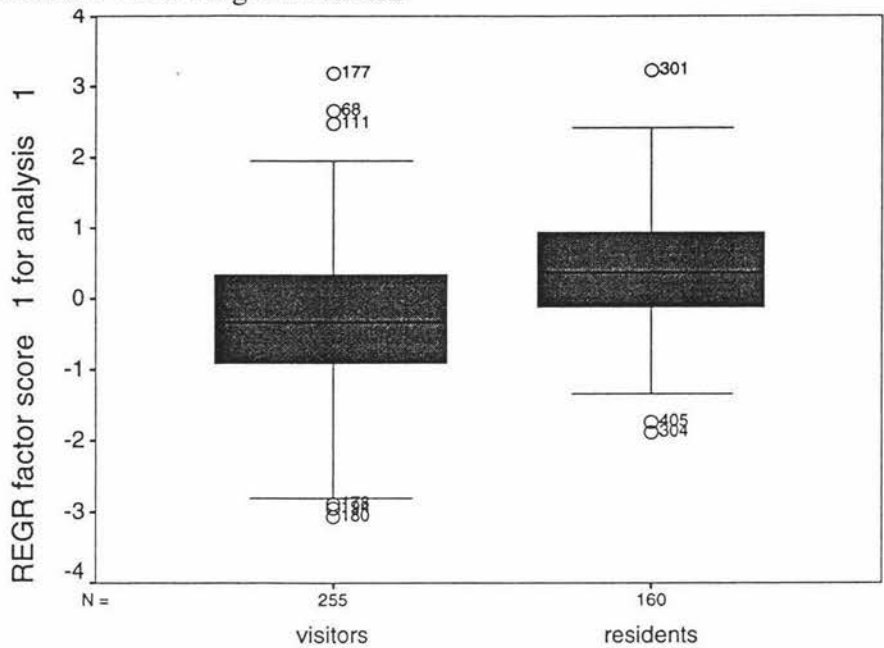


Figure 8.1 Visitor-related facilities

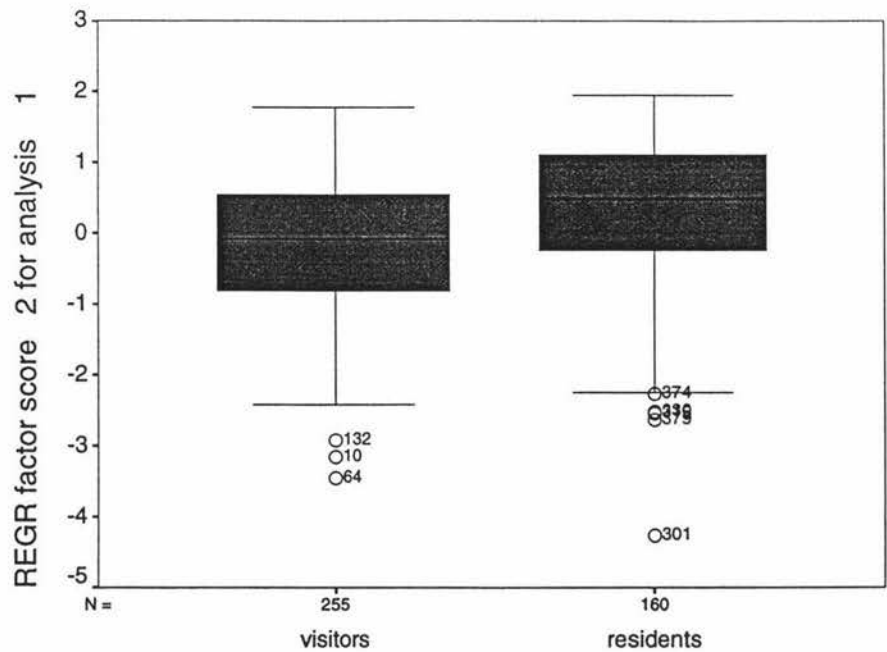


Figure 8.2 Environmental concerns (natural)

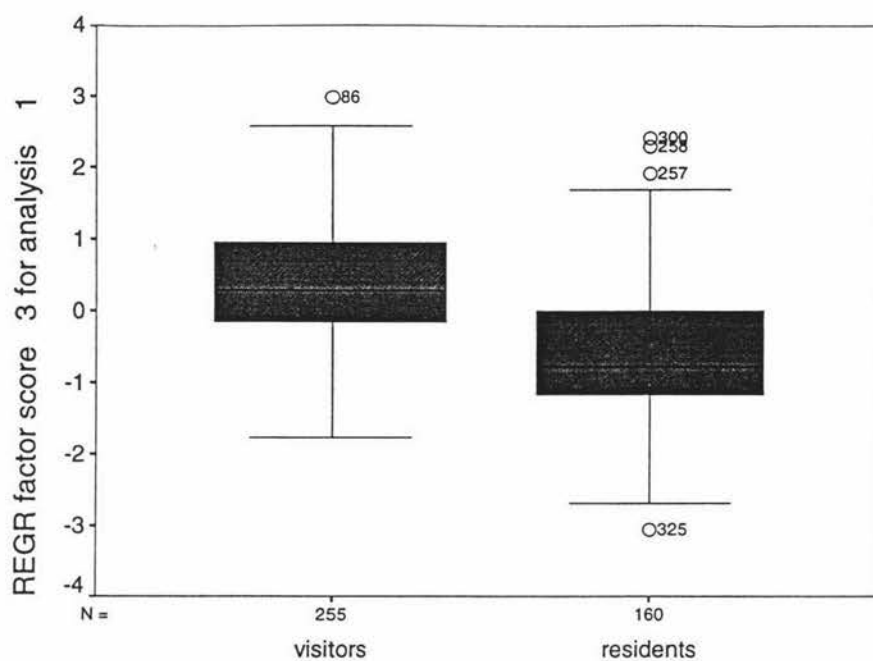


Figure 8.3 Access and parking

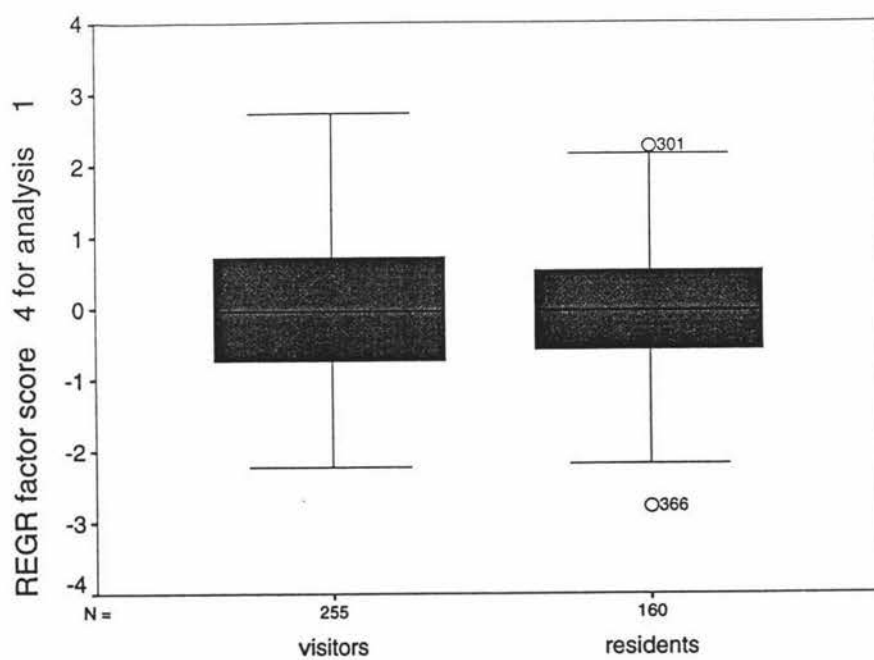


Figure 8.4 Changes to character

4.1.3 Cluster analysis

So that the results of the CM process could be better compared with the results of the Survey process, hierarchical cluster analysis was carried out (using responses to the same questions as for 4.1.2 Factor Analysis) for both groups. This analysis of variables produced dendrograms for residents and for visitors, using average linkage between groups of variables.

Analysis of the Residents' dendrogram (Figure 9.1) reveals four main clusters of concerns: 1. the need for planning/control; 2. the rating of the area for safety concerns; 3. problems related to suburbanization; and 4. the generation of visitor facilities .

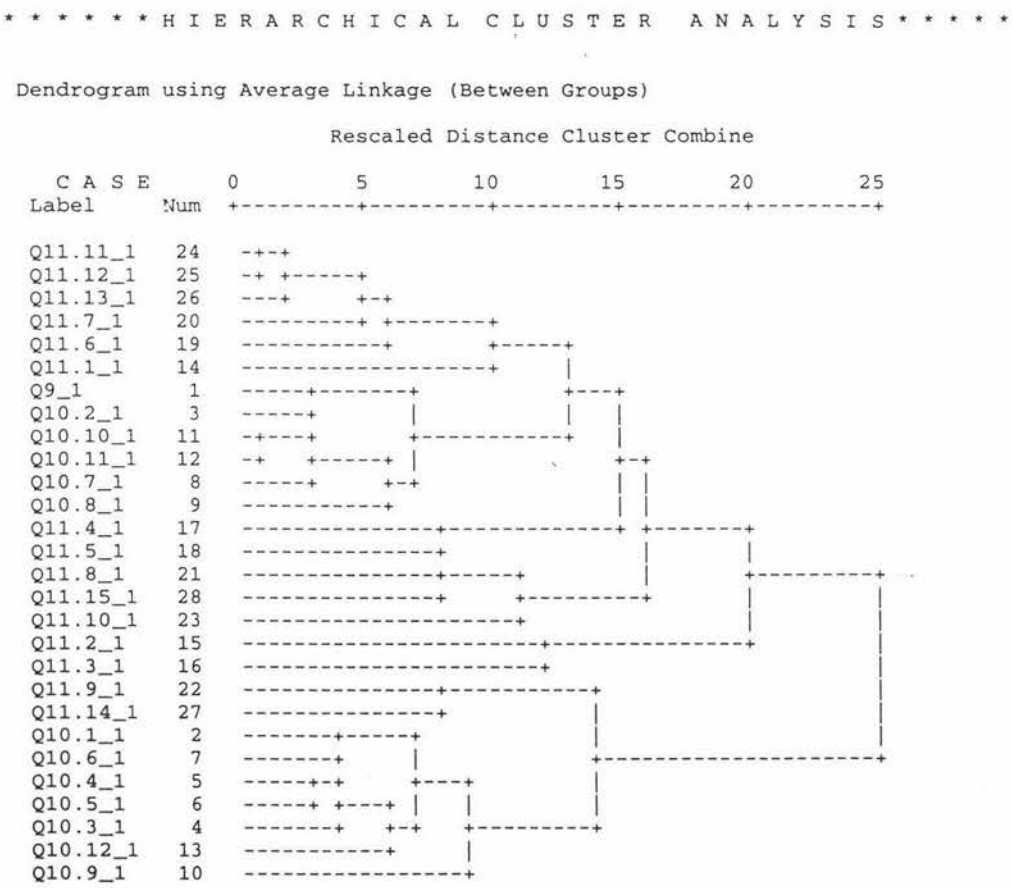


Figure 9.1 Dendrogram: Residents

Hierarchical cluster analysis performed on the same variables related to the Visitors' survey resulted in the dendrogram shown in Figure 9.2. Analysis revealed four main clusters: 1. Need for Control (*the need for planning/control*); 2. Safety First -recreational areas and safety (*the rating of the area for safety concerns*); 3. Changing Character - results of urbanisation (*problems related to suburbanization*), and 4. Visitor future needs (*the generation of visitor facilities*). These are similar to the clusters generated for the Residents' dendrogram which are shown in italics in brackets.

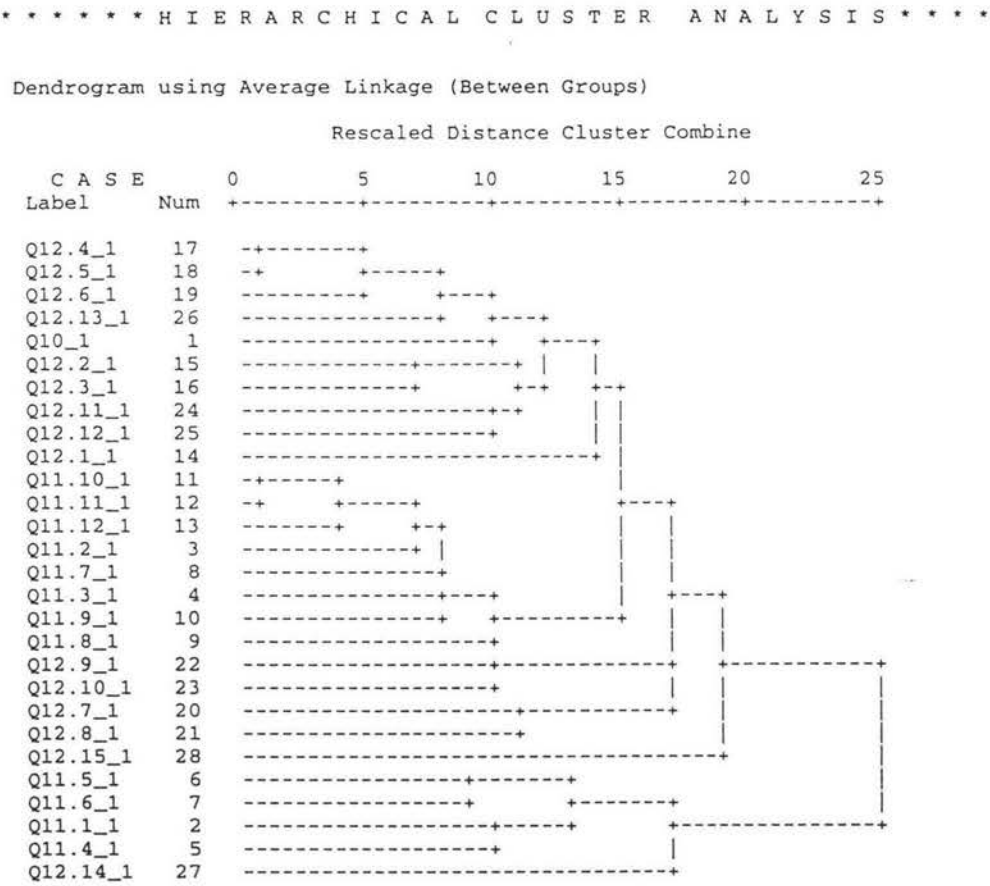


Figure 9.2 Dendrogram: Visitors

CHAPTER 5

CONCLUSIONS

5.1 *Discussion*

In general, the data demonstrate that CM is a useful tool for measuring people's perceptions of the way visitor activities interact with the environment and the perceived importance of those interactions. More specifically, the number of issues raised by the CM process was not added to by the results of the Survey and the issues identified by CM as important (e.g. environmental issues, traffic-related issues, change of character, control) were generally supported by the Survey. CM however was able to show more clearly the differences in perception of such issues as "traffic" where CM was able to show that Residents were more concerned with the safety of pedestrians and Visitors were more concerned with access and parking problems. Issues like this need clarification before stakeholders can reach some sort of agreement about planning objectives and the Survey results do not provide this kind of detail as readily.

Another advantage of CM shown by this study is that it provides a visual overview of issues that can be easily understood with only a little guidance. By comparison, although the results of frequency analysis can be graphed and the results of factor and cluster analyses can be presented visually, a degree of training is necessary for useful interpretation. In addition informal feedback reveals that participants in the CM process feel they have more of an investment in making sure that consensus is reached, that conflicts are resolved, or failing those outcomes that constructive compromise is sought.

Although originally designed to take place over the space of one day, this process has worked well over a longer time frame. Furthermore, compared with the Survey process CM is more time effective and therefore more cost effective because the smaller sample needed gives similar results. To be sufficiently representative however that smaller sample must reflect in-depth knowledge of the range of stakeholders as well as the particular characteristics of the local community. It is a pity the lack of other similar research projects do not allow comparisons to be made.

5.2 *Comparison with another planning techniques*

A close cousin of the CM process, the Delphi method takes the issues collected from surveys back to participants for confirmation, a process that is repeated until consensus or compromise is reached but CM's chief advantage is its visual dimension that helps participants "see" the whole picture. CM is a much neater, more easily controlled technique for providing a quantifiable way of making qualitative data scientifically acceptable.

5.3 *A Planning Framework*

It is more likely that the management of visitor impact for the sustainability of the visitor experience will be effective for sustainability if the necessary management steps lie within a suitable planning framework. Relevant to this objective was the discussion of conceptual frameworks in Chapter 1 (1.5.3, page 12-17). This included a description of the Limits of Acceptable Change (LAC) planning framework (Rumble, 1996; Blockley, 1996; Tyson, 1989; Stankey, McCool and Stokes, 1984; Stankey and Cole et al, 1985) and it was suggested that the CM process could be a useful tool for identifying issues and concerns in Step 1 of that framework. An important advantage of the LAC framework is that the key management focus is on the desired environmental and social conditions rather than on use level. In addition the viewpoints of a range of stakeholders (including managers and researchers as well as citizens) provide personal judgment of "acceptability" instead of focusing on scientific measurement of "carrying capacity".

Figure 10 on the next page is a suggested adaptation of the LAC framework which suggests a place for the CM process either alone or in conjunction with other tools. The framework could become the basis for replicating the CM process at other west coast beach areas such as Muriwai, Te Henga/Bethells Beach, or Karekare.

5.4 *Conclusion*

Although the focus of this thesis is on visitor impact management (an aspect of tourism planning), its use need not be restricted to this aspect of environmental management. Research that may be stimulated by the current study should include similar studies in similar areas and in association with other planning tools. Equally urgent is the adaptation of current planning frameworks and the construction of new ones to meet the needs of sustainability. Balanced community-based planning to be effective needs to incorporate an understanding of the complex range of perceptions involved and CM may help fill that gap.

STEP	DESCRIPTION	METHODOLOGY
1	(a) Identification of Issues and Concerns (b) Assessment of issue importance to local area and region ↓	Qualitative and quantitative methods - could include visioning CM system community based
2	Baseline assessment ↓	(a) Description of area's diversity related to recreation and needs of community (b) Selection of indicators of resource and social conditions for quantitative analysis (c) Inventory of resource and social conditions
3	Standards setting ↓	Specify standards for resource and social conditions
4	Identification of alternative ways of managing use of the area ↓	(Allocating opportunity classes) Alternatives address issues and concerns identified in Step 1; and take into account existing resource and social conditions
5	Management requirements/action plans ↓	Identify management actions for each alternative (including cost-benefit analysis that takes account of environment impact and impacts on visitors as well as administration costs)
6	Evaluation of alternatives and selection of preferred alternative	Selection of the preferred alternative takes into account the issues and concerns of Step 1 as well as the management requirements of Step 5

Figure 10 The CM process placed in a LAC planning framework

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APPENDICES

Project: Government Organisations	
Cluster Listing	
Cluster 1:	Cluster 7:
01. increased physical development 40. more septic tanks 68. more boats 02. more traffic	05. increased pressure on facilities 47. increased filming 83. higher management costs 56. increased ownership by visitors
Cluster 2:	Cluster 8:
12. impacts of alternative uses e.g. mountain bikes 20. increased fire risk 44. impacts on cultural sites 31. more dogs 67. increased water use 79. increased demand for water 69. more air transport 80. increased demand for alternative access	18. more conflicts between visitors 81. conflicts between users because of different values 23. disadvantaging future generations
Cluster 3:	Cluster 9:
29. more crowding on beaches 32. increased pressure for facilities 34. congestion	07. more concentrated use of the coastal zone 48. loss of marketability 62. increased alcohol consumption 14. change of character 45. quality of experience will change
Cluster 4:	Cluster 10:
21. increased world exposure 28. increased infrastructure 35. increased demand for services 63. need for accommodation 64. need for more public transport 75. need to relocate some services 78. need for alternative energy sources	03. more enjoyment 38. visitor safety 50. closing off of options
Cluster 5:	Cluster 11:
04. increased stress on the ecosystem 11. loss of wilderness 82. degradation of environment - litter, contaminants and so on 09. pollution - less water quality, increased litter 17. impacts on historic sites	49. increasing importance of balance 76. increased need to even out usage 57. more need to understand residents' needs 58. the importance of balancing back-owners, visitors, and... 65. more need for cultural sensitivity
Cluster 6:	
08. degradation of the coastal zone 41. introduction of invasive plants 42. introduction of invasive animals 19. decreased quality of visitor experience 30. more conflict with residents 60. increased vandalism 61. increased vehicle accidents	

Project: Non Government Organisations Cluster Listing	07 - 18 - 1996
Cluster 1: 01. Increased parking problems 43. more sightseeing helicopters 74. more light 'planes 18. increased fire hazard from cigarettes 49. more food outlets 21. more vehicles on the beach 40. more boats at South Beach 27. increased litter 17. decreased pedestrian safety 34. increased traffic density 19. increased fire hazards from BBQs	Cluster 6: 02. shellfish disappearing 86. erosion of bush tracks 83. erosion of Lion Rock 04. increased plant damage 67. more destruction of seedling plants in the bush 88. introduction of non-native plants that could spread 62. more noxious weeds from people's shoes 68. desecration of waahi tapu sites 69. desecration of the mauri (life force) of forest/sea 60. more bush removed for fuel 61. more wasps and other pests 80. increased threat to native bird life including penguins
Cluster 2: 06. more crime 46. more alcohol on beaches 73. more alcohol related threats to personal safety 30. increased vandalism 65. more large gatherings of young people 66. more graffiti	Cluster 7: 07. more pressure on tracks close to beach 29. more sand dune erosion with wind-blown sand problems 39. decreased fish resources for recreational fishing 70. a one dimensional visitor destination
Cluster 3: 44. more jet skis 81. more noise pollution from carnivals and surfing contest.. 63. more noise from car radios and trannies 64. more noise pollution from parties	Cluster 8: 13. increased need for public toilets including Kitekite Falls area 84. safety measures like steps and railing to tame 'wild' areas
Cluster 4: 12. more congestion in the water - surfing 72. more boogie board hazards 45. more surfboard hazards to swimmers 23. more rescue helicopters	Cluster 9: 03. rubbish disposal problems 08. more pressure for more facilities e.g. shops 31. more dogs and dogs' damage
Cluster 5: 25. more voluntary time required from the Fire Brigade 26. more voluntary time required from the surf club first aid 33. more pressure for water safety patrols 42. more demand for rescue facilities 48. more swimmers wearing inappropriate clothing 82. more backers of events promoting visitors to Piha	Cluster 10: 05. increased visual pollution 11. more septic tanks 87. demand for suburban-type facilities 28. increased need for sewage system that works 36. more public demand for piped water supply 09. more housing 75. more subdivisions
Cluster 11: 16. decreased visual attractiveness 38. overuse detracts from natural attractions 59. bush threatened because of blocked views	Cluster 12: 10. more pressure on Council for financial input 79. increased rates to fund increased services 14. increased need for road signs 15. decreasing values 32. more pressure for visitor accommodation 35. more road maintenance needed 37. more footpaths needed

Project: Residents Cluster Listing		07 - 18 - 1996
Cluster 1:		Cluster 8:
01. increased numbers of cars 06. more air pollution (traffic fumes) 48. more road markings 59. more tow trucks 02. more road accidents 03. more parking problems 09. more dangerous driving 49. more road widening		40. increased need for more public toilets including N. Piha 69. need for visitor education 70. need to adapt to tourists 71. need to promote backpackers 72. increased need for backpacker accommodation
Cluster 2:		Cluster 9:
08. more noise pollution 12. more fire risks (cigarettes) 13. deterioration of sand dunes 14. depletion of sea front		04. more rubbish 25. more dogs 22. depleted wildlife 24. fewer native birds 26. more people environmentally unaware 34. more exotic plants 16. more runoff because of fewer trees and cover 23. more feral cats 30. more noxious plants
Cluster 3:		Cluster 10:
10. more need for footpaths 11. tracks needed instead of road footpaths 45. more signage 28. more half rounds to prevent parking		05. more crime (arson, burglaries, graffiti) 63. more unwelcome types 57. less aesthetic awareness 65. changed culture
Cluster 4:		Cluster 11:
20. overtaxed facilities 60. more damage to bush tracks 29. more helicopters 33. more crowding		07. more problems with sewage 73. fewer low income people 44. more building 51. increased pressure on Council to change zoning 53. more subdivision 55. increased subdivision 56. more stretching and abusing of Council regulations
Cluster 5:		Cluster 12:
18. more fishermen 19. more unattended children 46. more strain on lifeguards 21. more drownings 35. more dangerous in the surf because of overcrowding		17. increased land prices 41. more residents 42. more commuters 36. need for sewerage reticulation 66. more Council-run facilities 68. possible loss of artists
Cluster 6:		Cluster 13:
15. more profit for local business 38. more cafes 43. increased film crew nuisance 27. more publicity		32. more public transport especially from West Auckland 50. increased demand for medical facilities 39. more alcohol use/demand 37. need for water availability 64. more TV culture 52. more commercial activities 62. more drugs
		<i>Please see next page for clusters 7 and 14</i>

Cluster 7:	Cluster 14:
31. visitors' facilities have priority over residents'	54. increased need for community planning
74. visitors' needs considered over residents'	67. more art
47. increased need for more languages on signs	58. more need for consensus
	61. a wider range of Piha people needed to plan for Piha

Project: Visitors Cluster Listing	07 - 18 - 1996
Cluster 1:	Cluster 11:
01. more cars 16. more car accidents 07. more air pollution - traffic 91. more congestion 46. decreased road quality 62. increased time to reach Piha because of traffic jams 63. more hitchhikers causing traffic hazards 09. more beach parties 65. more locksmiths	27. increased house prices 39. bigger houses 33. need for more police 50. more camp fires
Cluster 2:	Cluster 12:
10. more boats 25. more complaints from residents 28. more tourist buses 81. more full-time summer and weekend traffic control 97. more public transport	13. commercial accommodation 95. more pressure to build on unstable land 14. bed and breakfast accommodation 41. homestays 40. hotels
Cluster 3: (combined with cluster 6)	Cluster 13:
02. more rubbish 51. more dogs - pollution 82. impossibility of patrolling swimming in dangerous conditions	11. hiring companies - wet suits 42. beach massage people 37. kiosks 23. licensed restaurants 36. more kayaks
Cluster 4:	Cluster 14:
19. increased car conversion 64. more security systems needed 30. more noise 45. more burglary 35. more vandalism 92. decreased safety of persons and property 61. more locksmith (from cluster 1)	15. hawkers 29. more rubbish disposal problems 96. exclusion of some visitors if charges imposed 24. nude end of beach 52. increased rates
Cluster 5:	Cluster 15:
03. more dune erosion 21. increased damage to wildlife 06. increased erosion of tracks 74. increase in introduced plant life 98. increase of feral animals in bush	17. more parking areas 32. increased need for shops 78. more beach cleaning 26. more jobs 89. support by other communities - fire 60. more community services
Cluster 6:	Cluster 16:
05. more pollution -sewage 38. further subdivision (transferred to cluster) 47. change in the kind of visitor experience 48. increased recreational fishing 53. more litter	44. road widening 77. more traffic turning bays
	<i>Please see next page for Clusters 7 - 10; and 17 - 19.</i>

Cluster 7: (combined with cluster 8)	Cluster 17:
08. more damage to plants 67. increased fire hazards 20. change in the nature of environment 20. change in the nature of environment 66. change to people's perceptions of Piha	22. more playgrounds 43. more footpaths 72. more picnic areas and facilities 70. more lookout space 85. more street lighting 34. more signs 83. multilingual signs 71. more changing facilities and toilet blocks 86. information board
Cluster 8: (combined with cluster 7)	Cluster 18:
61. impacts on quality of life 94. cultural and heritage problems 90. loss of remoteness	18. increased infrastructure - water, sewage, power 54. more regulations for tour operators 76. need to control beach access with more boardwalks and .. 56. more track maintenance 68. water monitoring 73. erosion control
Cluster 9:	Cluster 19:
93. increased pressure to clear bush 84. protection of seaweed. 55. greater protection of shellfish	57. control of visitor numbers 69. need for buildings to satisfy an aesthetic standard 88. tighter control by Council 59. increased work for Council 678. stream control works 75. dune modification for parking space 87. natural environment monitoring
Cluster 10:	
12. more pressure on land for houses 49. separation of conflicting activities 31. need for more first aid 79. more full-time professional life guards 80. more lifesaving equipment 4.. need for more life savers	54. increased need for community planning 67. more art 58. more need for consensus 61. a wider range of Piha people needed to plan for Piha



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APPENDIX E

A L B A N Y

DEPARTMENT OF MANAGEMENT SYSTEMS

VISITORS' SURVEY

IMPACT OF INCREASING VISITOR NUMBERS ON PIHA

The aim of this questionnaire is to find out how to best manage Piha in order to maintain its attractiveness for both residents and visitors.

This forms part of the research for a thesis for the degree of Master of Business Studies at Massey University, Albany.

Participants will have the right to withdraw from the study at any time and their names will not be used without their permission. The information obtained will only be used for this research and publications arising from this research project.

For the purposes of this study '**VISITOR**' is to mean anyone residing outside Piha and includes anyone visiting Piha for a short time.

1. What is your usual place of residence. _____
If Auckland, what suburb? _____

2. How did you get to Piha?

Private Car	()
Regular Bus Service	()
Tour Bus	()
Other, please specify	()

3. How many times have you visited Piha?

First time	()
2 - 5 times	()
6 - 10 times	()
more than 10 times	()

4. How long did you stay (are you staying) in Piha?
 () 1-3 hours () Half day () Full day () Overnight

5. What do you like about Piha?

6. What do you dislike about Piha?

7. What is your main reason for visiting Piha? Tick only one.

- | | |
|------------------------------|--------------------------|
| Visiting permanent residents | <input type="checkbox"/> |
| Surfing | <input type="checkbox"/> |
| Swimming/beach activities | <input type="checkbox"/> |
| Sightseeing | <input type="checkbox"/> |
| Picnicking | <input type="checkbox"/> |
| Tramping | <input type="checkbox"/> |
| Other, please specify | <input type="checkbox"/> |

8. How did you find out about Piha?

- | | |
|-----------------------|--------------------------|
| Friends | <input type="checkbox"/> |
| Family | <input type="checkbox"/> |
| Known about it since | |
| I was a kid | <input type="checkbox"/> |
| Information Office | <input type="checkbox"/> |
| Brochures | <input type="checkbox"/> |
| Newspaper/magazine | |
| Article | <input type="checkbox"/> |
| Other, please specify | <input type="checkbox"/> |

9. At which site do you spend most of your time?

- | | |
|-----------------------------|--------------------------|
| South Piha | <input type="checkbox"/> |
| Middle Beach (north of Lion | |
| Rock) | <input type="checkbox"/> |
| North Piha | <input type="checkbox"/> |
| Other, please specify | <input type="checkbox"/> |

The following questions are related to issues that affect your enjoyment of Piha.

10. How would you rate Piha as a visitor destination?

Poor (1), Fair (2), Good (3), Very Good (4), Excellent (5)

11. More particularly, how would you rate the following:-

Visitor directions (signs etc)	(1)	(2)	(3)	(4)	(5)
Parks and beaches	(1)	(2)	(3)	(4)	(5)
Parking facilities	(1)	(2)	(3)	(4)	(5)
Toilets and changing facilities	(1)	(2)	(3)	(4)	(5)
Provision of rubbish bins	(1)	(2)	(3)	(4)	(5)
Picnicking areas	(1)	(2)	(3)	(4)	(5)
Beach access	(1)	(2)	(3)	(4)	(5)
Water safety	(1)	(2)	(3)	(4)	(5)
Roads	(1)	(2)	(3)	(4)	(5)
Tracks	(1)	(2)	(3)	(4)	(5)
Bush safety	(1)	(2)	(3)	(4)	(5)
Educational programmes	(1)	(2)	(3)	(4)	(5)

12. Here is a list of issues that are seen as concerns regarding the future of Piha. How would you rate them? (1) not important, (2) quite important, (3) important, (4) very important, (5) most important

Crime	(1)	(2)	(3)	(4)	(5)
Increased traffic	(1)	(2)	(3)	(4)	(5)
Roads	(1)	(2)	(3)	(4)	(5)
Pollution and Environmental degradation	(1)	(2)	(3)	(4)	(5)
Environmental protection	(1)	(2)	(3)	(4)	(5)
Environmental education	(1)	(2)	(3)	(4)	(5)
Built character	(1)	(2)	(3)	(4)	(5)
Change and loss of character	(1)	(2)	(3)	(4)	(5)
Accommodation	(1)	(2)	(3)	(4)	(5)
Services	(1)	(2)	(3)	(4)	(5)
Infrastructure	(1)	(2)	(3)	(4)	(5)
Control	(1)	(2)	(3)	(4)	(5)
Council responsibilities	(1)	(2)	(3)	(4)	(5)
Promotion/Publicity	(1)	(2)	(3)	(4)	(5)
User competition	(1)	(2)	(3)	(4)	(5)

13. Who should have most control at Piha? Tick only one.

Local community	()
Local council	()
Regional council	()
Joint control	()

14. What improvements would you expect if visitor numbers continue to increase?

15. What deteriorations would you expect if visitor numbers continue to increase?

Some questions about you...

16. What sex? Female ()
Male ()

17. What age group?

11 - 20	()
21 - 30	()
31 - 40	()
41 - 50	()
51 - 65	()
Over 65	()

18. Who are you visiting with?

Partner	()
Friends	()
Family	()
Organised tour	()
Other, please specify	()

19. Do you belong to any of the following organisations?

Environment-related	
e.g. Forest & Bird	()
Local government	()
Regional government	()
Sports club	()
Other, please specify	
similar groups	()
None	()

That's it. Thank you for your time.



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APPENDIX F

A L B A N Y

DEPARTMENT OF MANAGEMENT SYSTEMS

RESIDENTS' SURVEY

IMPACT OF INCREASING VISITOR NUMBERS ON PIHA

The aim of this questionnaire is to find out how to best manage Piha in order to maintain its attractiveness for both residents and visitors.

This forms part of the research for a thesis for the degree of Master of Business Studies at Massey University, Albany.

Participants will have the right to withdraw from the study at any time and their names will not be used without their permission. The information obtained will only be used for this research and publications arising from this research project.

For the purposes of this study **'VISITOR'** is to mean anyone residing outside Piha and includes anyone visiting Piha for a short time.

1. How long have you lived/owned a property in Piha?
 - ☐ - less than 1 year
 - ☐ - 1-2 years
 - ☐ - 3-5 years
 - ☐ - 6-10 years
 - ☐ - 11-20 years
 - ☐ - more than 20 years

2. Are you?
 - ☐ A permanent resident
 - ☐ A resident at weekends and holidays only
 - ☐ Other, please specify

3. Does your household consist of:
 - ☐ - 2 adults
 - ☐ - 2 adults with children
 - ☐ - 1 adult
 - ☐ - 1 adult with children
 - ☐ - more than 2 adults

4. What do you like about Piha?

5. What do you dislike about Piha?

6. Do you think that visitor numbers to Piha are:

☐ Not enough ☐ About right ☐ Too many

7. Do you think that the increasing number of visitors has changed the nature of Piha?

☐ Yes ☐ No If Yes, please specify:

8. What is it about Piha that decided you to live here?

The following questions are related to issues that affect your enjoyment of Piha.

9. How would you rate Piha as a recreational area? Please circle one.

poor
fair
good
very good
excellent

10. More particularly how would rate the following:-

Signage

poor
fair
good
very good
excellent

10 continued...

Parks and beaches	poor fair good very good excellent
Parking facilities	poor fair good very good excellent
Toilets and changing facilities	poor fair good very good excellent
Provision of rubbish bins	poor fair good very good excellent
Picnicking areas	poor fair good very good excellent
Beach access	poor fair good very good excellent
Water safety	poor fair good very good excellent
Roads	poor fair good very good excellent
Tracks	poor fair good very good excellent

10. continued...

Bush safety

poor
fair
good
very good
excellent

Educational programmes

poor
fair
good
very good
excellent

11. Here is a list of issues that are seen as concerns regarding the future of Piha. How would you rate them as concerns? (1) not important, (2) quite important, (3) important, (4) very important, (5) most important

Increased traffic	(1)	(2)	(3)	(4)	(5)
Pedestrian facilities	(1)	(2)	(3)	(4)	(5)
Visitor facilities	(1)	(2)	(3)	(4)	(5)
Suburbanisation	(1)	(2)	(3)	(4)	(5)
Zoning problems	(1)	(2)	(3)	(4)	(5)
Planning	(1)	(2)	(3)	(4)	(5)
Negative side effects of changing community culture e.g. crime	(1)	(2)	(3)	(4)	(5)
Outside demands e.g. for firefighting	(1)	(2)	(3)	(4)	(5)
Visitors' preferential treatment	(1)	(2)	(3)	(4)	(5)
Economic impacts	(1)	(2)	(3)	(4)	(5)
Environmental degradation	(1)	(2)	(3)	(4)	(5)
Environmental disadvantages of suburbanisation	(1)	(2)	(3)	(4)	(5)
Environmental education	(1)	(2)	(3)	(4)	(5)
Promotion/Publicity	(1)	(2)	(3)	(4)	(5)
Infrastructure e.g. water, power	(1)	(2)	(3)	(4)	(5)

12. Who should have most control at Piha? Tick only one.

Local community ()
Local council ()
Regional council ()
Joint control ()

13. What improvements would you expect if visitor numbers continue to increase?

14. What deteriorations would you expect if visitor numbers continue to increase?

Dear Sir/Madam

VISITOR IMPACT STUDY

Piha was chosen earlier this year as a case study for testing a relatively new method for measuring people's ideas about the effects of increasing visitor numbers. This process produced a diagram showing the relative importance of the ideas raised and the degree to which those ideas are related.

In order to assess how well the results are supported by a much wider range of visitors and residents, a questionnaire based on the findings is now being sent out to 300 randomly selected Piha residents and ratepayers. At the same time an equal number of visitors is being surveyed.

In this way a greater degree of consultation is possible about how best to manage conservation and development in this popular area.

The results of this study will be made available to the Waitakere City Council which is providing some financial support. It is expected that these results may be incorporated into the West Coast Plan.

My name is June Logie, a postgraduate student at Massey University (Albany Campus), currently working on my thesis for M.B.S. Since 1988 I have been a member of the Piha Environment Committee but the possibility of bias has been removed by the way the process has been directed by my advisors (Carole Page for concept mapping, and Kaye Thorn for planning) and my supervisor, Dr Keith Dewar.

I have attempted to make the survey form as brief as possible, while still allowing the opportunity for you to express your views. It is emphasised that all information collected is confidential and any data which is published in the report will not be capable of being traced to any individual.

Thank you in advance for your help. I would be most grateful if you could return the survey in the enclosed stamped addressed envelope by 21st December. Should you wish to discuss this further, please do not hesitate to contact June Logie on 4897461; or Keith Dewar at the Department of Management Systems at Massey University, Albany (telephone: 4439652).

Many thanks.

Yours sincerely,

JUNE LOGIE

GOVERNMENT ORGANISATIONS

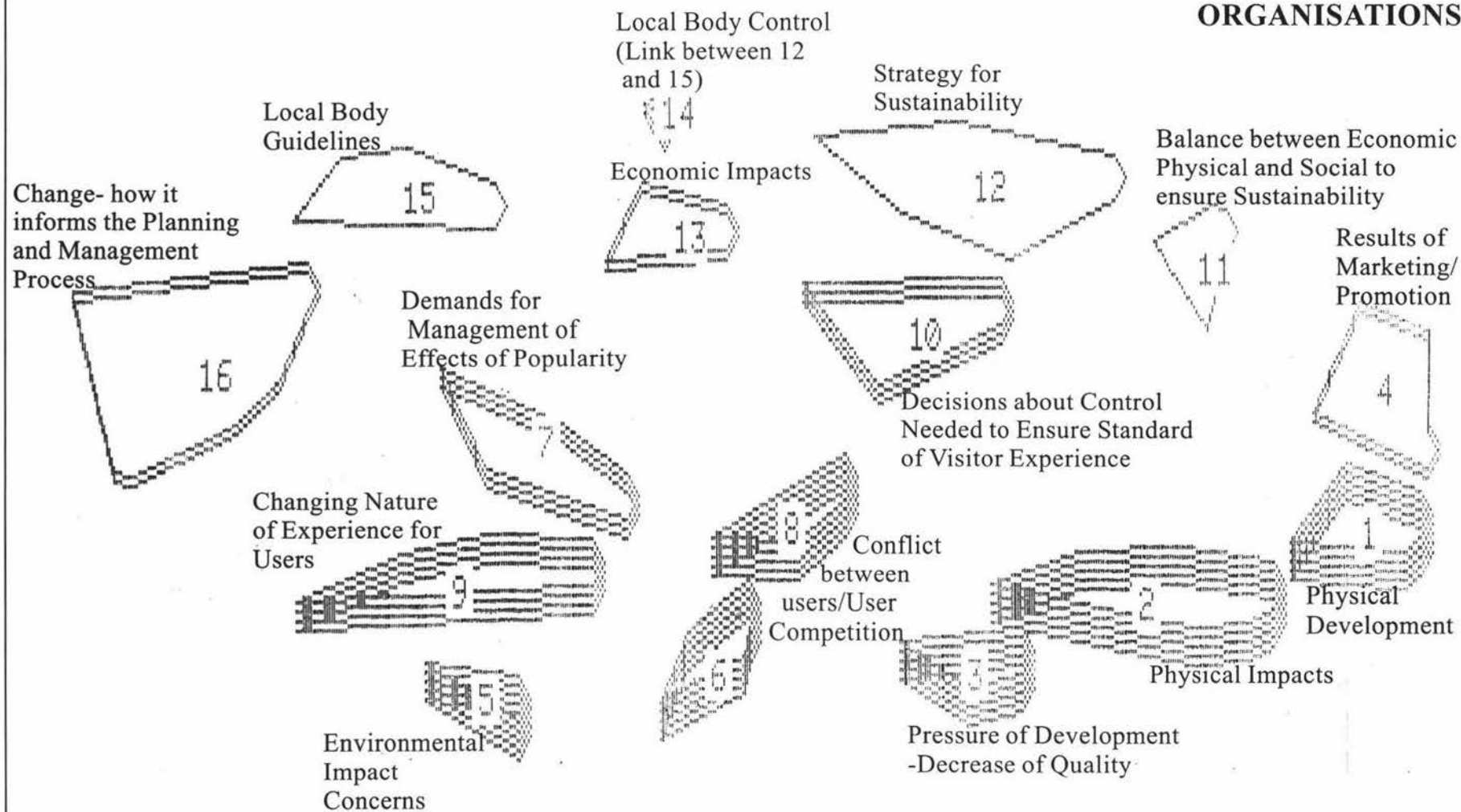


Figure 5.1 Concept Map: Government Organisations

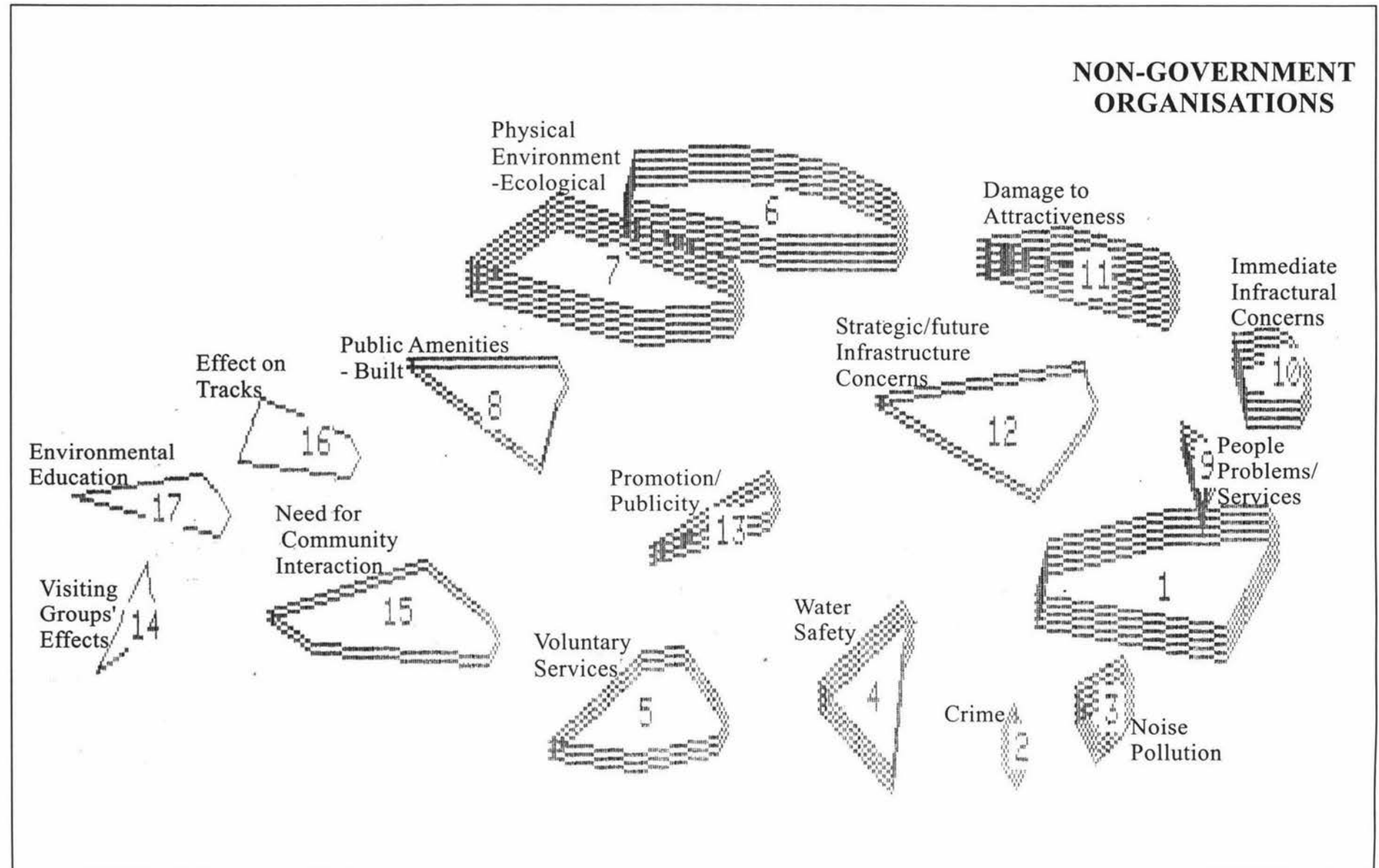


Figure 5.2 Concept Map: Non Government Organisations

RESIDENTS

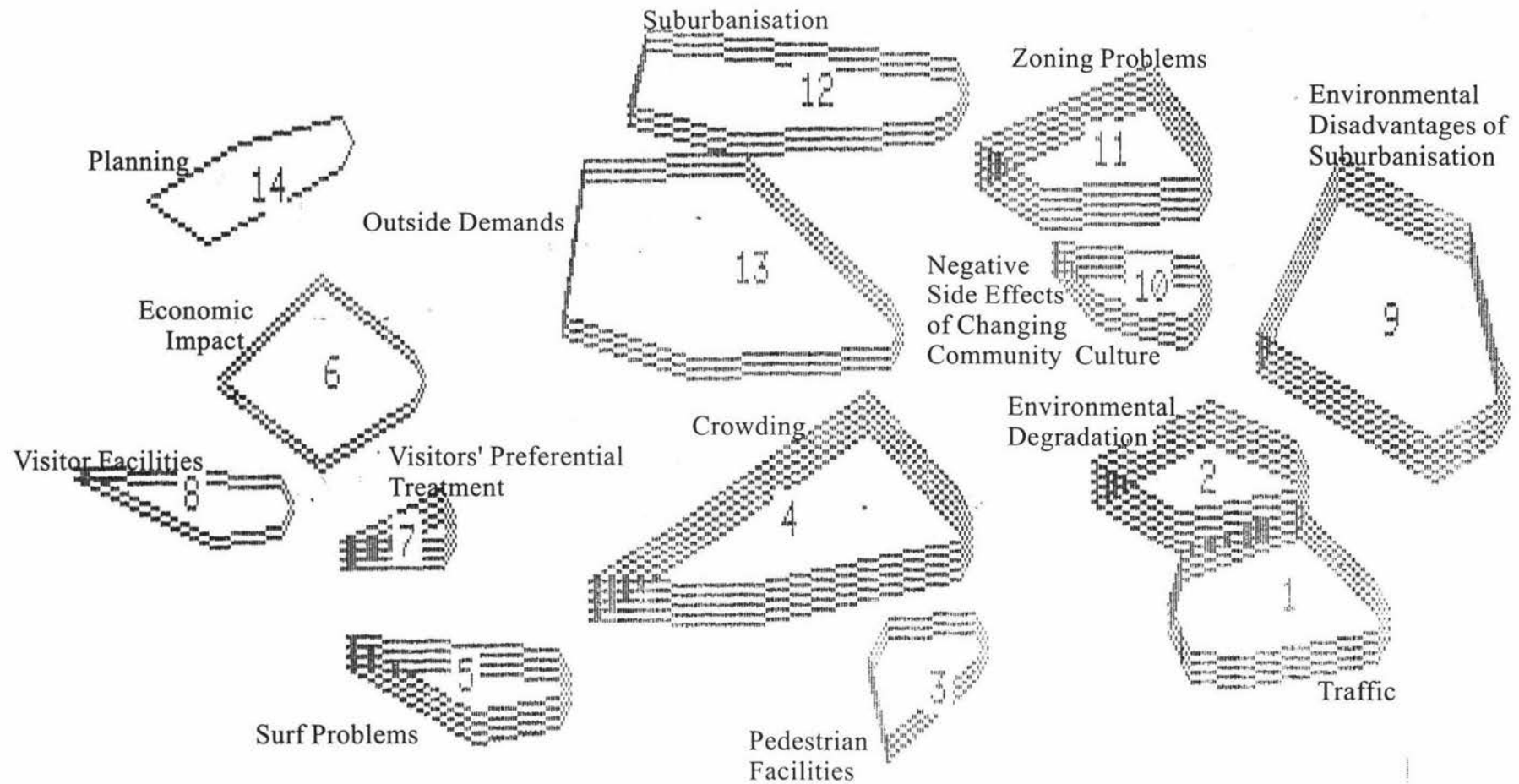


Figure 5.3 Concept Map: Residents

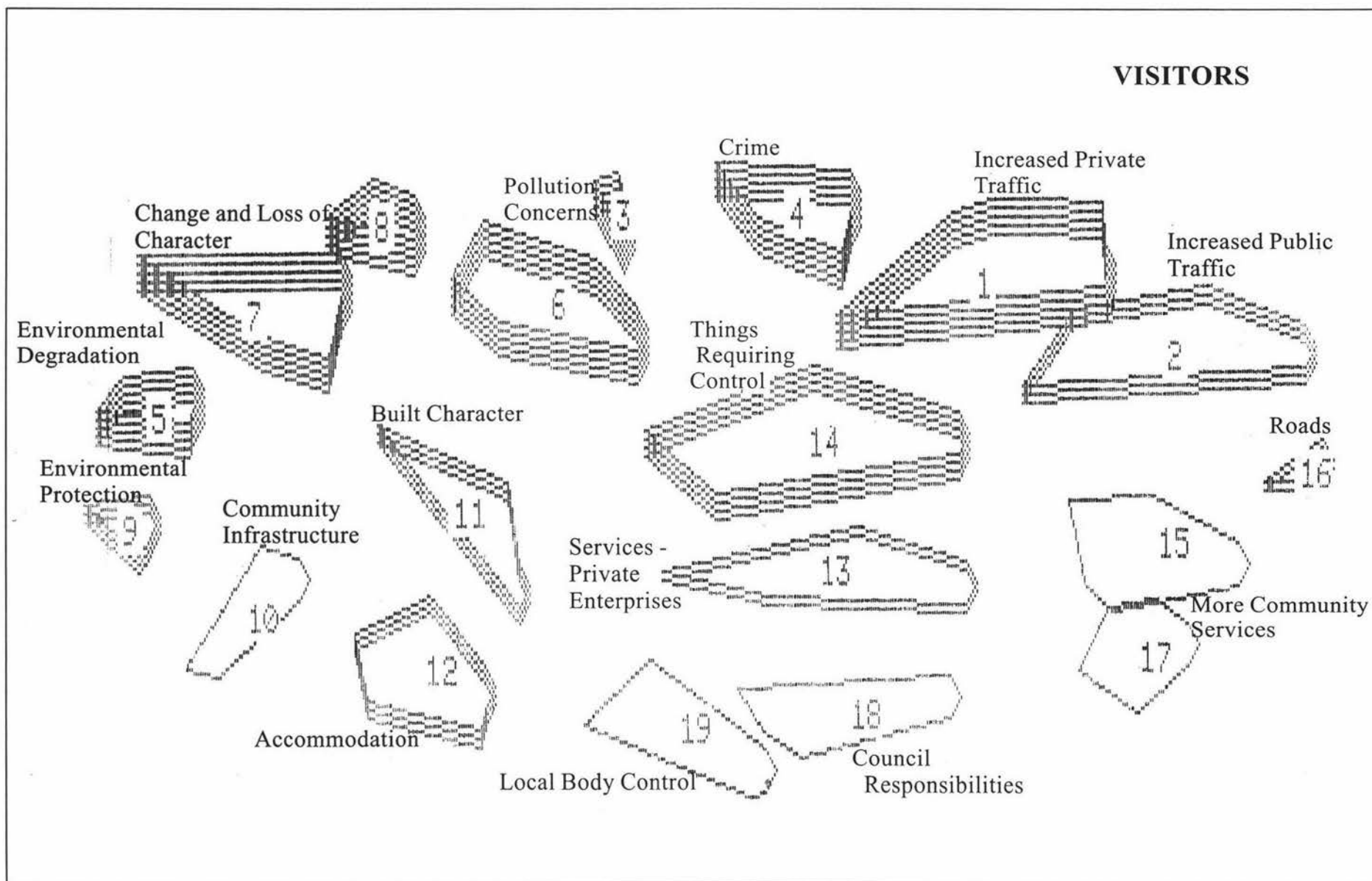
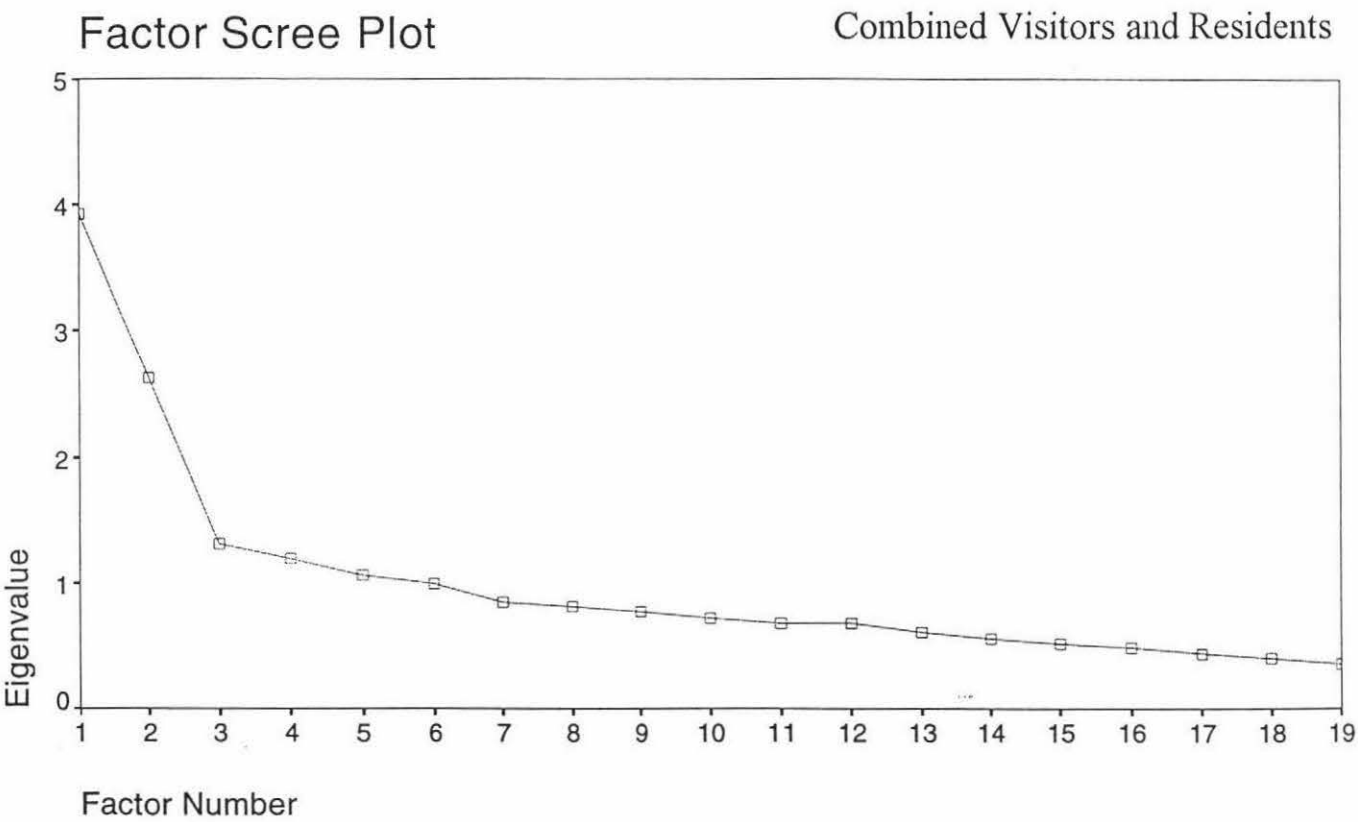
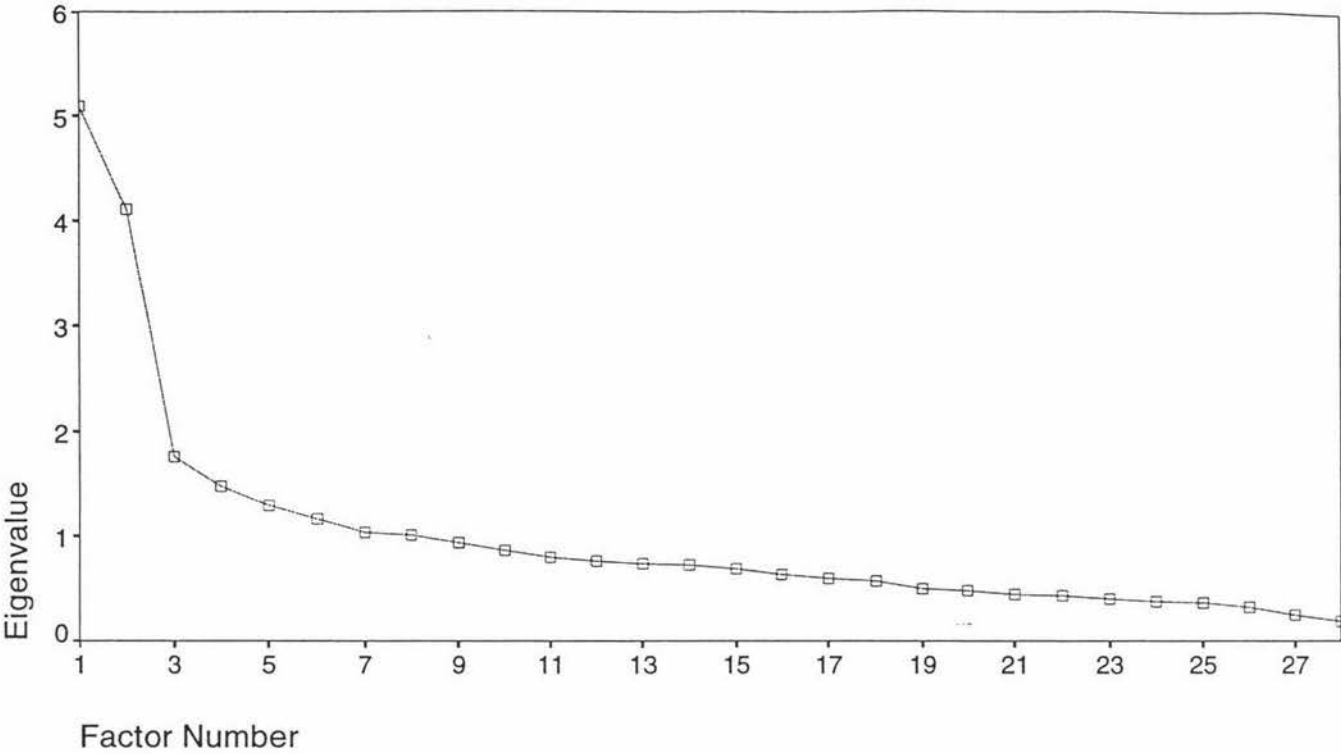


Figure 5.4 Concept Map: Visitors



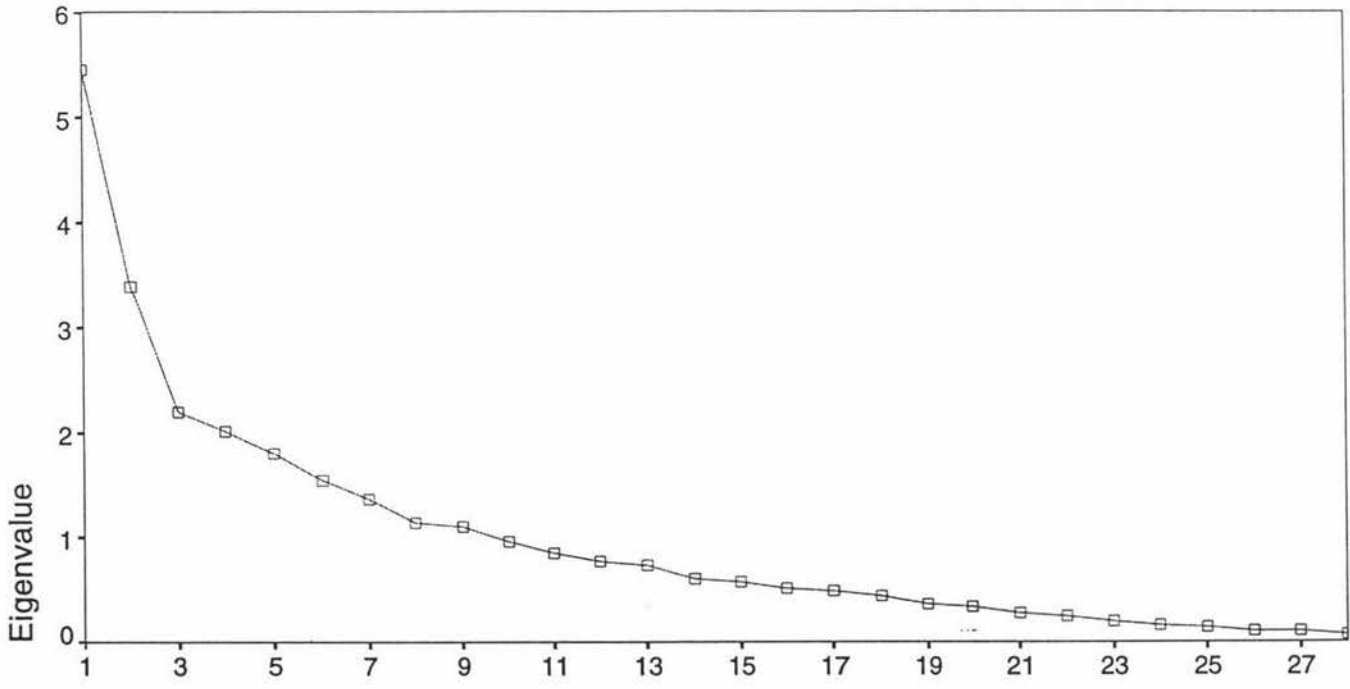
Factor Scree Plot

Visitors



Factor Scree Plot

Residents



GET

FILE='C:\CLIENTS\LOGIE\Combined.sav'.

EXECUTE .

FACTOR

```

/VARIABLES q11.1 q11.2 q11.3 q11.4 q11.5 q11.6 q11.7 q11.8 q11.9 q11.10
q11.11 q11.12 q12.1 q12.2 q12.4 q12.6 q12.7 q12.11 q12.14 /MISSING MEANSUB
/ANALYSIS q11.1 q11.2 q11.3 q11.4 q11.5 q11.6 q11.7 q11.8 q11.9 q11.10 q11.11
q11.12 q12.1 q12.2 q12.4 q12.6 q12.7 q12.11 q12.14
/PRINT EXTRACTION ROTATION
/FORMAT SORT BLANK(.10)
/CRITERIA FACTORS(4) ITERATE(25)
/EXTRACTION PC
/CRITERIA ITERATE(25)
/ROTATION VARIMAX
/SAVE REG(ALL)
/METHOD=CORRELATION .

```

Factor Analysis

Component Matrix^a

	Component			
	1	2	3	4
Q11.6 Picnicking areas	.687		-.186	
Q11.10 Tracks	.675			-.232
Q11.11 Bush safety	.672	-.125		
Q11.2 Parks and beaches	.608		-.287	
Q11.7 Beach access	.575		.280	
Q11.8 Water safety	.562	.144	-.255	
Q11.5 Provision of rubbish bins	.543			.123
Q11.4 Toilets and changing facilities	.540		.155	.313
Q11.9 Roads	.523		.112	
Q11.3 Parking facilities	.515	-.213	.513	
Q12.2 Increased traffic		.719	-.252	
Q12.4 Pollution, Environmental degradation	.126	.683	.132	-.398
Q12.6 Environmental education	.178	.646	.283	-.321
Q12.7 Built character	.139	.624	-.188	
Q12.1 Crime		.600	-.152	
Q12.11 Infrastructure	-.130	.492	.274	.422
Q11.12 Educational programmes	.350		.359	
Q12.14 Promotion/Publicity		.366	.406	.581
Q11.1 Visitor directions	.446		-.402	.477

Extraction Method: Principal Component Analysis.

a. 4 components extracted.

Communalities

	Extraction
Q11.1 Visitor directions	.589
Q11.2 Parks and beaches	.452
Q11.3 Parking facilities	.576
Q11.4 Toilets and changing facilities	.419
Q11.5 Provision of rubbish bins	.311
Q11.6 Picnicking areas	.510
Q11.7 Beach access	.419
Q11.8 Water safety	.402
Q11.9 Roads	.289
Q11.10 Tracks	.514
Q11.11 Bush safety	.470
Q11.12 Educational programmes	.256
Q12.1 Crime	.390
Q12.2 Increased traffic	.582
Q12.4 Pollution, Environmental degradation	.657
Q12.6 Environmental education	.632
Q12.7 Built character	.444
Q12.11 Infrastructure	.512
Q12.14 Promotion/Publicity	.638

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.927	20.666	20.666	2.995	15.762	15.762
2	2.629	13.836	34.502	2.475	13.026	28.788
3	1.313	6.912	41.414	2.191	11.529	40.317
4	1.196	6.292	47.706	1.404	7.389	47.706

Extraction Method: Principal Component Analysis.

Rotated Component Matrix^a

	Component			
	1	2	3	4
Q11.1 Visitor directions	.709		-.175	.233
Q11.6 Picnicking areas	.663		.244	
Q11.2 Parks and beaches	.633		.132	-.163
Q11.8 Water safety	.569	.222	.123	-.118
Q11.11 Bush safety	.530		.407	-.149
Q11.10 Tracks	.496	.102	.417	-.291
Q11.5 Provision of rubbish bins	.493		.258	
Q11.4 Toilets and changing facilities	.456	-.131	.360	.254
Q12.4 Pollution, Environmental degradation	-.104	.772	.218	
Q12.6 Environmental education	-.114	.705	.348	
Q12.2 Increased traffic	.137	.698	-.233	.145
Q12.7 Built character	.189	.617	-.113	.121
Q12.1 Crime		.546	-.186	.221
Q11.3 Parking facilities	.145	-.173	.724	
Q11.7 Beach access	.297		.574	
Q11.12 Educational programmes			.484	
Q11.9 Roads	.361		.397	
Q12.14 Promotion/Publicity		.113	.125	.779
Q12.11 Infrastructure	-.122	.284		.646

Extraction Method: Principal Component Analysis.
 Rotation Method: Varimax with Kaiser Normalization.
 a. Rotation converged in 8 iterations.

Component Transformation Matrix

Component	1	2	3	4
1	.805	.101	.579	-.084
2	-.021	.934	-.083	.347
3	-.505	-.083	.772	.377
4	.311	-.332	-.250	.855

Extraction Method: Principal Component Analysis.
 Rotation Method: Varimax with Kaiser Normalization.

```
EXAMINE
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  /MISSING=REPORT.
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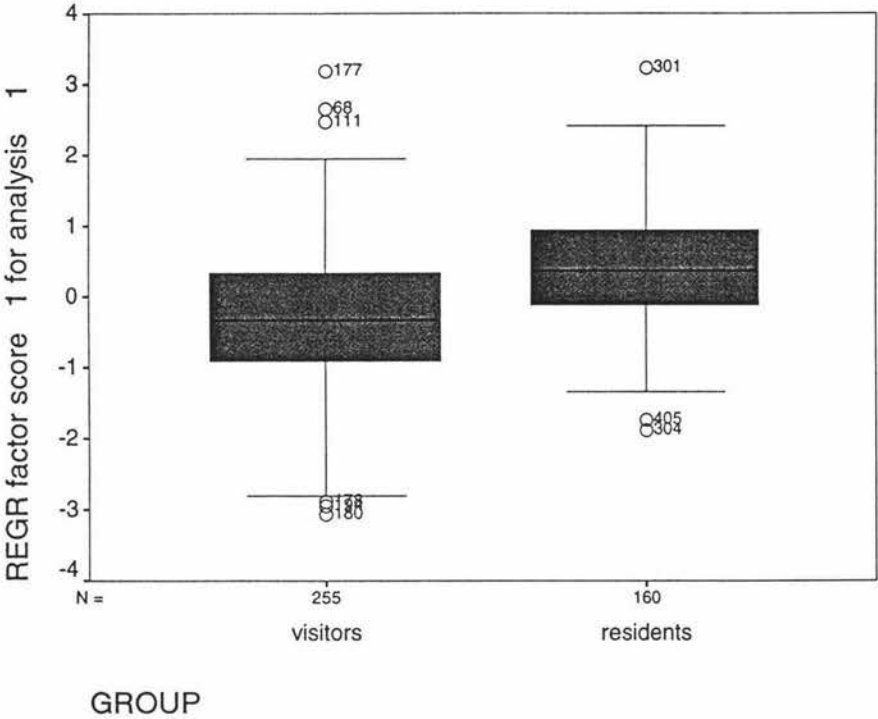
Explore

GROUP

Case Processing Summary

		Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
FAC1_1 REGR factor score 1 for analysis 1	1.00 visitors	255	100.0%	0	.0%	255	100.0%
	2.00 residents	160	100.0%	0	.0%	160	100.0%

FAC1_1 REGR factor score 1 for analysis 1



```
EXAMINE
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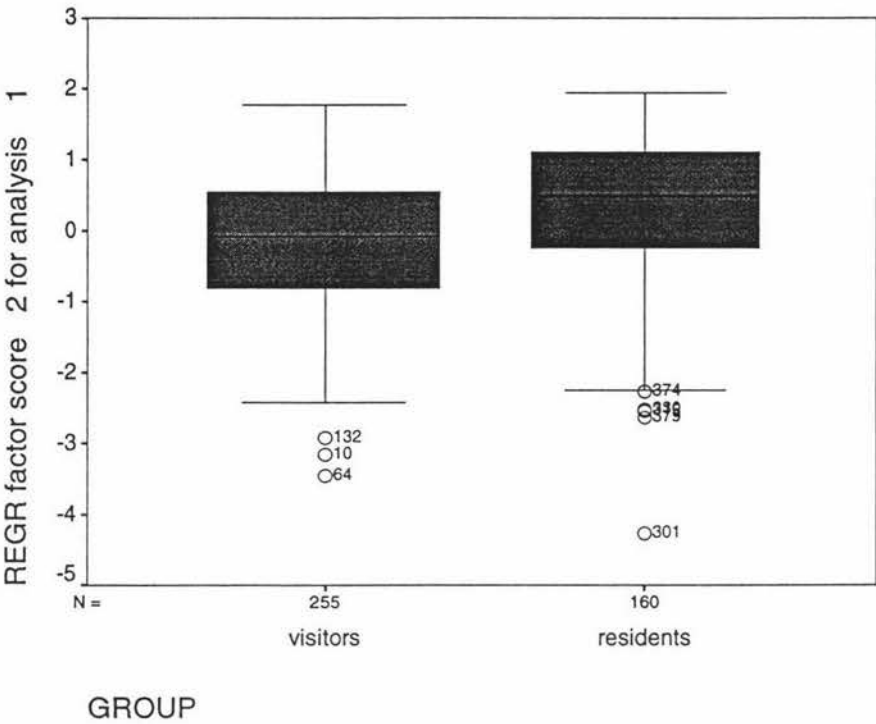
Explore

GROUP

Case Processing Summary

		Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
FAC2_1 REGR factor score 2 for analysis 1	1.00 visitors	255	100.0%	0	.0%	255	100.0%
	2.00 residents	160	100.0%	0	.0%	160	100.0%

FAC2_1 REGR factor score 2 for analysis 1



```
EXAMINE
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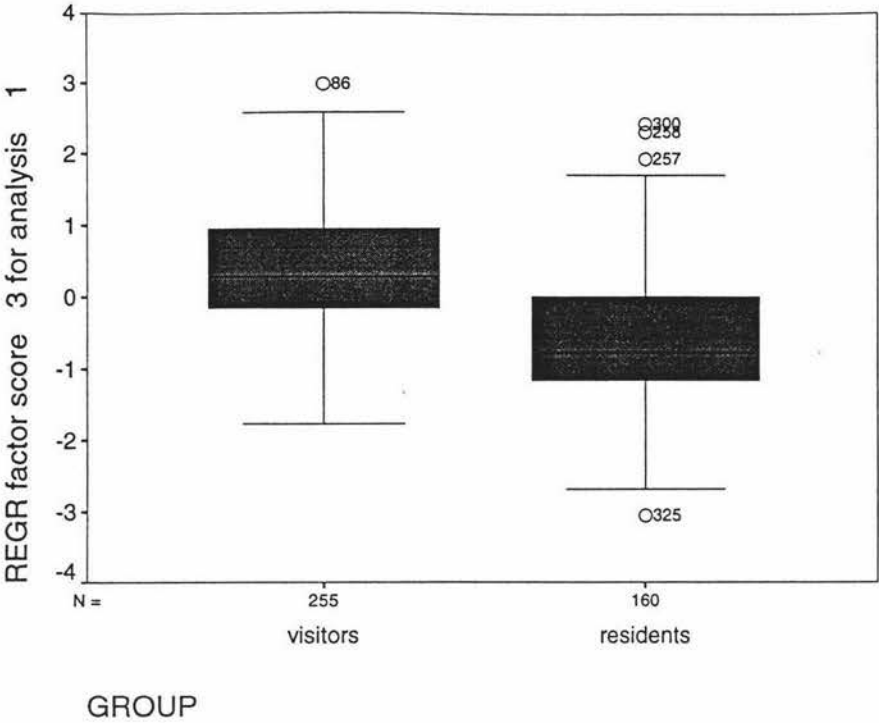
Explore

GROUP

Case Processing Summary

		Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
FAC3_1 REGR factor score 3 for analysis 1	1.00 visitors	255	100.0%	0	.0%	255	100.0%
	2.00 residents	160	100.0%	0	.0%	160	100.0%

FAC3_1 REGR factor score 3 for analysis 1



```
EXAMINE
  VARIABLES=fac4_1 BY group /PLOT=BOXPLOT/STATISTICS=NONE/NOTOTAL
  /MISSING=REPORT.
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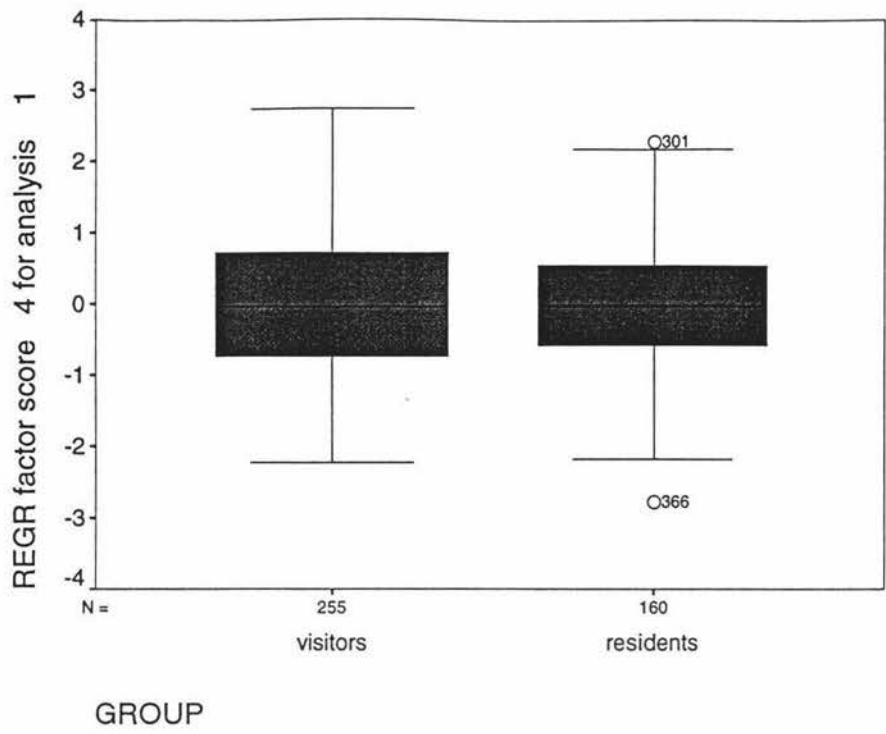
Explore

GROUP

Case Processing Summary

		Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
FAC4_1 REGR factor score 4 for analysis 1	1.00 visitors	255	100.0%	0	.0%	255	100.0%
	2.00 residents	160	100.0%	0	.0%	160	100.0%

FAC4_1 REGR factor score 4 for analysis 1



GROUP			N	Mean	Std. Deviation	Std. Error Mean
FAC1_1 REGR factor score 1 for analysis 1	1.00	visitors	255	-.2771511	.9659360	6.048926E-02
	2.00	residents	160	.4417096	.8909233	7.043367E-02
FAC2_1 REGR factor score 2 for analysis 1	1.00	visitors	255	-.1832350	.9417294	5.897338E-02
	2.00	residents	160	.2920308	1.0234122	8.090784E-02
FAC3_1 REGR factor score 3 for analysis 1	1.00	visitors	255	.3731024	.8339563	5.222437E-02
	2.00	residents	160	-.5946319	.9558689	7.556807E-02
FAC4_1 REGR factor score 4 for analysis 1	1.00	visitors	255	1.269275E-02	1.0122620	6.339031E-02
	2.00	residents	160	-2.0229075E-02	.9829559	7.770948E-02

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Mean	
									Lower	Upper
FAC1_1 REGR factor score 1 for analysis 1	Equal variances assumed	.767	.382	-7.601	413	.000	-.7188608	9.457780E-02	-.9047747	-.5329469
	Equal variances not assumed			-7.743	358.096	.000	-.7188608	9.284316E-02	-.9014471	-.5362744
FAC2_1 REGR factor score 2 for analysis 1	Equal variances assumed	.168	.682	-4.838	413	.000	-.4752659	9.823074E-02	-.6683604	-.2821713
	Equal variances not assumed			-4.747	316.845	.000	-.4752659	.1001196	-.6722492	-.2782826
FAC3_1 REGR factor score 3 for analysis 1	Equal variances assumed	1.128	.289	10.868	413	.000	.9677343	8.904280E-02	.7927007	1.1427679
	Equal variances not assumed			10.535	303.772	.000	.9677343	9.185814E-02	.7869754	1.1484931
FAC4_1 REGR factor score 4 for analysis 1	Equal variances assumed	.523	.470	.326	413	.745	3.292183E-02	.1009632	-.1655441	.2313877
	Equal variances not assumed			.328	345.298	.743	3.292183E-02	.1002851	-.1643247	.2301683