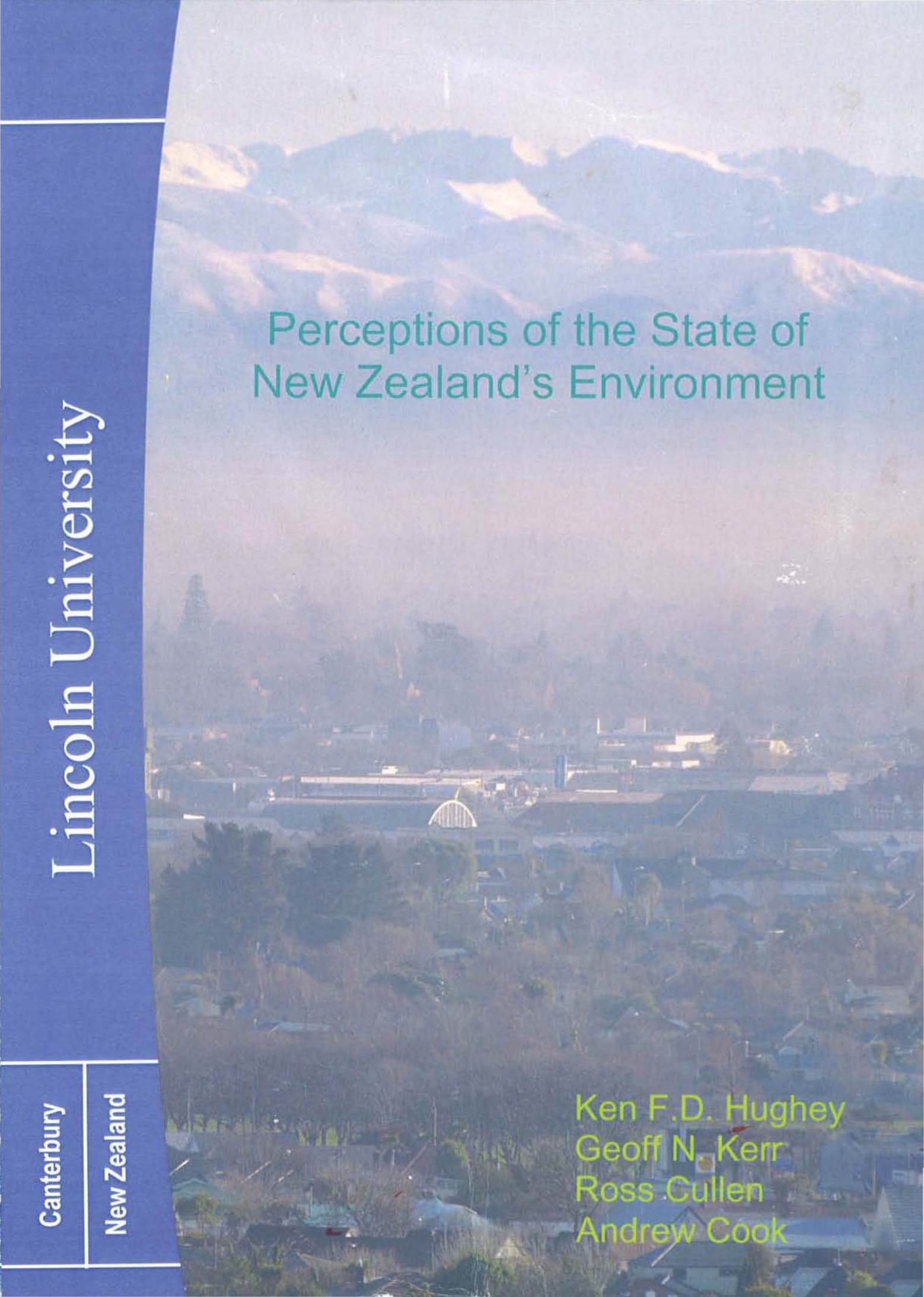


Perceptions of the State of New Zealand's Environment

Ken F.D. Hughey
Geoff N. Kerr
Ross Cullen
Andrew Cook

Lincoln University
Canterbury
New Zealand

Perceptions of the State of New Zealand's Environment: Findings from the first biennial survey undertaken in 2000

Ken F.D. Hughey
Geoff N. Kerr
Ross Cullen
Andrew Cook

2001

ISBN 0-86476-139-2

Agribusiness and Economics Research Unit
PO Box 84
Lincoln University
Canterbury
New Zealand

Ph: (64) (3) 325 2811
Fax: (64) (3) 325 3847
http:/www.lincoln.ac.nz/AERU

ACKNOWLEDGEMENTS

Our thanks to Sally Bottomley who laboured over much of the initial data coding and administrative work and to Russel McAuliffe for his skilful assistance with the database and graphics. We also appreciate the comments received from two Ministry for the Environment staff on drafts of the survey.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

Chapter 1
Introduction

State of the Environment Reporting (SER) is the way governments typically report on trends in (mostly) biophysical environmental parameters. In New Zealand 'The State of New Zealand's Environment' was reported on by the Ministry for the Environment (1997) and in an international context by OECD (1996). The New Zealand report was subsequently critiqued by Hughey et al. (1997) who, amongst a range of criticisms, considered socio-environmental matters were inadequately addressed. Effective SER requires that sets of indicators are consistently monitored and reported, and that there is a relationship between indicators and management. Since the production of New Zealand's first report, the Ministry has been leading a process to develop a core set of indicators.

However, nowhere in these SER development processes has any attempt been made to capture New Zealanders' perceptions of the state of their environment. This is despite a substantial number of environmental and national conservation-type surveys having been completed over the last decade or so (e.g., Heylen Research Centre 1993; Massey University 2001). Marion Hobbs, Minister for the Environment, intimated that more effort needs to be put into understanding the social aspects of environmental management, including people's understanding thereof (Speech for New Zealand's National State of the Nation's Environment address, Lincoln University, 25 May 2000).

Relying on trends among biophysical indicators for SER alone may be problematic. People's perceptions of the state of environmental parameters are also important because there is frequently a dissonance between technical and perceptual measures of risk. The cell phone tower debate classically demonstrates this problem – experts can reassure people that the levels of electromagnetic radiation from towers are safe but near neighbours often have a vastly different view and consider the levels are unsafe. Monitoring the technical (biophysical) indicator in this circumstance is important, but so to is the need to monitor changing public perception of such a parameter. The size of any variation can then be used to inform policy makers about the need for education programmes, improved policy response, etc.

With these thoughts in mind a brief review of the literature on public surveys about environmental matters in New Zealand was undertaken. A few surveys (e.g., the annual Christchurch City Council survey of ratepayers), are establishing a long-term record of matters concerning some environmental services such as roading, parks, etc. The 1993 International Social Survey Programme survey on "New Zealanders' Attitudes to the Environment" (Gendall et al. 1993) was used by Hini et al. (1995) to examine the link between environmental attitudes and behaviour. Recently Gendall et al. (2001) repeated the 1993 survey and reported the results, although these mostly relate to behaviour as opposed to perceptions of environmental management and trends in other key aspects. There are no long running surveys focused on detailed public perceptions of the state of our environment linked to the Pressure-State-Response model (see OECD (1996) and MfE (1997) for explanations of this model) used as the basis for environmental reporting. Having determined this gap in SER, it is the aim of this study to begin a long-term project to determine people's views about the State of New Zealand's Environment.

The main aims of the research are to measure, analyse and monitor changes in New Zealanders' perceptions, attitudes and preferences towards a range of environmental issues,

ultimately contributing to improved state of the environment reporting. Specific objectives are to:

- Implement a questionnaire, operated biennially, to measure and monitor New Zealanders' environmental attitudes, perceptions, and preferences;
- Provide independent commentary on key issues of public concern as a medium for providing policy advice to government and others;
- Provide space for individual researchers to derive one-off research data for individual areas of interest, including teaching purposes; and
- To report biennially, via a published report and other research publications, on findings from the questionnaire.

Chapter 2
Survey Method

A postal questionnaire based on the Pressure-State-Response model (PSR) model was developed to gather information on New Zealander's perceptions of the environment and environmental management. The postal questionnaire was selected as the best method of gathering this information. The large number of questions deemed it unsuitable for a telephone survey and interviews would have been an expensive and cumbersome method for sampling the New Zealand population.

2.1 The Questionnaire

Questionnaire items were presented in an A5-size booklet with questions on facing pages. Each questionnaire had thirteen pages of questions. A letter of introduction stating the purpose of the questionnaire, introducing the topics in the questionnaire and inviting voluntary participation was included. Questions were asked in sets with a response scale provided for each question. Respondents were instructed to either circle a number or tick the box the number was in to indicate their response. The questionnaire contained a total of 146 questions.

The PSR framework guided the development of survey questions. Three sets of questions assessed perceptions of the state of the environment and three sets of questions assessed perceptions of the response by management. For all of these measures a 'don't know' option was provided for respondents who did not feel they were sufficiently informed to respond. Perceived pressures were assessed by one set of questions. Further questions supplemented the PSR framework. These included measurement of the main perceived causes of damage to the environment. One question set examined preferences for institutional arrangements for the management of the environment, with subsequent measures taken of preferred allocation of government expenditure on environmental management and government services. There is often debate about the roles of individuals and agencies in terms of responsibility for environmental management. These debates frequently involve discussion about free market approaches versus government control and increasingly, in New Zealand, feature discussion of Maori input to management. The range of institutional arrangements reflecting combinations of positions was therefore provided for selection by respondents. Participation in thirteen activities was measured to explore relationships between environmental behaviour and responses to the PSR framework. Perceptions of the management of natural hazards and household preparedness were measured for a separate project, though initial analysis of these perceptions is provided in this report. Eight questions sought demographic information. The dynamics of relationships between demographic information and concern for the environment have been well documented (e.g., Jones and Dunlap, 1992) and these will be developed biennially.

Knowledge and standard of living
The questionnaire began by assessing knowledge of the environment and New Zealand's standard of living with the invitation: *We would like your opinion on the following issues.* The questions were: *Your knowledge of the environment is...* and *The overall standard of living in New Zealand is...* Measurements were taken on five-point scales anchored by *very good* and *very bad.*

The state of the environment
To measure the state of the environment three set of questions were asked on the quality or condition, the availability or amount, and change of state over the previous five years. The first set was preceded by the instruction: *Please indicate what you think the state of each of the following is.* Followed by: *The quality or condition of New Zealand's...* The eleven aspects were then presented with a five-point scale provided for measurement of each which was anchored by *very good* and *very bad.*

The second set of questions regarding the state of the environment measured perceptions of the amount or availability of nine natural resources. These were measured by asking: *We would like your opinion on the availability or amount of some of our natural resources.* The set of nine natural resources was then preceded by: *In New Zealand the...* The set was presented with five-point scales provided for measurement anchored by *very high* and *very low.*

The third measurement was of perceptions of change in the state of the environment over the last five years. These were taken with the invitation: *Now that you have told us what you think about the state of New Zealand's environment, we would like you to tell us how you think the environment has changed over the last 5 years.* The set of aspects was preceded by: *Compared to five years ago...,* followed by thirteen aspects of the New Zealand environment. These aspects were presented with a five-point measurement scale anchored by *much better* and *much worse.*

Adequacy of environmental management
Judgement of the adequacy of management was sought by introducing five aspects of management with: *Now we would like you to tell us what you think of the following items* followed by *Management of New Zealand's...* followed by the five aspects. These aspects were presented with a five-point scale provided for measurement of each anchored by *very good* and *very bad.*

A set of questions designed to measure current management of aspects of the environment was then presented. Thirteen items were preceded by: *Currently in New Zealand how well or poorly managed is...* These items were presented with a five-point scale provided for measurement of each anchored by *very well managed* and *extremely poorly managed.*

A further set of management questions was design to establish whether management had improved or had become worse over the previous five years. The question presented the same set of items as the prior set with the instruction: *Compared to five years ago, management of New Zealand's...* These items were presented with a five-point scale provided for measurement anchored by *much better* and *much worse.*

Preferences for management
Preferences for who should manage resources were measured with the invitation: *There are many ways to manage resources. Please indicate your preferences by ticking one box for each line.* Fourteen resource areas were presented with five possible management arrangements for respondents to select.

Pressures on the environment
The PSR framework includes pressures on the environment. Pressures in terms of the perceived causes of adverse environmental effects were measured by presenting a table containing ten aspects of the New Zealand environment with fifteen potential causes. Respondents were instructed to select up to three causes rather than a single cause. This

approach was designed to assist respondents by removing the necessity to select the single most important item from the fifteen presented. Respondents were invited to respond with the invitation: *Tell us what you think are the main causes of damage to parts of the New Zealand environment by ticking up to three items on each line.*

Allocation of government funds
To enable comparison between preferences for the allocation of government spending on natural resources and other services, respondents were asked whether they considered more or less should be spent on a number of items. The question began by stating: *There are many different ways in which government can spend our money.* This was followed by the instruction: *Please indicate how you would change the allocation of government spending if total spending was the same as now.* Measurement was then taken on five-point scales anchored by *we should spend far more* and *we should spend far less.*

Participation in environmental activities
Measurements were taken of whether respondents had participated in twelve activities related to the environment. Respondents were asked: *Please indicate if in the last twelve months you have...* followed by twelve environmental activities. Measurements were then taken using either *yes, no* or *don't know* options.

Preparedness for natural hazards
Measures were then taken of respondents' views of the preparedness of emergency services to deal with natural hazards. Respondents were presented with eight natural hazards and asked: *How well prepared do you consider the New Zealand emergency services are to cope with dangers from the following natural hazards?* Measurements were then taken on five-point scales anchored by *very well prepared* and *not at all prepared.*

Measures were also taken of respondents' views of the preparedness of their household to deal with natural hazards. Respondents were presented with the same eight natural hazards as used to measure the preparedness of emergency services and were asked: *How well prepared do you consider your household is to cope with dangers from the following natural hazards?* Measurement for these items was taken using the five-point *very well prepared* to *not at all prepared* scale as used to measure preparedness of emergency services.

Demographic information
Information was sought regarding gender, age, education, personal income, current situation, the industry the person worked in or had worked in, and their main occupation or former occupation. These were measured by providing categories for respondents with the exception of industry and occupation where written answers were taken which were subsequently categorised using categories from the 1996 New Zealand census. Demographic information and the categories for their measurement are provided in appendix 1. In addition, numbering each survey derived data for respondents' location, which was subsequently categorised into three regions (southern, central and northern).

2.2 Pre-Testing

Pre-testing involved 26 individuals who completed the questionnaire and subsequently provided comments about the questionnaire and the questionnaire topics. MfE staff also appraised the questionnaire. Subsequently, minor adjustments were made to questionnaire items before producing the questionnaire presented in this report.

2.3 Methods of Analysis

A number of methods of statistical analysis were employed in the analysis of the survey data for the purpose of enabling commentary on key issues of public concern. Due to large number of relationships tested, in general only summarised results are reported for significant relationships ($p < 0.05$ or better), which is nevertheless in keeping with the purpose of undertaking the analysis. Description of the components of the model was undertaken with means and standard deviations provided for interval or ratio data and frequency of occurrence provided for categorical data measured on either nominal or ordinal scales. Where measured, 'don't know' responses are also provided.

Relationships between demographic information and survey data measured on five-point interval or ratio scales were explored used T-tests (unequal) to compare means per gender, ANOVA (sig of F) was used to compare means per category for the remaining measures of demographic information and correlation (two tailed) for relationships with age. Relationships between demographic information and survey data measured in categories were explored using chi square, except for age where T-tests (for categories of participation in an environmental activity) and ANOVA (sig of F) (for categories of preferred management) were used to compare means of age per category. A summary of the results of these analyses are provided with the descriptive results (section 3). Only significant relationships ($p < 0.05$ or better) are reported and only the category of relevance is reported, for example, from an ANOVA (sig of F) test the category with the highest mean score is reported. For ANOVA (sig of F) results for categories with an ordered range (education and income) where the highest and lowest means were at the range ends or within one category of their respective ends these are reported as being either higher or lower. K-means cluster analysis was used to form two groups from selected data with demographic information and knowledge of environmental issues used to compare these groups. The analysis of differences between these groups was undertaken using either T-tests or chi square. These results are also only provided in summary form in section 2 with only significant ($p < 0.05$) relationships reported.

Relationships between parts of the PSR framework and other items, excluding relationships with demographic information (provided in section 2), were explored. Correlation (two tailed) was used to analyse relationships between interval or ratio data and chi-square was used to analyse relationships between nominal or ordinal data. Relationships between interval or ratio data and data of nominal or ordinal scale were analysed by comparing means of the interval or ratio data when grouped on the nominal or ordinal scale using ANOVA (sig of F) (preferred management) or T-tests (participation in environmental activities). The results of the correlation analysis is provided in Appendix 2 and significant relationships from the remaining tests are provided with the discussion in section 3.

2.4 Distribution

Two thousand questionnaires were distributed to randomly selected households drawn from the New Zealand electoral roll. The questionnaire and the letter of introduction were posted with a freepost return envelope. The questionnaires were posted on 3 February 2000. In addition, a second posting was made on 9 March 2000 to those who had not returned their questionnaire.

2.5 Response

The survey received an effective response rate of 48 per cent (N = 894). The sample had a margin of error at the 95% confidence interval of approximately three per cent. The response rate is in keeping with other research conducted at Lincoln University in the topic area.

Chapter 3
Results on an Individual Question Basis

3.1 Knowledge of the Environment and Standard of Living

The first question in the survey measured knowledge of the environment and the perceived overall standard of living in New Zealand (Table 1 and Figure 1).

Table 1
Knowledge of Environmental Issues and Standard of Living

Respondents perceptions of ...	N	Very good (1)	Good (2)	Adequate (3)	Bad (4)	Very bad (5)	Don't know	Mean (1-5)	Std. Dev
		%							
their own knowledge of environmental issues	862	6.6	29.9	53.0	9.0	1.4	16	2.69	.78
the overall standard of living in New Zealand	856	10.7	44.0	34.8	5.4	0.9	7	2.39	.80

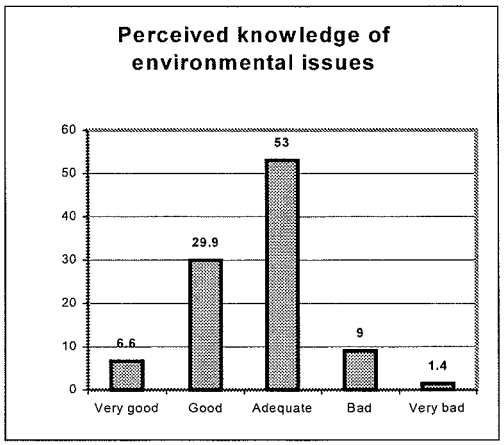
In general most respondents reported *adequate* to *good* knowledge of environmental issues. Very few respondents reported *bad* to *very bad* knowledge.

Table 2 summarises differences in responses to Question 1 by respondent characteristics. Description of respondent characteristic scales may be found in the Methods section of this report. In general, males, people with a higher level of education, those with higher incomes, and respondents working in resource based industries thought they had better levels of knowledge of environmental issues. Overall, respondents with higher levels of education assessed New Zealand's standard of living more favourably, as did respondents whose main occupation was voluntary work.

Table 2
Groups Reporting More Knowledge and a Higher Standard of Living

	Gender	Education	Industry	Income	Situation
Groups evaluating themselves as having the best knowledge of environmental issues	Males (n=854)**	Postgraduate (n=850)**	Resource based (n=812)**	>$100,000 (n=788)**	
Groups most positively evaluating the overall standard of living in New Zealand		Bachelors degree (n=843)*			Volunteer (n=842)*

Note: T tests established differences between genders and ANOVA (sig of F) established differences between means for remaining items. Significance levels; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.



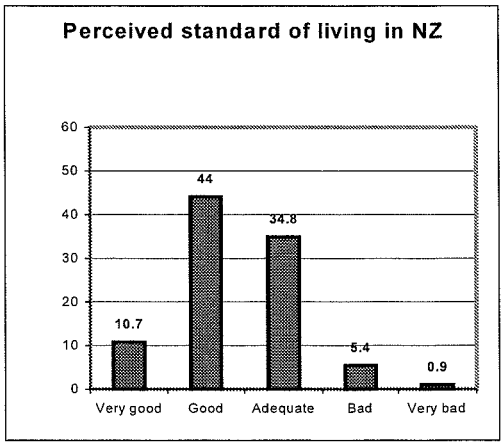


Figure 1
Knowledge of the Environment and the Perceived Overall Standard of Living in New Zealand (percent of responses)

3.2 The State of the Environment

a) Quality of the Environment in New Zealand

Question 2 measured perceived quality of aspects of the New Zealand environment.

Table 3 (and Figure 2) shows that perceptions of the state of the New Zealand environment were generally *good* to *adequate*. Of the environmental aspects presented, air was considered to be in the best condition and marine fisheries were considered to be the worst, although the mean for both are still within the *good* to *adequate* range. Marine fisheries and wetlands received the largest number of 'don't know' responses (each with more than 10%). While aspects of the environment were generally judged as *good* to *adequate*, the state of the New Zealand environment compared to other developed countries received a higher rating of *good* to *very good*.

Table 3
Perceived State of New Zealand's Environment

Respondents perceived quality of ...	N	Very good (1)	Good (2)	Adequate (3)	Bad (4)	Very bad (5)	Don't know	Mean (1-5)	Std. Dev
		%							
natural environment in towns and cities	864	3.7	35.1	48.2	12.3	0.7	14	2.71	.75
other natural environments	842	11.9	48.2	35.7	3.3	0.8	24	2.33	.76
air	857	20.2	47.5	23.8	7.2	1.3	9	2.22	.89
native land and freshwater plants and animals	846	13.0	44.0	30.7	10.4	1.9	24	2.44	.91
native bush and forests	856	20.8	40.4	26.4	10.7	1.6	14	2.32	.97
soils	792	11.0	43.7	36.4	7.7	1.3	32	2.45	.84
coastal waters and beaches	852	12.7	38.1	36.0	11.6	1.5	42	2.51	.91
marine fisheries	765	7.1	34.5	37.6	17.6	3.1	19	2.75	.93
fresh waters	842	12.1	36.7	36.5	12.7	2.0	33	2.56	.93
wetlands	735	7.1	33.3	40.1	15.4	3.1	22	2.74	.91
New Zealand's natural environment compared to other developed countries	821	37.0	45.3	15.7	1.7	0.2	15	1.83	.77

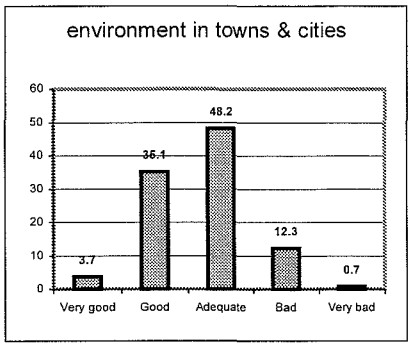
A summary of differences in perceived environmental quality by demographic characteristics is presented in Table 4. Males tended to consider the quality of fresh waters and wetlands to be better. Higher education levels were associated with the views that the quality of natural environments in towns and cities, and air quality were better. Air quality was also considered to be better by respondents in the central region of New Zealand. Respondents in the southern region considered the condition of fresh water and wetlands to be best. Respondents working in resource-based industries considered the quality of native bush and forests to be better than did respondents in other industries.

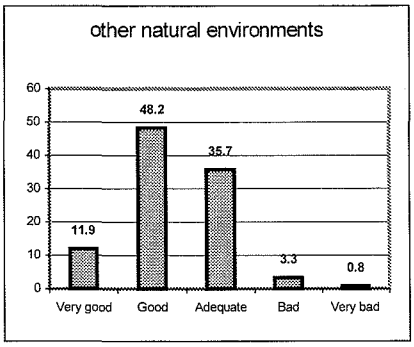
Table 4
Groups Reporting Better Quality or Condition

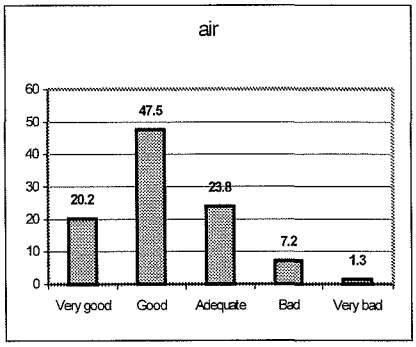
Groups reporting best perceived quality of ...	Gender	Education	Industry	Region
natural environment in towns and cities		Bachelors degree (n=840)**		
air		Bachelors degree (n=845)*		Central region (n=850)***
native bush and forests			Resource based (n=845)**	
coastal waters and beaches	Males (n=786)**			
fresh waters	Males (n=736)**			Southern (n=835)**
wetlands				Southern (n=732)**

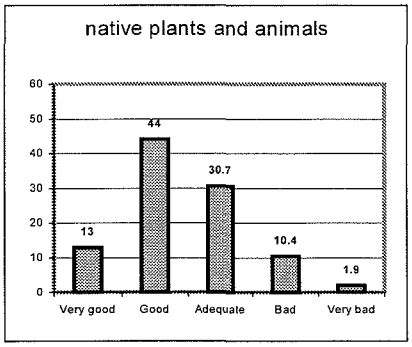
Note: T tests established differences between genders and ANOVA (sig of F) established differences between means for remaining items. Significance levels; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

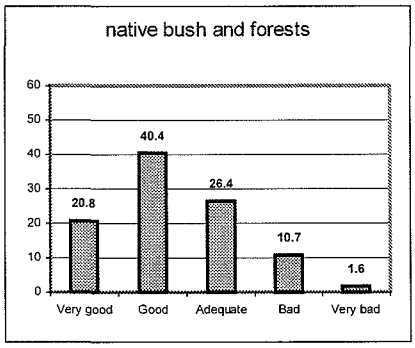
Grouping (K-means cluster analysis) of all measures in Table 3 provided two groups comprising favourable (67%) or unfavourable (33%) ratings of quality. Significant differences (chi square 15.7, df 7, $p < 0.05$) between these groups were found for income. Disproportionately more respondents with income between $20,001 and $30,000 and with income between $70,001 and $100,000 were in the group with more favourable ratings.

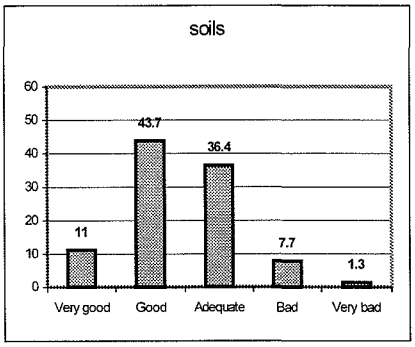


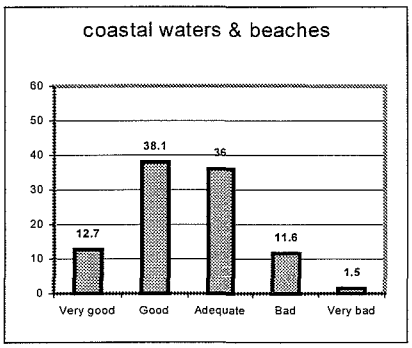


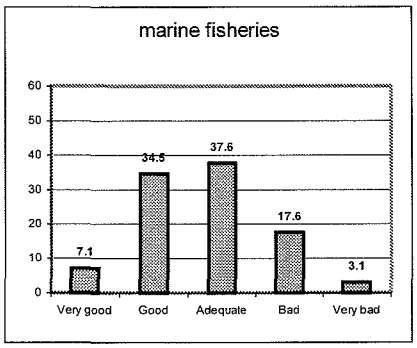


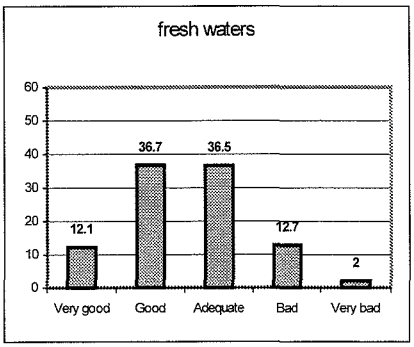


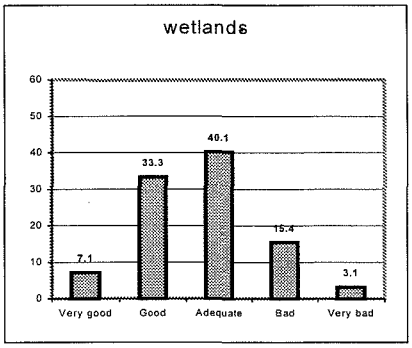












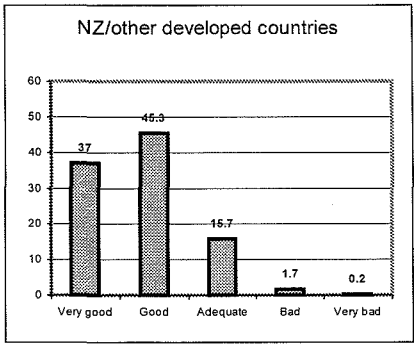


Figure 2

Perceived State of the Environment (percent of responses)

b) Availability of Natural Resources

Respondents' assessments of the availability of aspects of the New Zealand environment were measured in Question 3.

From Table 5 (and Figure 3) it can be seen that respondents rated three items; marine reserves, wetlands and reserves of oil and gas, as having *moderate* to *low* availability. The area of national parks was considered *high*, as was the diversity of native land and fresh water plants and animals, and the amount of native bush and forests. Marine reserves, wetlands and reserves of oil and gas received the highest number of 'don't know' responses.

Table 5
Perceived Availability of Natural Resources

Respondents perceptions of ...	N	Very high (1)	High (2)	Moderate (3)	Low (4)	Very low (5)	Don't know	Mean (1-5)	Std. Dev
		%							
diversity of native land and fresh water plants and animals	781	8.2	38.8	43.7	8.6	0.8	60	2.55	.79
amount of native bush and forests	834	9.5	40.0	35.5	12.9	2.0	16	2.58	.90
quantity of marine fisheries	719	4.5	29.6	45.1	19.1	1.8	127	2.84	.84
area of marine reserves	710	3.0	16.5	45.4	29.3	5.9	139	3.19	.88
amount of fresh water	809	11.7	43.4	34.1	8.9	1.9	42	2.46	.88
area of national parks	835	16.5	46.0	31.1	5.5	0.8	23	2.28	.83
area of wetlands	672	3.6	21.4	47.0	24.1	3.9	183	3.03	.87
availability of parks and reserves in towns and cities	840	12.3	36.9	38.1	10.7	2.0	16	2.53	.91
reserves of oil and gas	617	1.6	13.8	45.2	34.0	5.3	234	3.28	.83

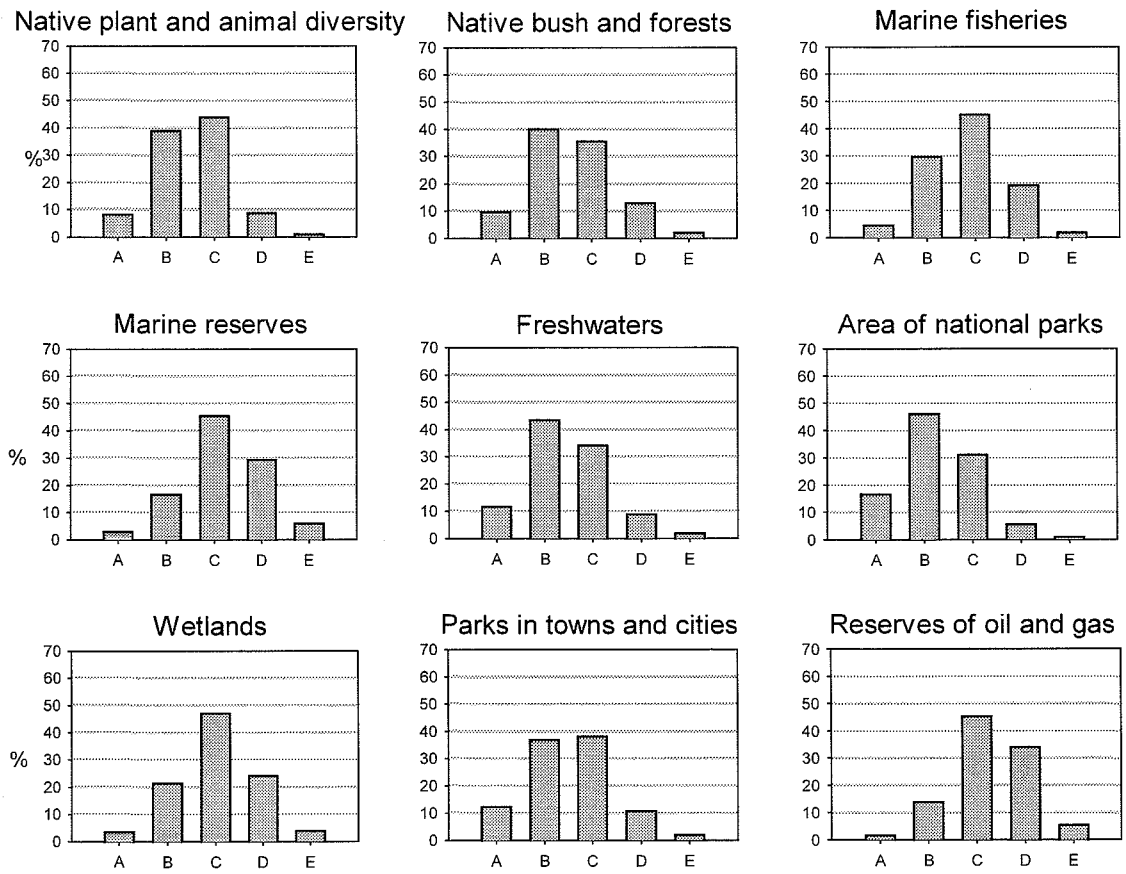
Differences in terms of demographic characteristics are shown in Table 6. Males tended to consider the area of marine reserves to be higher. Lower education levels were associated with the view that the area of wetlands was greater, as were respondents who were not in paid employment and respondents who lived in the Northern region. Respondents in the Southern region considered there was greater availability of parks and reserves in towns and cities, and people with a high income and students considered there were greater amounts of fresh water.

Table 6
Groups Reporting Better Availability

Groups reporting best evaluation of current ...	Gender	Education	Employment status	Income	Situation	Region
area of marine reserves	Males (n=712)*					
amount of fresh water				>$100,000 (n=748)**	Student (n=796)*	
area of national parks						Southern (n=827)*
area of wetlands		No high school qualification (n=845)*	Not in paid employment (n=671)*			Northern (n=669)*
availability of parks and reserves in towns and cities						Southern (n=833)*

Note: T tests established differences between genders and ANOVA (sig of F) established differences between means for remaining items. Significance levels; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Marine reserve and marine fisheries managers should note the relatively high proportions of people who considered there was moderate to low quantities of marine reserves and marine fish stocks.



KEY:
A: Very high
B: High
C: Moderate
D: Low
E: Very low

Figure 3
Perceived Availability of Natural Resources

c) Change in the State of the Environment

Measurement of how the perceived state of New Zealand's environment had changed over the last five years was taken with Question 4.

As shown in Table 7 (and Figure 4), respondents generally considered that no or little change had occurred over the last five years. There was, however, an indication that national parks were perceived to have improved and also that marine fisheries were considered to have become worse. Respondents also believed that New Zealand's natural environment had improved compared to natural environments in other developed countries. There were large numbers of *don't know* responses for: soil condition, marine fisheries, marine reserves and wetlands.

Table 7
The Perceived State of the Environment Compared to Five Years Ago

Perceived change over the last five years of ...	N	Much better (1)	Better (2)	No change (3)	Worse (4)	Much worse (5)	Don't know	Mean (1-5)	Std. Dev
		%					N		
natural environment in towns and cities	817	4.0	36.2	33.9	25.0	0.9	36	2.82	.88
other natural environments	785	2.4	27.8	46.5	21.9	1.4	67	2.92	.80
air quality	814	3.7	10.6	49.0	33.9	2.8	32	3.22	.81
native land and fresh water plants and animals	763	2.9	19.3	47.2	28.3	2.4	90	3.08	.82
native bush and forests	787	3.2	23.6	42.7	26.9	3.6	62	3.04	.88
soils	681	1.9	14.5	62.6	18.8	2.2	70	3.05	.70
coastal waters and beaches	787	2.0	15.8	43.1	33.4	5.7	65	3.25	.86
marine fisheries	653	2.1	13.8	37.5	41.8	4.7	197	3.33	.85
marine reserves	633	3.5	31.6	44.4	18.8	1.7	212	2.84	.83
fresh water quality	775	2.5	13.5	46.5	32.8	4.8	68	3.24	.83
national parks	767	3.9	35.3	49.8	10.3	0.7	82	2.68	.73
wetlands	601	2.0	20.1	53.6	22.0	2.3	239	3.02	.77
New Zealand's natural environment compared to other developed countries	762	15.2	50.9	27.4	5.8	0.7	95	2.26	.81

Table 8
Changes Over the Last Five Years by Groups

Groups reporting a relatively more optimistic view of changes over the last five years in ...	Gender	Education	Employment status	Situation	Age	Region
air quality			Not in paid employment (n=794)***		Older (n=728)***	Central (n=812)*
native land and fresh water plants and animals		No high school qualifications (n=808)**	Not in paid employment (n=794)***	Volunteer (n=808)**		Southern (n=812)*
native bush and forests		No high school qualifications (n=776)***				
soils			Not in paid employment (n=622)**			
coastal waters and beaches		No high school qualifications (n=776)*		Volunteer (n=776)***		Southern (n=780)**
marine fisheries		No high school qualifications (n=642)**				
marine reserves	Males (n=630)*					
fresh water quality		No high school qualifications (n=764)**	Not in paid employment (n=750)*		Older (n=737)**	
wetlands		No high school qualifications (n=593)**	Not in paid employment (n=582)*			Southern (n=598)**

Note: T tests established differences between genders, correlation for relationships with age and ANOVA (sig of F) established differences between means for remaining items. Significance levels; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Differences in perceived change in the state of the environment over the last five years by demographic characteristics are shown in Table 8. Respondents not in paid employment, who were older, and those from the central region viewed changes in air quality over the last five years more positively than other groups. Lower education respondents viewed changes more positively than others for all items except air quality, soils and marine reserves. Respondents who were not in paid employment tended to rate improvements relatively positively for more than half the items, including: air quality, native land, soils, fresh water quality and wetlands. Voluntary workers also tended to be more positive in ratings on the improvement of native land and fresh water plants and animals, and coastal waters and beaches. Older respondents were more likely than others to have judged air quality and fresh water quality as having improved over the preceding five years. There was a tendency for native land, coastal waters and beaches, and wetlands to be judged as having improved more by respondents from the Southern region.

Grouping by K-means cluster analysis of all measures in Table 7 provided two groups comprising favourable (47.5%) or unfavourable (52.5%) ratings of condition of the environment. Significant differences (chi square 8.14, df 2, $p < 0.05$, $n = 205$) between these groups were found for employment status. Relatively few respondents in paid employment (45.3%) were in the favourable group, compared with respondents who were not in paid employment (68% were in the favourable group).

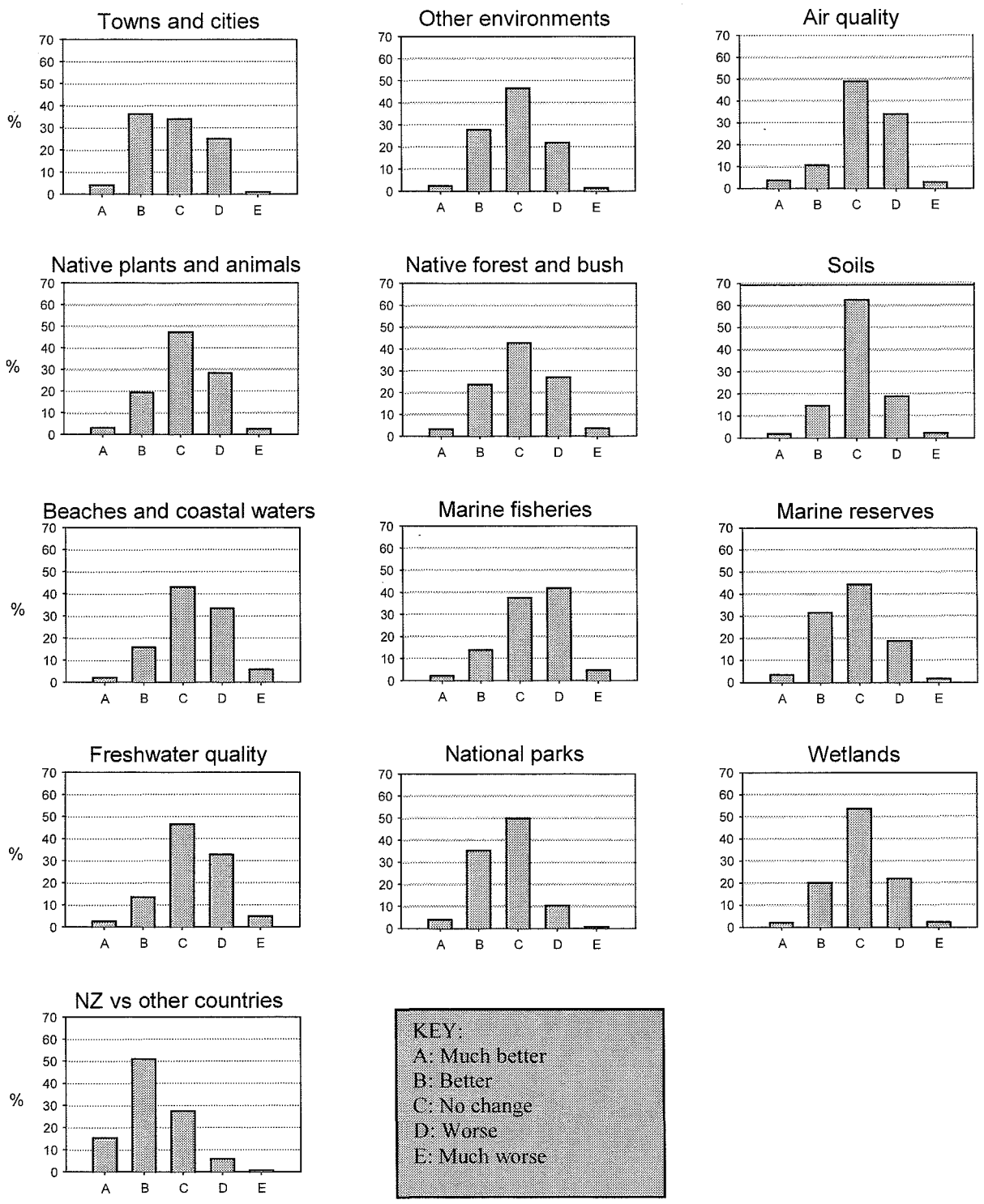


Figure 4
Perceived Changes in the State of the Environment

3.3 Management of the Environment

a) Management of Aspects of the Environment

Question 5 asked survey respondents to evaluate quality of management of five pest and pollution control activities (Table 9 and Figure 5).

Table 9
Perceived Quality of Management Activities

Respondent perceptions of management of ...	N	Very good (1)	Good (2)	Adequate (3)	Bad (4)	Very bad (5)	Don't know	Mean (1-5)	Std. Dev
		%					N		
pest and weed control	796	3.1	20.1	36.9	32.3	7.5	56	3.21	.95
solid waste disposal	797	1.8	13.7	41.5	35.1	7.9	57	3.34	.87
sewage disposal	816	2.1	14.6	41.5	32.8	8.9	37	3.32	.90
farm effluent and runoff	693	0.9	11.3	36.5	40.1	11.3	156	3.50	.87
hazardous chemicals use and disposal	687	2.0	10.0	34.9	36.2	16.7	167	3.56	.95

Most respondents gave an *adequate* or *bad* rating for each area. Overall, few respondents rated management as *very good.* The management of farm effluent and runoff and hazardous chemicals use and disposal received the least favourable assessment.

Table 10
Groups Reporting Better Management

Groups with better perceptions of the quality of ...	Education	Industry	Employment status	Region
pest and weed control			Not in paid employment (n=771)**	
solid waste disposal	No high school qualifications (n=786)**		Not in paid employment (n=770)**	
sewage disposal	No high school qualifications (n=806)*			Southern (n=802)***
farm effluent and runoff	No high school qualifications (n=682)*	Resource based (n=650)**		Southern (n=802)***

Note: ANOVA (sig of F) established differences between means for all items. Significance levels; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Differences in the assessment of management by demographic characteristics are shown in Table 10. Lower education was related to judgements of better management for solid waste disposal, sewerage disposal and farm effluent and runoff. Respondents in resource-based industries more positively evaluated management of farm effluent and runoff. In addition, respondents not in paid employment judged the management of pest and weed control and solid waste disposal more favourably than did other respondents. Respondents in the Southern region judged sewage disposal and farm effluent and runoff better managed than respondents from other regions.

Grouping (K-means cluster analysis) of all measures in Table 9 provided two groups respectively comprising favourable (32%) or unfavourable (68%) ratings of environmental quality.

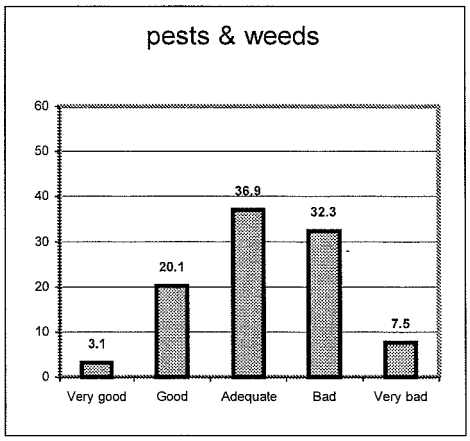
Significant differences in group membership were found for:

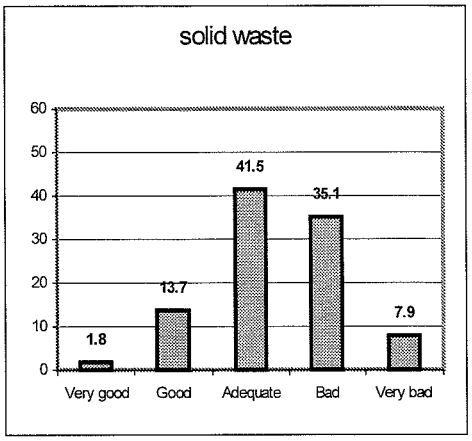
- income (chi square 14.73, df 7, $p < 0.05$, $n = 547$). Proportionately more respondents with income greater than $50,000 (84.2% compared with 72.2% in other groups) were in the group that had unfavourably rated management.

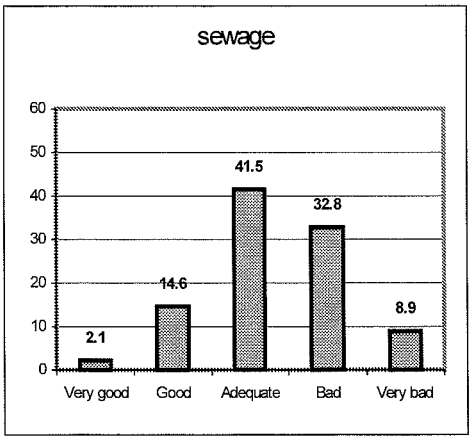
- employment status (chi square 7.48, df 2, $p < 0.05$, $n = 576$). Disproportionately more respondents working more than thirty hours (72.5%) were in the group that had unfavourably rated management.

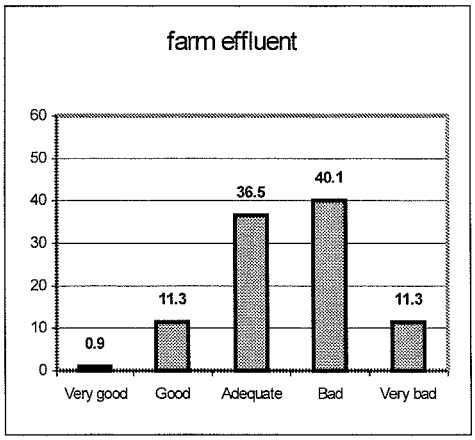
- education (chi square 15.35, df 6, $p < 0.05$, $n = 586$). Favourable rating of management was disproportionately high among respondents who had left high school without qualifications (39.7%) or had only attended primary school (56.5%). Only 8.5% of postgraduates gave favourable ratings.

The lack of confidence in management responses to the issues addressed in Question 5 is likely to be of concern to resource management agencies.









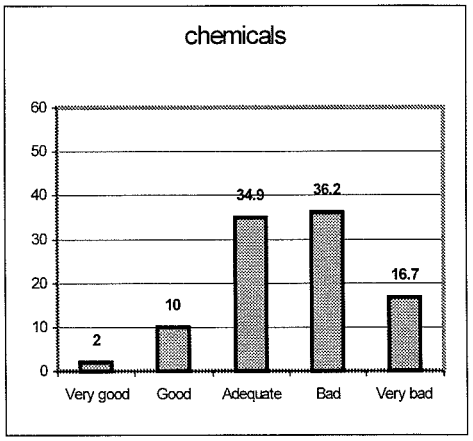


Figure 5
Management of the Environment

b) Current Management of the Environment

Question 6 carried on the theme of evaluation of management but, whereas Question 5 addressed management activities, Question 6 addressed perceptions of quality of management of particular environments (Table 11 and Figure 6).

Table 11
Perceptions of Current Management of the Environment

Perceived quality of management of ...	N	Very well managed (1)	Well managed (2)	Adequately managed (3)	Poorly managed (4)	Very poorly managed (5)	Don't know	Mean (1-5)	Std. Dev
		%					N		
natural environment in towns and cities	825	2.9	27.3	55.5	13.1	1.2	27	2.82	.73
other natural environments	782	3.2	28.4	54.9	12.3	1.3	69	2.80	.74
air quality	804	3.0	21.3	48.4	24.3	3.1	47	3.03	.84
native land and freshwater plants and animals	775	3.6	24.6	51.2	18.7	1.8	74	2.90	.80
native bush and forests	808	5.8	30.8	41.7	18.4	3.2	42	2.82	.91
soils	690	1.9	22.3	54.8	17.8	3.2	157	2.98	.78
coastal waters and beaches	788	2.7	18.9	47.3	26.6	4.4	58	3.11	.85
marine fisheries	658	2.9	17.0	42.9	31.6	5.6	190	3.20	.89
marine reserves	651	3.4	26.6	52.8	14.3	2.9	202	2.87	.80
fresh waters	757	3.7	22.5	50.6	19.7	3.6	89	2.97	.84
national parks	794	10.2	42.2	40.2	5.9	1.5	54	2.46	.81
wetlands	620	2.6	24.7	48.7	21.0	3.1	222	2.97	.83
New Zealand's natural environment compared to other developed countries	747	13.3	45.5	35.5	5.0	0.8	105	2.35	.80

Table 11 shows a range of responses for current management of aspects of the environment. In general, the management of most aspects was considered *adequate* to *well managed*, however, the management of air quality, coastal waters and beaches, and marine fisheries was considered *adequate* to *poor*. There were large numbers of 'don't know' responses for soil condition, marine fisheries, marine reserves and wetlands.

Table 12 shows differences in assessments of current management by demographic characteristics. Lower educated, and respondents not in paid employment perceived better management for most aspects. Respondents in resource-based industries and manufacturing gave the most favourable evaluations of air management, and respondents in resource based industries considered soils to be better managed. Respondents from the Southern region considered wetlands to be better managed than did respondents from other regions.

Table 12
Groups Reporting Better Current Management

	Education	Industry	Employment status	Region
The natural environment in towns and cites			Not in paid employment (n=798)**	
Air quality		Resource based and manufacturing (n=759)*	Not in paid employment (n=779)**	
Native land and freshwater plants and animals	No high school qualifications (n=764)*		Not in paid employment (n=798)**	
Native bush and forests	No high school qualifications (n=797)*		Not in paid employment (n=783)*	
Soils	No high school qualifications (n=797)***	Resource based (n=652)*	Not in paid employment (n=669)***	
Coastal waters and beaches	No high school qualifications (n=778)*		Not in paid employment (n=766)*	
Marine fisheries	No high school qualifications (n=648)*			
Fresh waters	No high school qualifications (n=746)**			
Wetlands	No high school qualifications (n=611)**		Not in paid employment (n=604)*	Southern (n=618)**

Note: T tests established differences between genders and ANOVA (sig of F) established differences between means for remaining items. Significance levels; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Grouping by K-means cluster analysis of all measures in Table 11 provided two groups comprising those who considered the environment to be more well managed (44.6%) or less well managed (55.4%). Significant differences (chi square 13.77, df 2, $p < 0.01$, $n = 444$) between these groups were found for employment status. 72.4% of respondents working more than thirty hours per week were in the group that considered the environment to be well managed, with only 45.6% of respondents who were not in paid employment in this group.

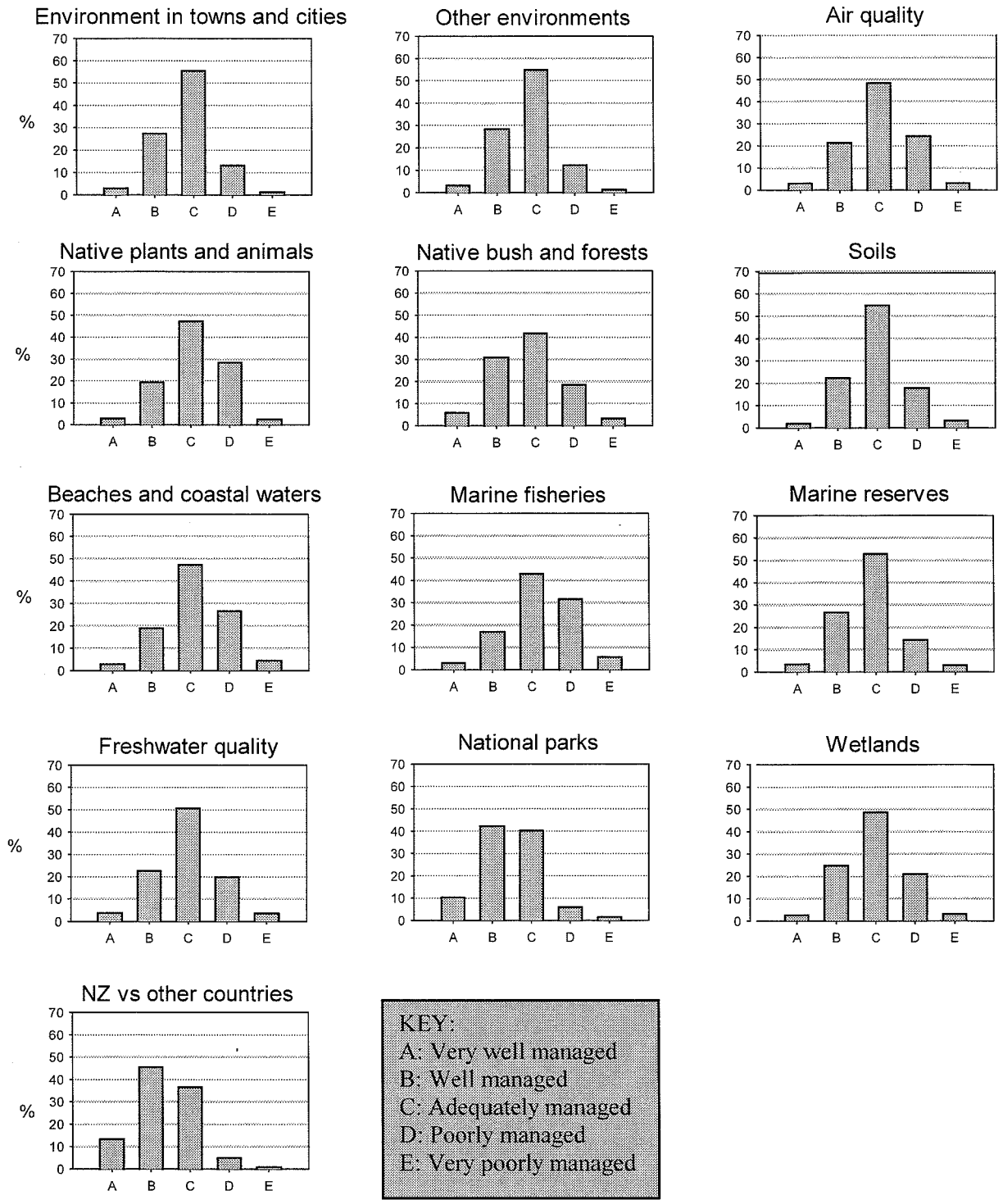


Figure 6
Evaluations of Current Management

c) Management of the Environment Compared to Five Years Ago

Question 7 established how respondents perceived quality of management to have changed over the previous five years (Table 13 and Figure 7).

Table 13
Quality of Management Compared to Five Years Ago

Perceived change in management compared to 5 years ago of ...	N	Much better (1)	Better (2)	The same (3)	Worse (4)	Much worse (5)	Don't know (N)	Mean (1-5)	Std. Dev
		%					N		
natural environments in towns and cities	785	6.1	41.5	41	10.1	1.3	62	2.59	.80
other natural environments	761	3.9	34.6	50.3	9.5	1.7	83	2.70	.76
air quality	772	3.2	18	55.8	20.5	2.5	71	3.01	.78
native plants and animals	761	3.9	32.9	47.6	13.7	2	82	2.77	.81
native bush and forests	770	4.7	33.2	45.8	14	2.2	73	2.76	.83
soils	660	2.9	17.1	65.2	13.6	1.2	180	2.93	.68
coastal waters and beaches	757	3.2	21.4	50.7	20.9	3.8	88	3.01	.84
marine fisheries	644	3.4	20.8	46.7	24.8	4.2	199	3.06	.87
marine reserves	628	3.3	32.2	47.9	14.2	2.4	214	2.80	.81
fresh waters	730	3.3	20.1	56.7	15.9	4	107	2.97	.81
national parks	755	5.8	36.6	47.7	8.6	1.3	90	2.63	.78
wetlands	607	3.1	24.1	55.4	15.3	2.1	234	2.89	.77
New Zealand's natural environment compared to other developed countries	704	15.8	42.5	35.8	4.7	1.3	139	2.33	.84

As shown in Table 13, in general respondents considered that management was either *the same* or *better* than five years ago. Respondents considered the management of New Zealand's natural environment had improved compared to other developed countries. Respondents were divided on changes in marine fisheries, with those who thought management had got *worse* slightly outnumbering those who thought it had got *better.* In addition, as found for previous management questions, soils, marine fisheries, marine reserves and wetlands received a large number of 'don't know' responses.

Differences by demographic characteristics are shown in Table 14. Females were more likely than males to consider the management of native plants and animals and the management of bush and forest to have improved. Students, those involved in home duties, and unpaid voluntary workers considered the management of some aspects to have improved compared to other situation groupings. Compared to other industry groups, respondents in resource-based industries considered the management of soil to have improved more. The management of air quality was judged to have improved more by those in the central region, and respondents in the southern region evaluated more favourably the management of wetlands and management of New Zealand's natural environment compared to other developed countries.

Table 14
Groups Reporting Better Management

	Gender	Situation	Industry	Region
Natural environments in towns and cities		Student (n=774)**		
Air quality				Central (n=764)**
Native plants and animals	Females (n=757)**	Home duties (n=774)**		
Native bush and forests	Females (n=766)*	Home duties (n=760)***		
Soils			Resource based (n=624)**	
Coastal waters and beaches		Unpaid volunteers (n=747)**		
Marine reserves		Home duties (n=747)*		
National parks		Students (n=744)***		
Wetlands		Unpaid volunteers (n=599)*		Southern (n=605)**
New Zealand's natural environment compared to other developed countries				Southern (n=699)*

Note: T tests established differences between genders and ANOVA (sig of F) established differences between means for remaining items. Significance levels; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Cluster analysis of all measures in Table 13 provided two groups comprising those who considered the environment to be either better managed (39.5%) or less well managed (60.5%) than five years ago. Significant differences (t test, $p < 0.05$, $n = 258$) between these groups were found for age. Respondents in the group who considered management to be better were older (mean age = 49.6 years) than those in the group who considered the environment was less well managed (mean age = 46.3 years). Findings here are reasonably consistent with related questions. Particularly notable is concern about fisheries management.

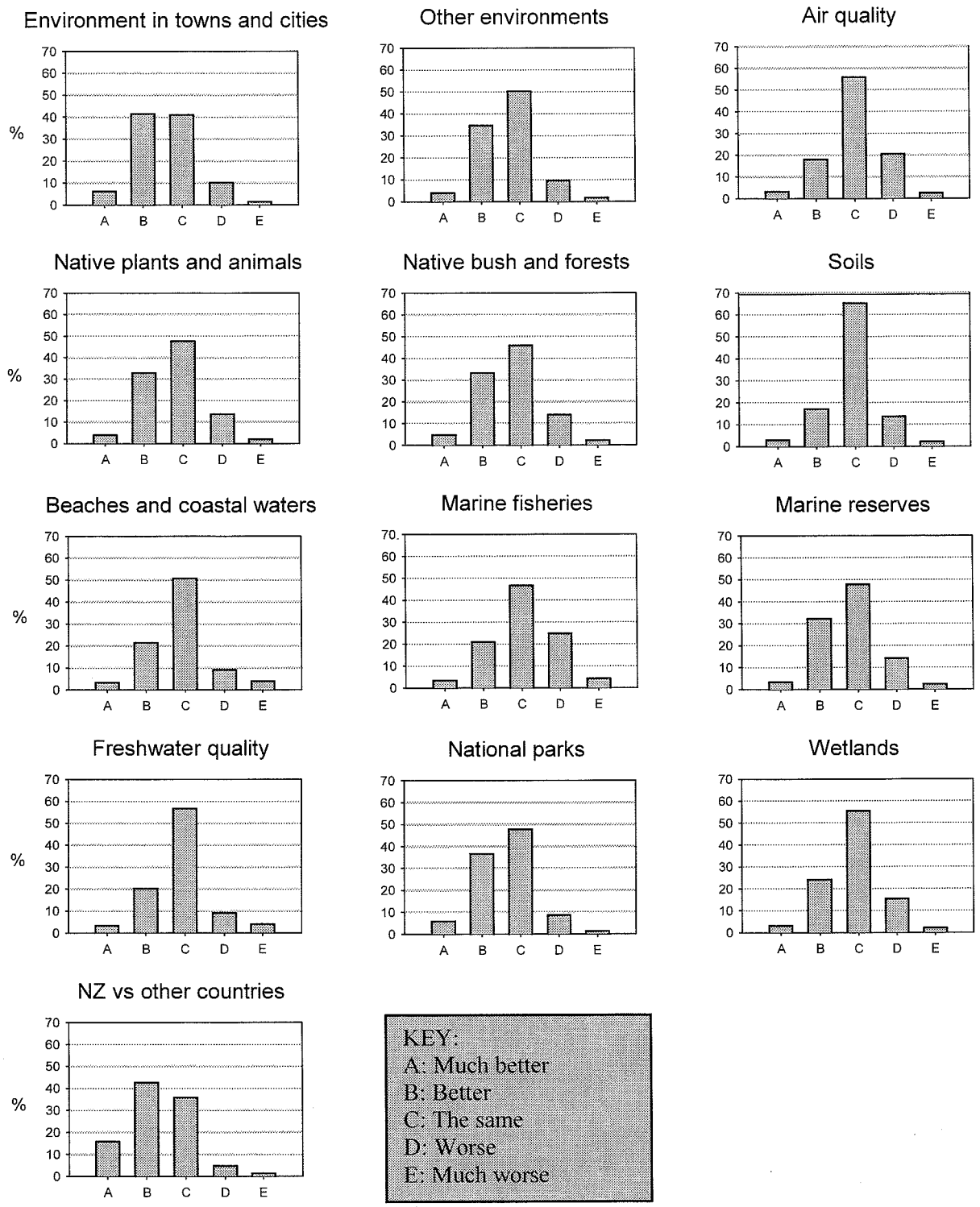


Figure 7
Changes in Management

3.4 Preferences for Management

Preferences for who should manage resources were measured in Question 9 (Table 15 and Figure 8). Fourteen resource areas were presented, with five possible management arrangements for respondents to select from.

Table 15
Preferences for Management

Respondent preferences for management of ...	N	Individuals and firms	Individuals, firms, iwi and communities	Individuals, communities, iwi and government	Local and central government	Central government
air quality	847	7.1	9.1	25.4	46.6	11.8
native plants and animals	846	3.7	10.2	44.3	29.0	12.9
native forests and bush	850	2.4	8.0	43.9	28.2	17.5
soils	838	8.7	10.6	32.6	37.5	10.6
beaches and coastal waters	849	2.7	11.4	41.0	35.3	9.5
marine fisheries	835	3.5	6.3	30.4	29.3	30.4
marine reserves	840	2.7	5.0	31.9	33.0	27.4
fresh waters	850	2.9	7.5	36.4	41.6	11.5
national parks	851	2.0	4.1	31.8	31.7	30.3
wetlands	824	2.9	6.9	37.6	36.5	16.0
sewage disposal	850	4.0	6.4	20.6	62.7	6.4
hazardous chemical disposal	850	10.1	6.0	18.6	47.2	18.1
energy use	846	10.2	7.8	28.5	32.2	21.4
pest and weed control	852	7.3	8.9	37.2	39.3	7.3

Table 15 indicates that respondents favoured management by *central government*, *central and local government*, or by *individuals, communities, iwi and government.* Management arrangements that omitted central or local government had less support. Few respondents preferred management by *individuals and firms*, although relatively more support was given to their management of hazardous chemical disposal, energy use, soils, and pest and weed control.

Male respondents held stronger preferences than females for management by *central government* and females preferred management by *individuals and firms* for native plants and animals, soils, and marine fisheries (Chi square, $p < 0.05$). In addition, with the exclusion of only four aspects (native plants and animals, soils, marine fisheries and national parks) older respondents were more likely than others to prefer management by either *central government* or a combination of *local and central government* (ANOVA, sig of F, $p < 0.05$).

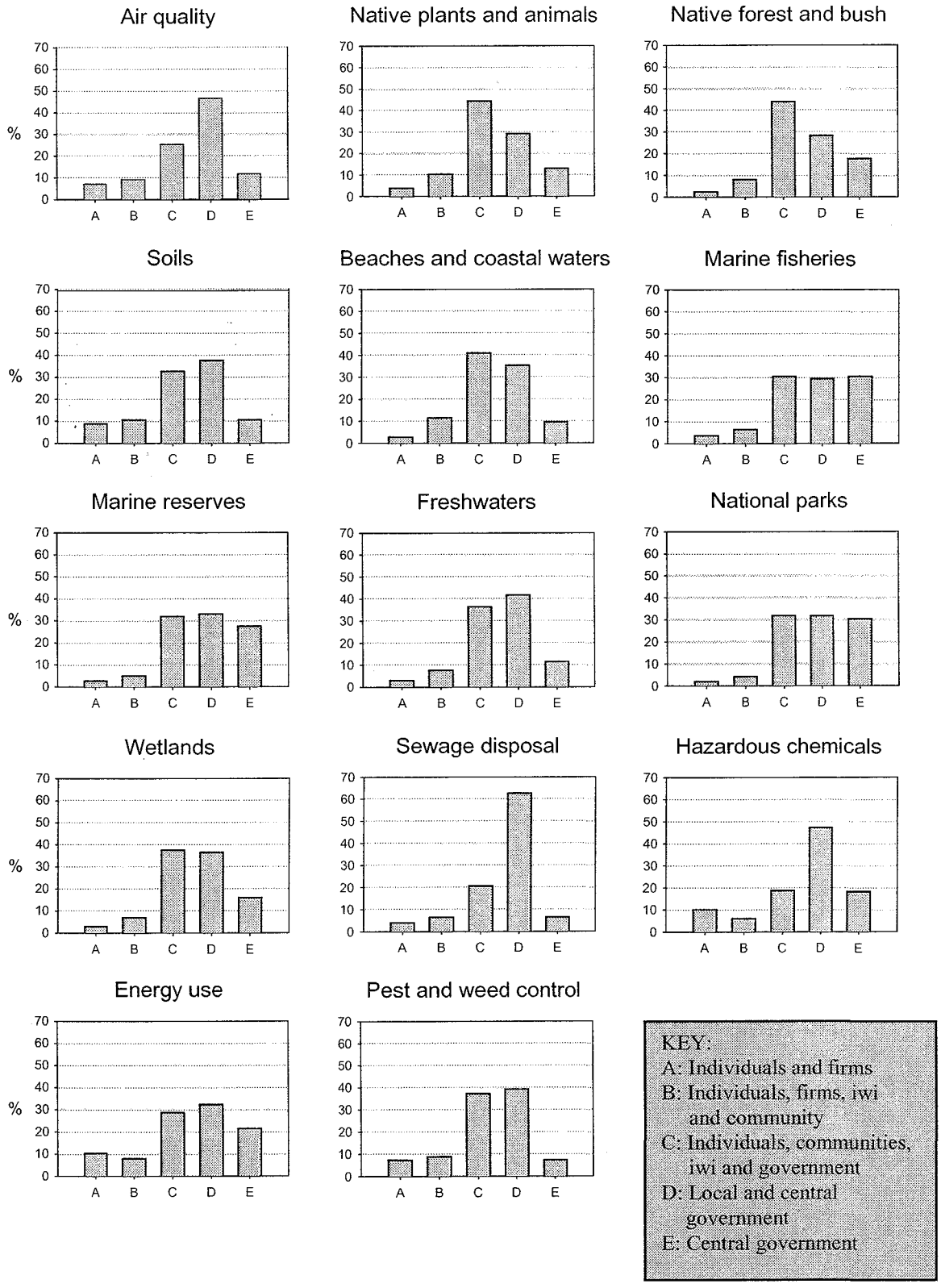


Figure 8
Preferences for Management

3.5 Main Causes of Damage to the Environment

Respondents' judgements of the main causes of damage to the environment are reported in Table 16 and shown in Figure 9. Respondents were instructed to select what they considered to be the main causes of damage from a list of fifteen items for ten aspects of the environment. Respondents could select up to three items.

An example serves to illustrate how Table 16 should be interpreted. The top left cell indicates that 2.3% of respondents indicated that motor vehicles are one of the three main causes of damage to wetlands.

Table 16 shows that pests and weeds were considered to be an important problem for four resources (native plants and animals, native bush and forests, national parks, and wetlands). Sewage and storm water was considered was considered to be the major cause of damage for: native animals and plants, coasts and beaches, marine fisheries, marine reserves, freshwater and wetlands.

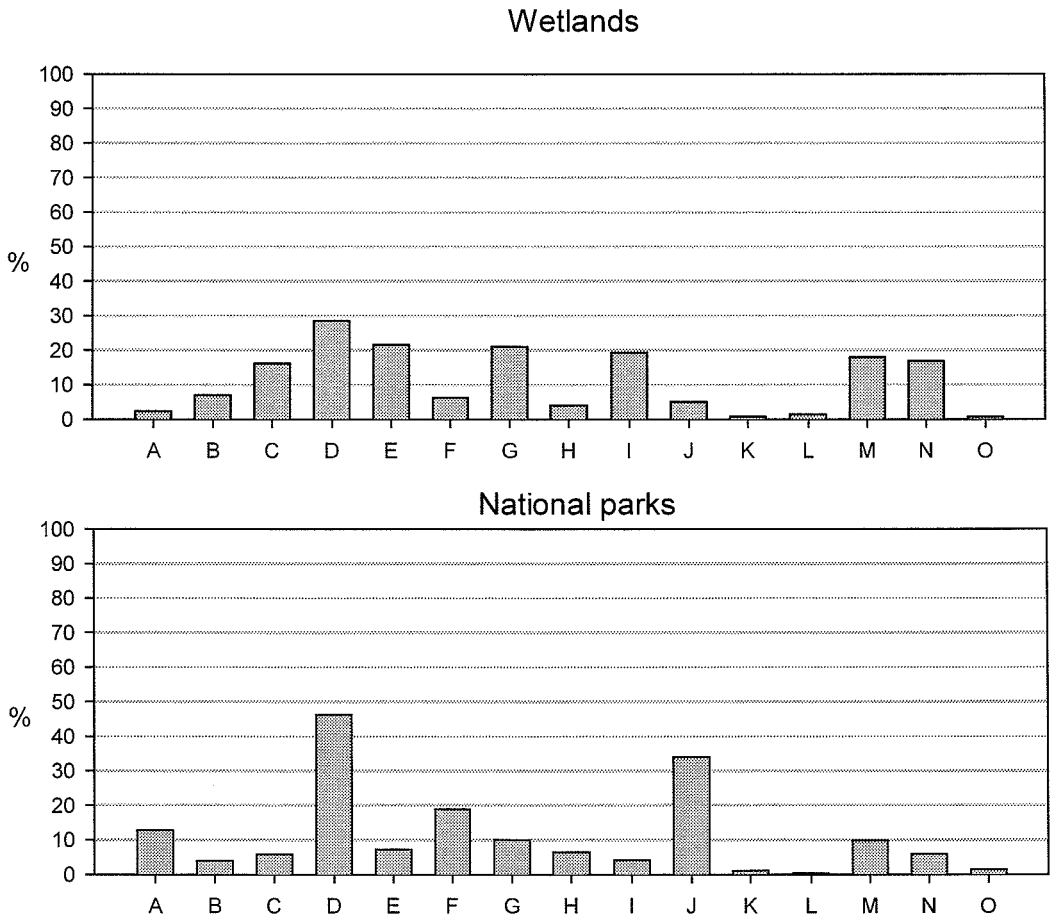
Table 16
Main Causes of Damage to the New Zealand Environment

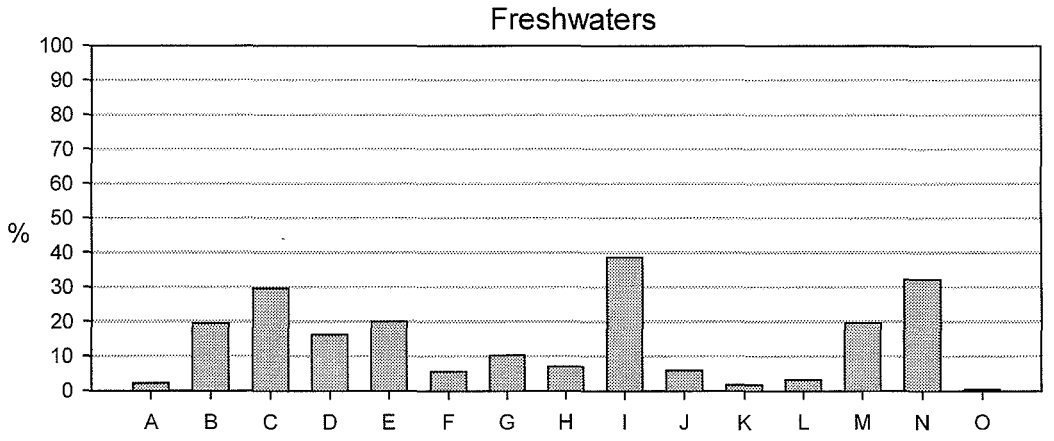
Potential causes of environmental damage	Affected environments									
	Wetlands	National Parks	Fresh waters	Marine reserves	Marine fisheries	Coasts and beaches	Soils	Native bush and forests	Native animals and plants	Air
Motor vehicles	2.3	12.8	2.2	2.3	0.9	4.1	1.9	5.7	4	85.3
Households	6.9	4	19.5	5.1	5.1	19.6	12.4	2.2	10.3	28.7
Industrial activities	16.1	5.8	29.6	10.5	14	17.7	23.2	11.4	21	67.3
Pests and weeds	28.5	46.2	16.2	7	3.7	4.6	16.9	54.1	46.9	4.0
Farming	21.5	7.2	20.1	1.2	1.6	2.6	20.2	16.6	18.9	2.2
Forestry	6.2	18.9	5.5	0.7	0.6	0.9	7.8	42 .4	15.5	0.4
Urban development	21	10	10.3	4.6	2.3	14.7	11.4	23.8	21.8	13.3
Mining	4	6.5	7	1.9	1.1	2.1	12.6	13.1	9.7	1.5
Sewage and storm water	19.2	4.1	38.6	29.3	32	63.9	16.4	3.9	22.5	5.1
Tourism	5	34	5.9	12.1	5	10.7	0.3	13.9	6	0.8
Commercial fishing	0.7	1.1	1.7	30.3	59.7	18.6	0.1	0.2	2.1	0.6
Recreational fishing	1.3	0.3	3.2	17.3	15.4	5.4	0.2	0.1	1	0.1
Dumping of solid waste	17.9	9.8	19.6	13.3	14.9	24.6	40.4	10	19.5	8.6
Hazardous chemicals	16.8	5.9	32.2	18.8	22.1	22.1	44.9	8.3	21.9	27.6
Other	0.6	1.5	0.4	2.8	1.8	2.5	1.2	1.9	1	0.6

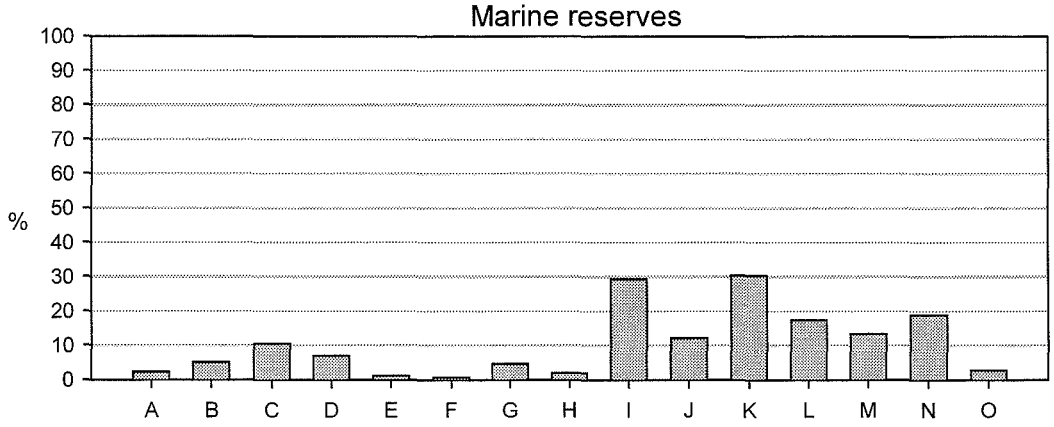
Figure 9

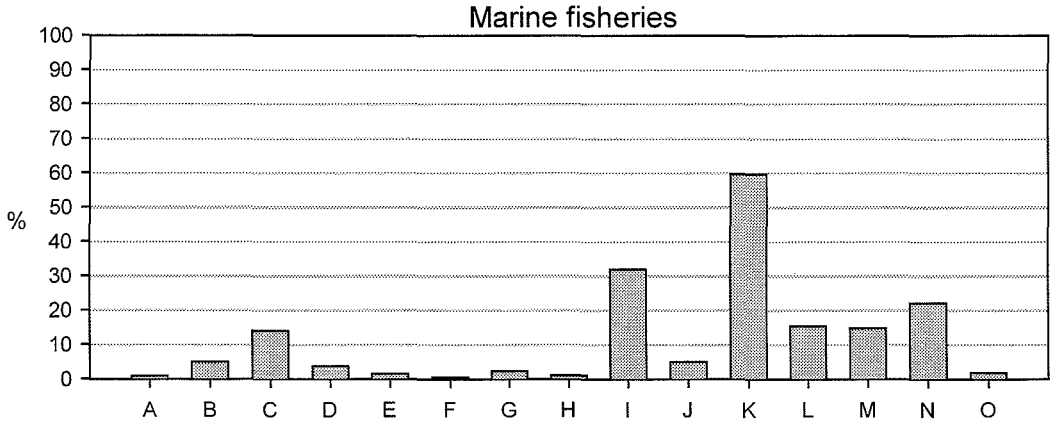
Main Causes of Damage to the New Zealand Environment (Data Represents Percentage of Respondents Identifying up to Three Main Causes of Problems to Particular Environments)

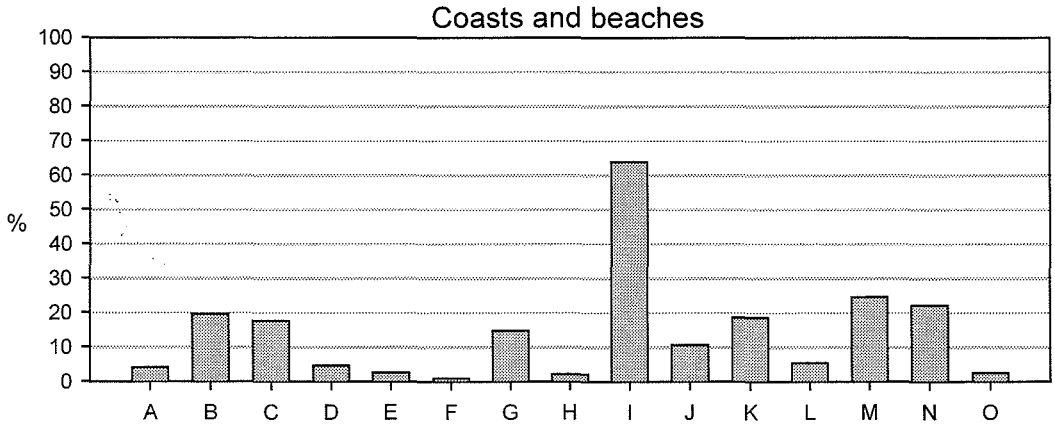
Key:	
A	Motor vehicles
B	Household waste & emissions
C	Industrial activity
D	Pest & weeds
E	Farming
F	Forestry
G	Urban development
H	Mining
I	Sewage & storm water
J	Tourism
K	Commercial fishing
L	Recreational fishing
M	Dumping of solid waste
N	Hazardous chemicals
O	Other

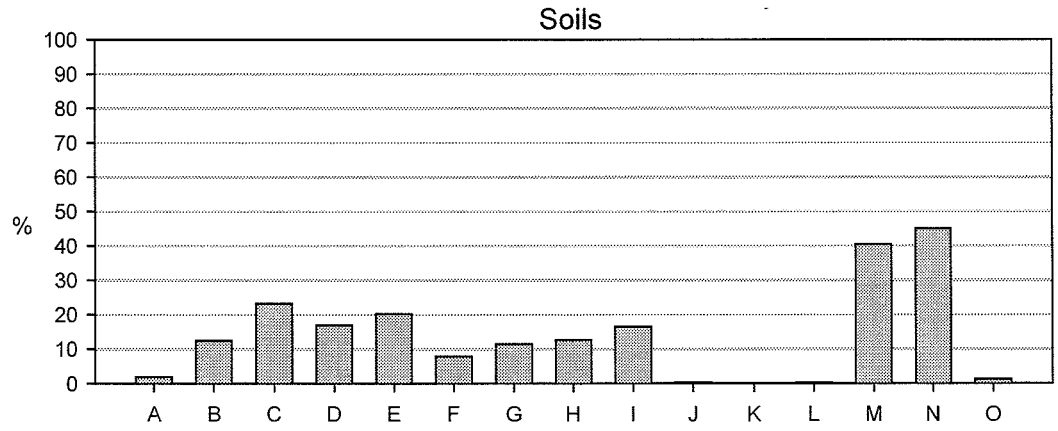


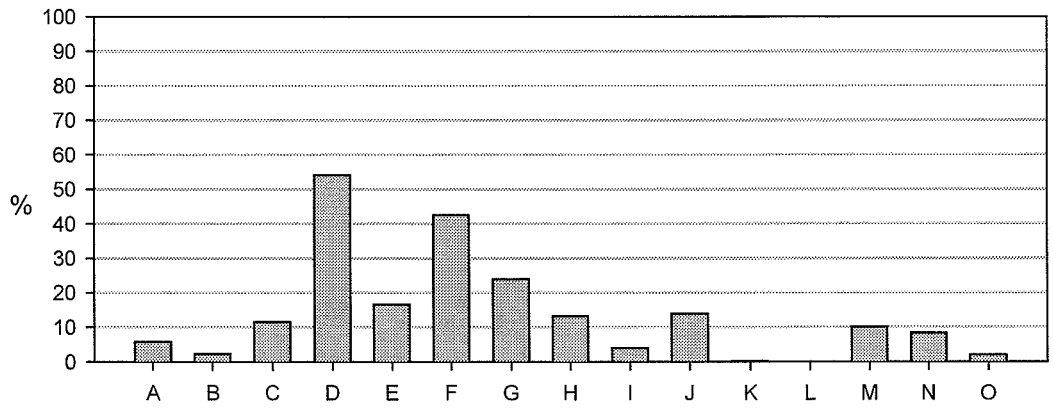

Freshwaters
100
90
80
70
60
50
40
30
20
10
0
%
A B C D E F G H I J K L M N O

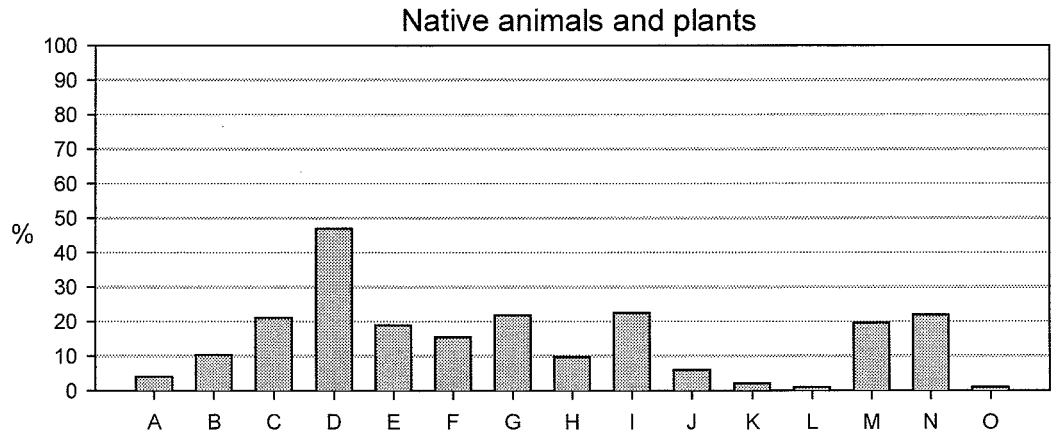

Marine reserves
100
90
80
70
60
50
40
30
20
10
0
%
A B C D E F G H I J K L M N O

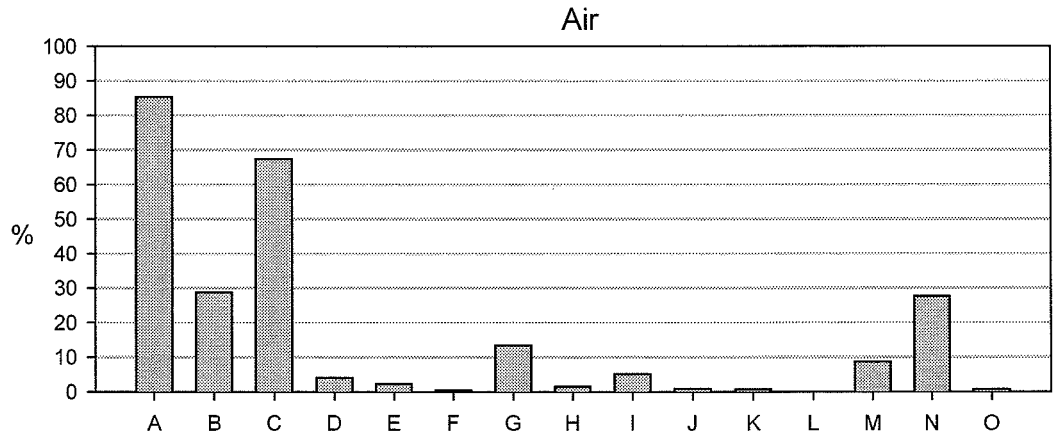

Marine fisheries
100
90
80
70
60
50
40
30
20
10
0
%
A B C D E F G H I J K L M N O


Coasts and beaches
100
90
80
70
60
50
40
30
20
10
0
%
A B C D E F G H I J K L M N O


Soils
%
100
90
80
70
60
50
40
30
20
10
0
A B C D E F G H I J K L M N O


Native bush and forests
%
100
90
80
70
60
50
40
30
20
10
0
A B C D E F G H I J K L M N O


Native animals and plants
%
100
90
80
70
60
50
40
30
20
10
0
A B C D E F G H I J K L M N O


Air
%
100
90
80
70
60
50
40
30
20
10
0
A B C D E F G H I J K L M N O

3.6 Allocation of Government Spending

Respondents were asked to reallocate the existing budget amongst a selected set of items (Table 17 and Figure 10). Total budget spending remained fixed.

Table 17
Preferences for Allocation of Government Spending

Preferences for spending on ...	N	Spend far more (1)	Spend more (2)	No change (3)	Spend less (4)	Spend far less (5)	Mean (1-5)	Std. Dev
		%						
defence	865	6.1	22.1	37.5	21.3	13.1	3.13	1.09
pest and weed control	849	11.1	47.7	38.9	2.0	0.4	2.33	.71
education	857	35.5	48.9	14.6	0.8	0.2	1.81	.72
roads and transport	863	14.3	39.2	42.9	2.8	0.9	2.37	.79
civil defence	863	4.4	23.1	64.7	6.3	1.6	2.78	.70
endangered species	863	17.5	38.0	39.7	3.8	0.9	2.33	.84
crime prevention	871	36.2	45.5	17.3	0.9	0.1	1.83	.74
health	871	43.1	41.2	14.6	0.8	0.3	1.74	.76
air quality	865	15.3	36.6	46	2	0.1	2.35	.76
Superannuation	863	14.1	33.5	45.5	5.6	1.3	2.46	.85
native forests and bush	859	8.6	36.8	50.2	4.1	0.3	2.51	.72
income support	866	6.8	15.8	44.0	24.1	9.2	3.13	1.01
soils	849	3.3	26.0	65.6	4.5	0.6	2.73	.62
beaches and coastal waters	861	7.0	38.7	52.3	1.6	0.5	2.50	.67
marine fisheries	853	4.7	29.1	61.0	4.3	0.9	2.68	.68
marine reserves	856	5.8	33.2	57.1	3.3	0.6	2.60	.68
fresh waters	860	11.6	39.3	47.9	0.8	0.3	2.39	.71
national parks	870	7.0	29.7	58.8	4.0	0.5	2.61	.7
wetlands	851	6.5	31.8	55.6	5.4	0.7	2.62	.72

Table 17 shows that in non-environmental areas respondents wanted *more spending* on education, roads/transport, crime prevention, health and superannuation. Respondents wanted *less spending* on defence and either *no change* or *less spending* on income support. In terms of the natural environment, the majority want *more spending* on pests and weeds, endangered species, air quality and fresh waters. In general, respondents considered there should be *no change* in expenditure for native forests and bush, soils, beaches and coastal waters, marine fisheries, marine reserves, national parks and wetlands.

Table 18
Groups Preferring More Spending

	Gender	Education	Situation	Employment status	Income	Region	Age
Defence		No high school qualifications (n=852) **	Retired (n=853) **	Not in paid employment (n=837) ***			Older (n=824) ***
Pest and weed control	Males (n=844) ***						
Education	Males (n=853) **	No high school qualifications (n=847) *	Students (n=846) ***	More than 30 hours (n=831) *			Older (n=856) **
Crime prevention	Males (n=865)**	No high school qualifications (n=858)					
Health	Females (n=865)***	No high school qualifications (n=858) *			<$10,000 (n=804) *		
Air quality						Southern (n=858) **	
Superannuation		No high school qualifications (n=852) ***			<$10,000 (n=800) *		
Native forests and bush			Voluntary workers (n=847)*				Younger (n=819) ***
Income support	Females (n=861)**	No high school qualifications (n=854) ***	Unemployed (n=864) ***	Not in paid employment (n=838) ***	<$10,000 (n=800) ***		
Beaches and coastal waters						Northern (n=853) *	Younger (n=822) ***
Marine reserves		No high school qualifications (n=848) **					
National parks			Voluntary (n=857) **				Younger (n=809) ***
Wetlands			Unemployed (n=837) **	Not in paid employment (n=823) **	>$100,000 (n=785) *		Younger (n=809) ***

Note: T tests established differences between genders, correlation for relationships with age and ANOVA (sig of F) established differences between means for remaining items. Significance levels; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 18 shows a number of demographic differences for preferred reallocation of government spending. Males considered that more should be spent on pest and weed control,

education and crime prevention, while females considered that more should be spent on health and income support. Respondents with less education considered that more should be spent on seven items, of which only one (marine reserves) was an environmental item.

Unsurprisingly, students considered more should be spent on education and the unemployed considered more should be spent on income support. Voluntary workers wanted more spending on native forests and bush and national parks, and the unemployed wanted more spending on wetlands. Respondents with lower income considered more should be spent on social services including health, superannuation, and income support, as did sales and service workers. Respondents from the southern region wanted more spending on air quality, with those from the northern region preferring more spending on beaches and coastal waters. Older respondents preferred more spending on education and defence, with younger respondents preferring more spending on the environment, including native forests and bush, beaches and coastal waters, national parks and wetlands.

KEY:
1: Spend far more
2: Spend more
3: No change
4: Spend less
5: Spend far less

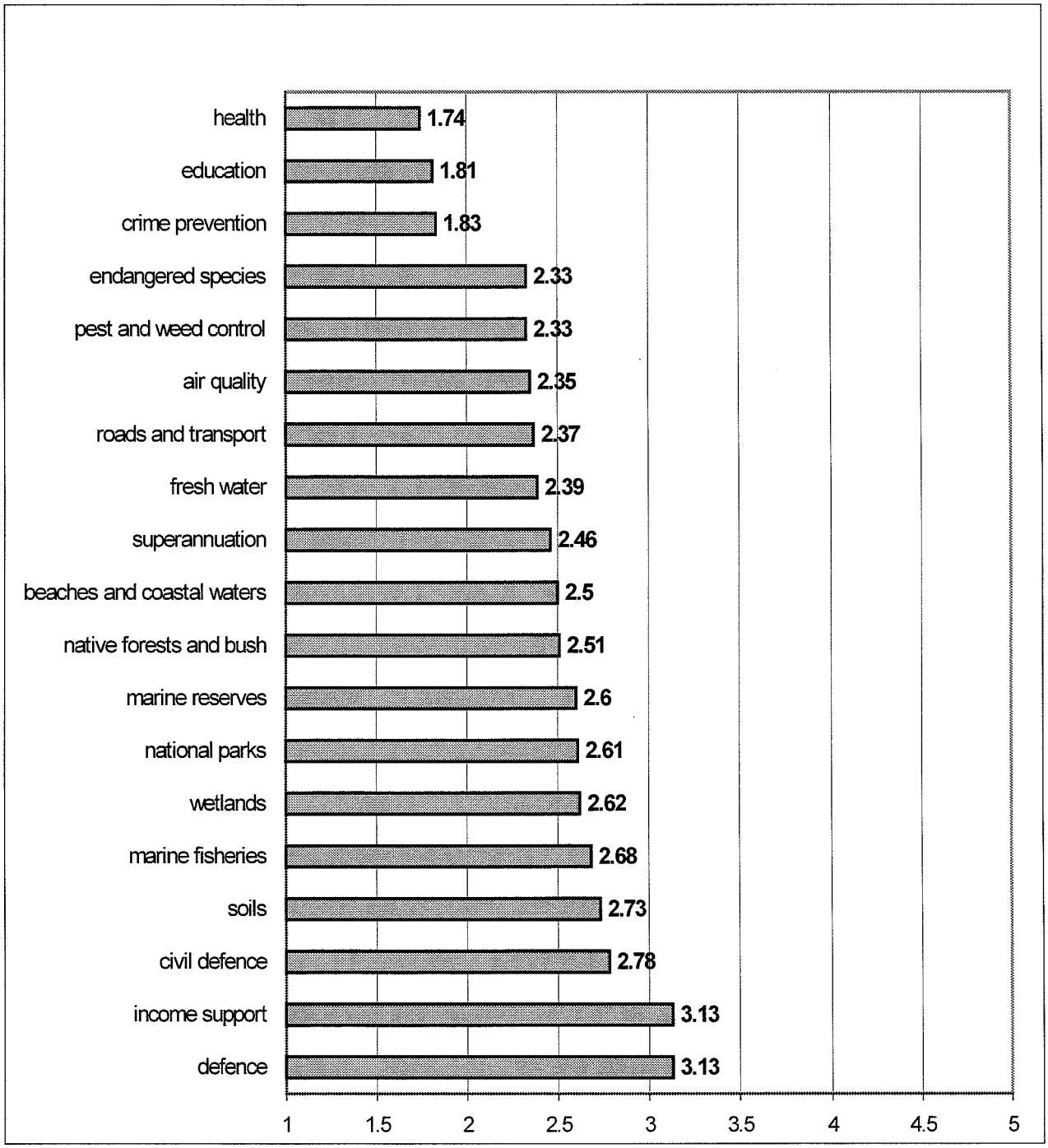


Figure 10
Preferred Reallocation of Government Spending

3.7 Participation in Environmental Activities

Respondents reported their participation in twelve activities related to the environment in the preceding twelve months (Table 19 and Figure 11).

Table 19
Participation in Environmental Activities

In the last 12 months the respondent had ...	N	Yes	No	Don't know
		%		
reduced or limited their use of electricity	863	58.5	35.7	5.8
visited a marine reserve	859	36.0	63.0	1.0
visited a national park	861	33.4	66.1	0.5
bought products that are marketed as environmentally friendly	865	79.2	12.9	7.9
recycled household waste	866	83.7	15.2	1.0
composted garden and/or household waste	864	70.7	28.8	0.5
been involved in a project to improve the natural environment	859	76.5	21.3	2.2
grown some of their own vegetables	867	70.6	29.2	0.2
obtained information about the environment from any source	863	51.1	46.1	2.8
taken part in hearings or consent processes about the environment	864	14.1	84.7	0.8
participated in an environmental organisation	862	12.5	86.7	0.8
regularly commuted by bus or train	863	27.5	81.9	0.6
been an active member of a club or group that restores and/or replants natural environments	864	11.9	87.2	0.9

Table 19 shows levels of participation in the environmental activities. From the table it can be seen that more than seventy percent of respondents recycled household waste, composted domestic waste, or grew their own vegetables. More than seventy percent had also bought environmentally friendly products or had been involved in a project to improve the environment. Almost sixty percent had reduced or limited their use of electricity. Few respondents, however, had been involved in the restoration or replanting of the natural environment. Also few had participated in an environmental organisation or took part in hearings or consent processes related to the environment. More than a third of respondents had visited a marine reserve or national park and just under one third had regularly commuted by bus train.

Table 20
Groups With More Participation

Groups most likely to have ...	Age	Education	Region	Situation	Income	Employment
Visited a marine reserve		Bachelors degree (n=839) *	Northern (n=842) ***		$50,000-$70,000 (n=787) **	
Visited a national park	Younger (n=618) ***	Postgraduate (n=847) **		Student (n=847) ***	$50,000-$70,000 (n=793) ***	Working less than 30 hours (n=831) **
Bought products that are marketed as environmentally friendly	Younger (n=758) ***					
Recycled household waste			Northern (n=849) ***			
Grown some of own vegetables	Older (n=823) ***			Voluntary (n=854) **	$20,000-$30,000 (n=798) *	Not in paid employment (n=837) *
Obtained information about the environment from any source		Postgraduate (n=829) ***				Working more than 30 hrs (n=811) *
Participated in an environmental organisation		Postgraduate (n= 846) **				
Regularly commuted by bus or trains	Younger (n=817) **		Northern (n=850) *			

Note: ANOVA (sig of F) established differences for age and Chi square established differences for remaining items. Significance levels; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 20 shows a number of demographic differences for participation in environmental activities. Older respondents more frequently grew their own vegetables, while younger respondents were more likely to have visited a national park, bought environmentally friendly products, and to have regularly commuted by bus or train. More respondents with a higher education visited a national park or marine reserve, or were members of an environmental organisation. More northern respondents had visited a marine reserve and more of them had recycled household waste. More students and part-time workers had visited a national park. Higher income respondents were also more common visitors to marine reserves and national parks. Voluntary workers or workers in resource-based industries more frequently grew their own vegetables as did those not in paid employment and those on lower incomes. Respondents with higher education, and people working more than thirty hours per week had been more involved in obtaining information about the environment.

K-means cluster analysis of all measures in Table 19 provided two groups comprising those who had predominantly participated (47.7%) and those who predominantly had not participated (52.3%).

- Significant differences (chi square 13.36, df 6, $p < 0.05$, $n = 662$) between these groups were found for industry. Disproportionately more respondents working in education (56.2%) were in the group that predominantly participated with those in communication and financial services (41.9%) having the lowest proportion in this group.

- There were also differences between groups with respect to level of education (chi square 35.28, df 6, $P < 0.001$). Disproportionately more respondents with higher levels of education (bachelors degree 61.8%, postgraduate 63.8%) were in the group that predominantly participated.

- In addition, there were differences with regard to situation (chi square 19.06, df 6, n = 690). More unpaid voluntary workers were in the group that predominantly participated (83.3%), whereas few retired respondents were in the group (34.1%).

- Differences depending on employment status were also found (chi square 7.35, df 2, n = 679). More respondents working more than thirty hours were in the group that predominately participated (54.7%) with this group having fewer respondents not in paid employment (41.3%).

- The group that predominantly participated were also found to be younger (mean 46.16) than the other group (mean 49.7) (t test $p < 0.01$).

- Participators claimed better knowledge of environmental issues (t test $p < 0.001$).

Differences in participation in environmentally friendly activities could be explained, in part, by demographics. Outdoor activities, such as visiting marine reserves and national parks, are typically undertaken by those with a higher education and those with a higher income, i.e., those with the knowledge and resources to take part. More northern region people visit marine reserves because there are more there and they tend to be accessible. Conversely, people growing some of their own vegetables tend to be older, have a lower income, are not in paid employment, work in a resource-based (often rural) industry or work in the voluntary sector. Those belonging to environmental organisations are typically those with higher education, typical of people who visit national parks and marine reserves.

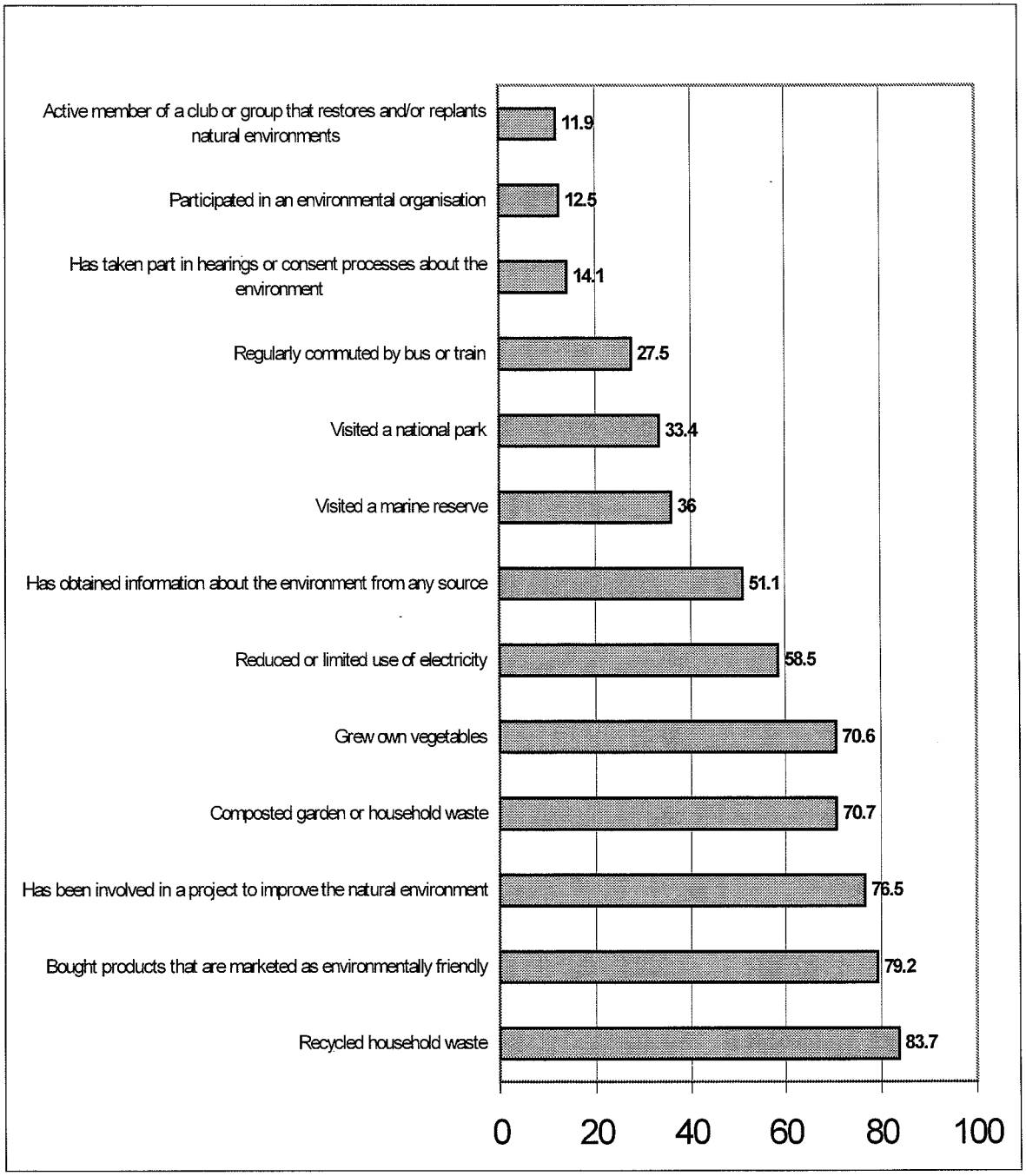


Figure 11
Participation Rates (%)

3.8 Preparedness of Emergency Services

a) Emergency Service Preparedness

Respondents' views of the preparedness of emergency services to deal with natural hazards are summarised in Table 21 and Figure 12.

Table 21
Perceived Preparedness of Emergency Services

Perceived preparedness of emergency services to cope with ...	N	Very well prepared (1)	Well prepared (2)	Adequately prepared (3)	Poorly prepared (4)	Not at all prepared (5)	Don't know	Mean (1-5)	Std. Dev
		%					N		
landslides and slips	771	5.2	21.5	53.6	17.0	2.7	83	2.91	.83
severe weather	790	2.7	23.2	55.7	17.1	1.4	58	2.91	.75
flooding	794	3.5	21.5	48.6	24.3	2.0	56	3.00	.83
volcanic activity	733	2.6	14.1	46.4	29.7	7.2	113	3.25	.88
coastal erosion	746	0.8	8.0	46.6	37.7	6.8	103	3.42	.77
tidal wave/tsunami	697	0.4	6.0	31.7	43.3	18.5	155	3.73	.84
natural fires	800	4.3	23.9	52.8	17.1	2.0	51	2.89	.81
earthquakes	777	4.2	18.8	47.5	25.1	4.4	76	3.07	.88

In all situations the majority of respondents considered emergency services were *adequately* to *poorly prepared* for dealing with problems caused by natural hazards. Emergency services were generally considered best prepared for natural fires and least well prepared for tidal waves and coastal erosion.

Table 22
Groups Indicating Better Preparedness of Emergency Services

	Gender	Situation	Age
Landslides and slips	Males (n=768)**	Unemployed (n=764)*	Younger (n=737)**
Severe weather		Unemployed (n=782)*	
Flooding	Males (n=791)**	Paid employment (n=786)***	Younger (n=712)**
Natural fires	Males (n=797)*	Student (n=792)*	Younger (n=765)***
Earthquakes		Student (n=769)**	Younger (n=741)***

Note: T tests established differences between genders, correlation for relationships with age and ANOVA (sig of F) established differences between means for situation. Significance levels; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Differences in terms of demographic differences in perceived preparedness of emergency services are shown in Table 22. Males gave more positive evaluations than females for preparedness of emergency services to cope with landslides and slips, flooding and natural fires. Unemployed respondents were most favourable about preparedness for landslides and slips and severe weather. Students and younger respondents were groups who considered that emergency services were best prepared for natural fires and earthquakes. In addition, younger respondents considered services were better prepared for dealing with landslides and slips and flooding.

K-means cluster analysis of all measures in Table 21 provided two groups (n= 632) comprising those who thought services were well prepared (65%) and poorly prepared (35%). Investigation of significant differences found that the group who thought services were well prepared were older (mean age = 49.47 years) than the other group (mean age = 43.95years) (t test $p < 0.001$). However, the group who thought services were well prepared reported poorer knowledge of environmental issues (t test $p < 0.001$).

While most respondents for most hazards considered agencies to be *adequately prepared* to *well prepared* to manage such events, substantial numbers of people consider that emergency services are poorly prepared for a range of natural hazard events, most notably coastal erosion and tsunami.

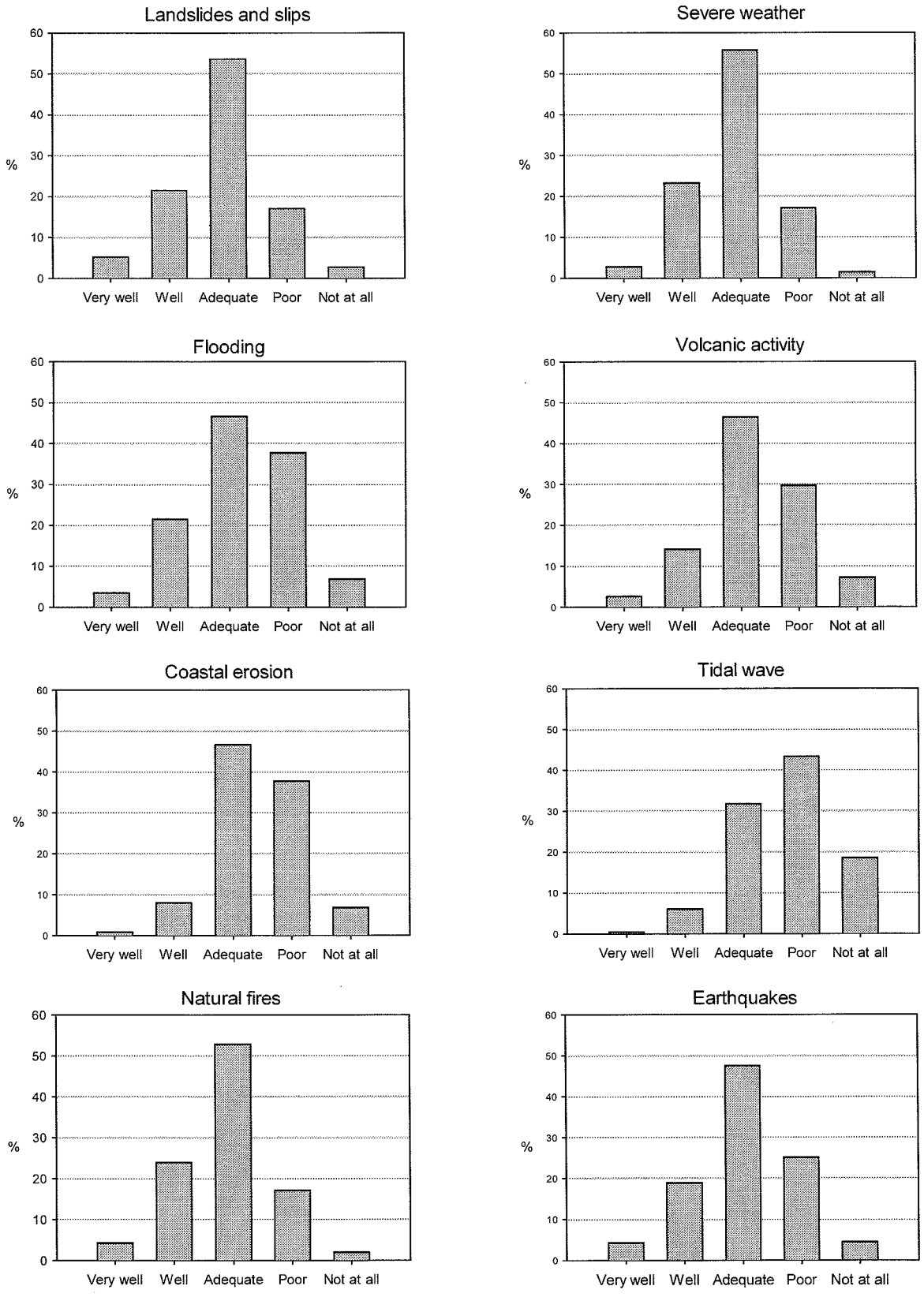


Figure 12
Perceptions of Emergency Services' Degree of Preparedness

b) Preparedness of households

Table 23 (and Figure 13) reports respondents' views of the preparedness of their household to deal with natural hazards.

Table 23
Perceptions of Own Household Preparedness

Perceived preparedness of respondent households to cope with ...	N	Very well prepared (1)	Well prepared (2)	Adequately prepared (3)	Poorly prepared (4)	Not at all prepared (5)	Don't know	Mean (1-5)	Std. Dev
		%					N		
landslides and slips	813	6.0	12.3	38.7	25.7	17.2	33	3.36	1.09
severe weather	839	4.2	19.5	54.6	15.4	6.3	18	3.00	.88
flooding	830	4.6	16.5	46.0	22.4	10.5	23	3.18	.98
volcanic activity	767	2.7	5.7	28.4	33.5	29.6	79	3.81	1.01
coastal erosion	732	5.2	8.6	33.7	24.2	28.3	94	3.62	1.13
tidal wave/tsunami	751	3.6	7.1	23.7	29.7	36.0	86	3.87	1.09
natural fires	831	4.1	14.7	46.9	23.7	10.6	22	3.22	.96
earthquakes	826	2.7	11.6	46.1	24.5	15.1	31	3.38	.96

Table 23 shows that the majority of respondents considered their households to be *adequately prepared* to *poorly prepared* for dealing with problems caused by natural hazards. Households generally considered themselves best prepared for severe weather and least prepared for tidal waves and coastal erosion. Households considered themselves to be less well prepared than emergency services (Table 21) to address these natural hazards.

Table 24
Groups Indicating Better Household Preparedness

	Gender	Region
Landslides and slips	Males (n=836)**	
Severe weather		Southern (n=831)*
Flooding	Males (n=827)**	
Earthquakes		Central (n=818)***

Note: T tests established differences between genders and ANOVA (sig of F) established differences between means for region. Significance levels; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

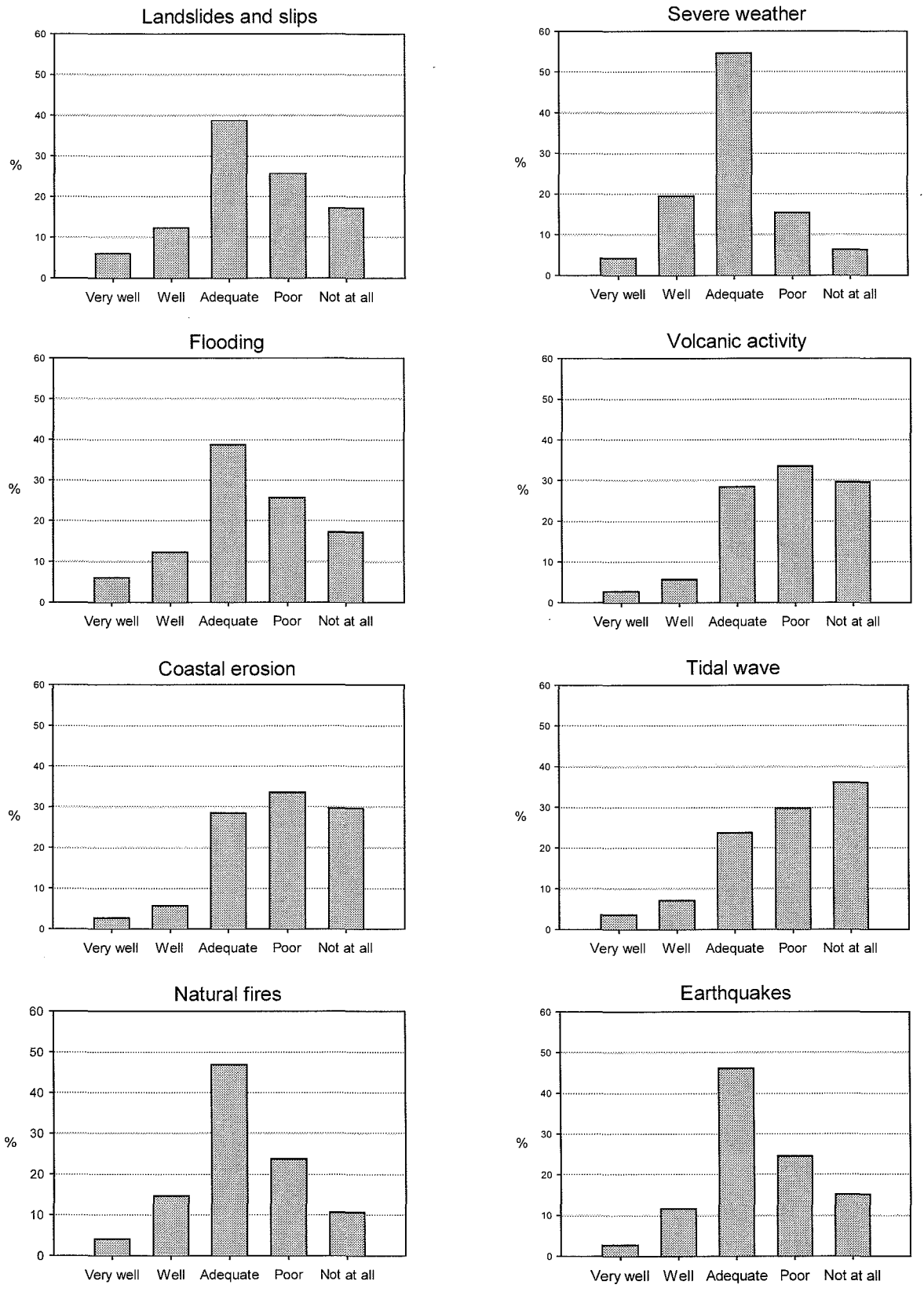


Figure 13
Households' Perceived Degree of Preparedness for Environmental Hazards

Compared with females, males judged their households to be better prepared for landslides and slips and flooding. People inhabiting the southern region evaluated themselves as best prepared for severe weather, whereas those in the central region rated their earthquake preparedness the highest.

Grouping of all measures in Table 24 provided two groups (n= 670) comprising well prepared (44.8%) and poorly prepared (55.2%) ratings.

Significant differences (chi square 16.29, df 6, $p < 0.05$, $n = 640$) between these groups were found for industry. Disproportionately more respondents in resource-based industries (61.6%) were in the group who considered they were well prepared. In comparison, fewer respondents in communication and financial services (35.2%) were in this group.

Proportionately more males (49.2%) than females (41.2%) were also found to be in the group reporting they were well prepared (chi square 4.25, df 1, $p < 0.05$, $n = 668$).

Self-assessed knowledge of the environment was better for those who were in the well prepared group (t test $p < 0.001$).

Chapter 4
An Overview of Some Key Resource Areas

4.1 Introduction

Correlation analysis (significance level $p < 0.05$) revealed that assessments were generally aligned. For example, where the state of an aspect was evaluated to be poor, its availability or amount was usually perceived to be low and its condition was judged to have changed for the worse in the last five years. In addition, these perceptions were commonly aligned to perceptions that current management is poor, that management was worse compared to five years ago, and to the view that more should be spent on the particular aspect of the environment. These relationships are reported in Appendix 2. On this basis it was decided to summarise findings from the key resource areas covered in section 3.2 and these are presented below.

4.2 The Natural Environment in Towns and Cities

New Zealand, in common with other 'developed' countries, has most of its population dwelling in urban environments. Although there is no national set of urban environmental indicators, it is clear that New Zealanders consider the urban setting is important for social and aesthetic reasons. This is clearly manifested in Christchurch, where people take great pride in the urban environment and have christened Christchurch the Garden City. From the survey (Figure 14) it is clear that most people think the natural environment in towns and cities is adequate to good and that the availability of parks and reserves is moderate to high. All other 'indicators' in this set also scored positively, unlike any other resource or environment examined. There are highly significant ($p < 0.001$) correlations between responses to all questions (Appendix 2 - Table A), e.g., people who think the quality or condition of urban natural environments is good also consider current management is good ($r = 0.402$, $p < 0.001$).

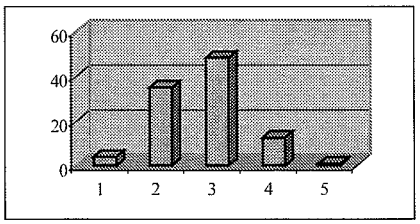
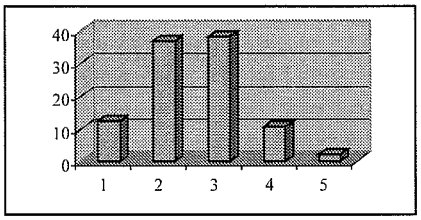
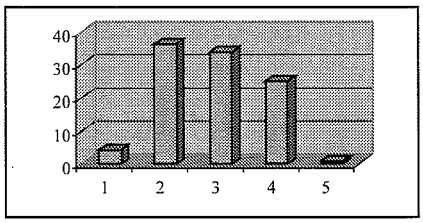
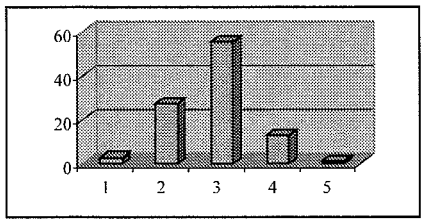
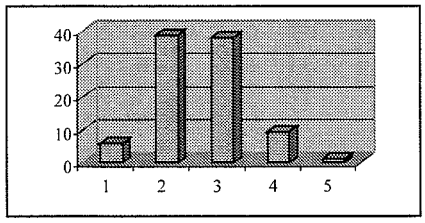
Question	Likert scale category	
Q2: Quality or condition of the natural environment in towns and cities ... Mean Likert score = 2.71; N= 842 (excludes don't knows); Don't know = 14	1= very good 2= good 3= adequate 4= bad 5= very bad	
Q3: Availability of parks and reserves in towns and cities is... Mean Likert score = 2.53; N= 840 (excludes don't knows); Don't know = 16	1= very high 2= high 3= moderate 4= low 5= very low	
Q4: Condition of the natural environment in towns and cities compared to 5 years ago Mean Likert score = 2.82; N= 817 (excludes don't knows); Don't know = 36	1= much better 2= better 3= no change 4= worse 5= much worse	
Q6: Currently in NZ the natural environment in towns and cities is ... Mean Likert score = 2.82; N= 825 (excludes don't knows); Don't know = 27	1= very well managed 2= well managed 3= adequately managed 4= poorly managed 5= very poorly managed	
Q7: Compared to 5 yrs ago management of NZ's natural environment in towns and cities is ... Mean Likert score = 2.59; N= 785 (excludes don't knows); Don't know = 62	1= much better 2= better 3= the same 4= worse 5= much worse	

Figure 14
People's Perception (% response by category) of the Status and Management of the Natural Environment in Towns and Cities in NZ

4.3 Non-Urban Natural Environments

Most people think the natural environment outside towns and cities is good to very good (Figure 15). While most people think no change has occurred in the last five years, around 25% think it has improved and 20% think it is worse. Management is viewed as adequate to good, with 30% thinking there has been an improvement over the last five years.

There are highly significant ($p < 0.001$) correlations between responses to all questions (Appendix 2 - Table B), e.g., those who think the state of the non-urban natural environment is adequate to good also think current management is adequate to well managed ($r = 0.415$, $p < 0.001$) and that management is the same or has improved over the last 5 years ($r = 0.493$, $p < 0.001$).

Over half of the sample think the condition of the non-urban natural environment is good to very good - this perception is not backed up by monitoring data which indicates that habitat loss, species loss and deterioration in rural water quality, amongst other issues, are matters of concern (see MfE 1997).

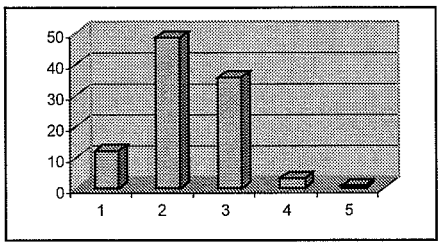
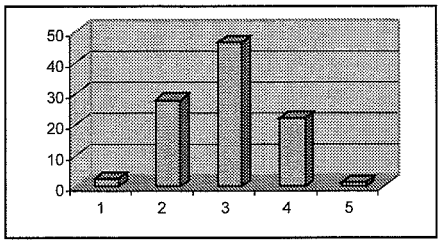
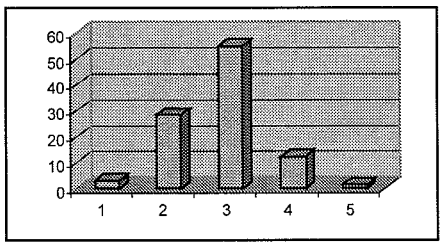
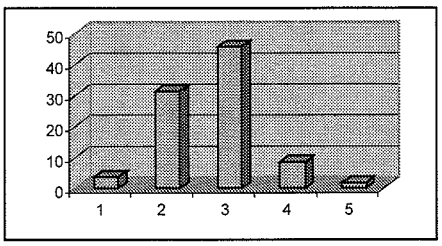
Question	Likert scale category	
Q2: Quality or condition of natural environments other than those in towns and cities Mean Likert score = 2.33; N= 842 (excludes don't knows); Don't know = 24	1= very good 2= good 3= adequate 4= bad 5= very bad	
Q4: State of natural environments other than those in towns and cities compared to 5 years ago Mean Likert score = 2.92; N= 785 (excludes don't knows); Don't know = 67	1= much better 2= better 3= no change 4= worse 5= much worse	
Q6: Currently in NZ the natural environments other than those in towns and cities are … Mean Likert score = 2.80; N= 782 (excludes don't knows); Don't know = 69	1= very well managed 2= well managed 3= adequately managed 4= poorly managed 5= very poorly managed	
Q7: Compared to 5 yrs ago management of NZ's natural environments other than those in towns and cities is … Mean Likert score = 2.70; N= 761 (excludes don't knows); Don't know = 83	1= much better 2= better 3= the same 4= worse 5= much worse	

Figure 15
People's Perception (% response by category) of the Status and Management of Non-Urban Natural Environments

4.4 Air

Air quality is an important issue in the Auckland region and in Christchurch and there is frequent discussion about the ozone layer and climate change gases generally. From the survey it is clear that New Zealanders believe air quality is good, but the majority of respondents believed its condition has declined in the last 5 years (see Figure 16). Management is deemed to be adequate and is seen to be most appropriately handled by local and central government. The perceived deterioration in air quality is matched by a demand for more expenditure on air quality. There are highly significant ($p < 0.001$) correlations between responses to all questions, e.g., people who thought there was a deterioration in air quality over the last 5 years also thought there should be an increase in expenditure on air quality (see Appendix 2 - Table C).

MfE (1997: 6:24) reported that "as with suspended particulate matter, smoke levels around the country have also shown some improvements over the last 10 to 20 years. In Christchurch and Dunedin, for example, wintertime levels of smoke have decreased - significantly in the case of Christchurch - especially over the last decade". Further analysis of the available information from MfE (1997) indicates that in general air quality in New Zealand is good. Why respondents perceive a decline in air quality over the last five years is therefore unknown.

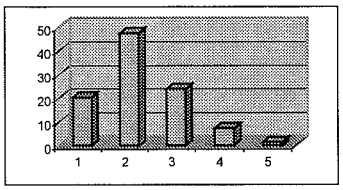
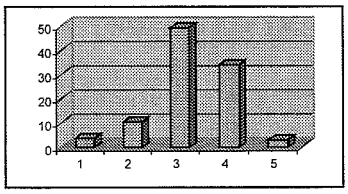
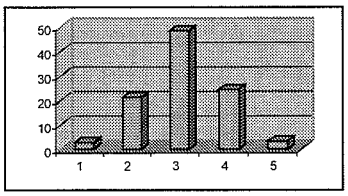
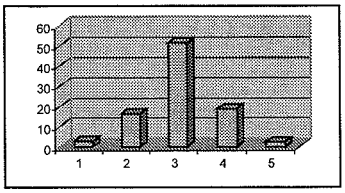
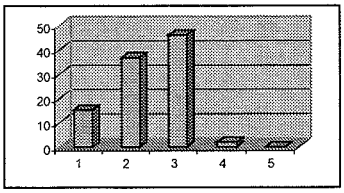
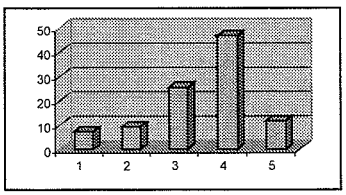
Question	Likert scale category	
Q2: Quality or condition of air Mean Likert score = 2.22 N= 857 (excludes don't knows); Don't know = 9	1= very good; 2= good 3= adequate; 4= bad 5= very bad	
Q4: Condition of air compared to 5 years ago Mean Likert score = 3.22 N= 814 (excludes don't knows); Don't know = 32	1= much better; 2= better 3= no change 4= worse 5= much worse	
Q6: Currently in NZ air quality is … Mean Likert score = 3.03 N= 804 (excludes don't knows); Don't know = 47	1= very well managed; 2= well managed 3= adequately managed 4= poorly managed 5= very poorly managed	
Q7: Compared to 5 yrs ago management of NZ's air quality is … Mean Likert score = 3.01 N= 772 (excludes don't knows); Don't know = 71	1= much better; 2= better 3= the same 4= worse 5= much worse	
Q10: If total govt spending was the same as now then in terms of air quality we should … Mean Likert score = 2.35 N= 865 (there was no *don't know* option for this question)	1= spend far more; 2= spend more 3= no change 4= spend less 5= Spend far less	
Q9: The best managers of air quality are … Non-continuous response scale implies Likert score is meaningless; N= 847 (there was no *don't know* option for this question)	1= Individuals & firms; 2= Individuals, firms, iwi & communities; 3= Individuals, communities, iwi & govt; 4= Local and central govt; 5= Central govt	

Figure 16
People's Perception (% response by category) of the Status and Management of Air in NZ

4.5 Native Land and Freshwater Plants and Animals

Conservation of New Zealand's native plants and animals is one of the country's main environmental issues (DoC and MfE 2000). New Zealand has a diverse flora and fauna with many endangered plants and animals, some of which, e.g., kakapo and kiwi, are national symbols and attract high levels of media interest. From the survey it is clear New Zealanders believe the quality or condition of native land and freshwater plants and animals to be adequate to good, although there is a perceived decline in this position over the last five years (see Figure 17). Management is deemed to be good and improving and is seen to be most appropriately handled by perhaps a combination of individuals, communities, iwi and local and central government.

There are highly significant ($p < 0.001$) correlations between responses to most questions (Appendix 2 - Table D). The notable exceptions occur in the area of changed expenditure demands where there is weak to no correlations indicating an erratic pattern of responses to this set of questions. This discrepancy might be caused by the wording change in this question, i.e., from 'native plants and animals' to 'endangered species'. The wording was changed because this is often the phrase used in media and other discussions of species management when proposed expenditure changes are debated. The changed wording might have led to a different pattern of responses in the expenditure question to those in other questions.

The view that the condition of New Zealand's native plants and animals is adequate to good is surprising. This is not the case and is borne out by the contents of the National Biodiversity Strategy which notes that many ecological processes have been damaged and that there are over 1000 threatened species in New Zealand (DoC and MfE 2000).

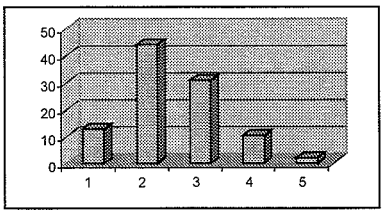
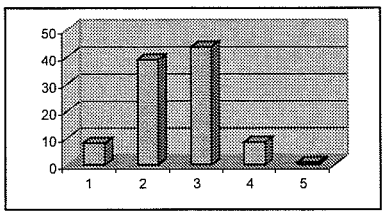
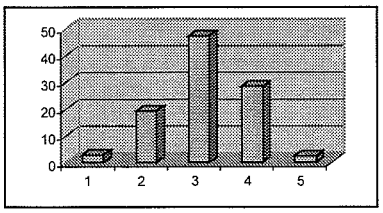
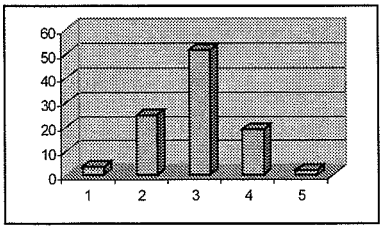
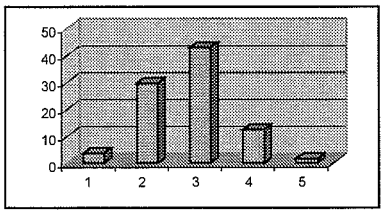
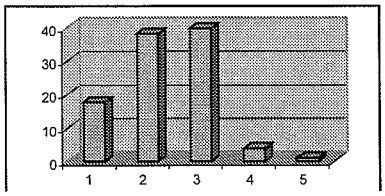
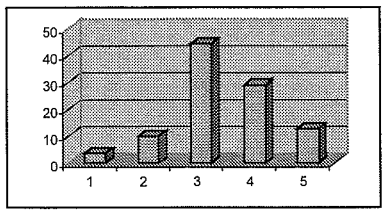
Question	Likert scale category	
Q2: Quality or condition of native land and freshwater plants and animals Mean Likert score = 2.44; N= 846 (excludes don't knows); Don't know = 24	1= very good 2= good 3= adequate 4= bad 5= very bad	
Q3: Diversity of native land and freshwater plants and animals Mean Likert score = 2.55; N= 781 (excludes don't knows); Don't know = 60	1= very high 2= high 3= moderate 4= low 5= very low	
Q4: Condition of native land and freshwater plants and animals compared to 5 years ago Mean Likert score = 3.08; N= 763 (excludes don't knows); Don't know = 90	1= much better 2= better 3= no change 4= worse 5= much worse	
Q6: Currently in NZ the native land and freshwater plants and animals are … Mean Likert score = 2.90; N= 775 (excludes don't knows); Don't know = 74	1= very well managed 2= well managed 3= adequately managed 4= poorly managed 5= very poorly managed	
Q7: Compared to 5 yrs ago management of NZ's native plants and animals is … Mean Likert score = 2.77; N= 761 (excludes don't knows); Don't know = 82	1= much better 2= better 3= the same 4= worse 5= much worse	
Q10: If total government spending was the same as now then in terms of endangered species we should … Mean Likert score = 2.33; N= 863 (there was no *don't know* option for this question)	1= spend far more 2= spend more 3= no change 4= spend less 5= Spend far less	
Q9: The best managers of native plants and animals are … Non-continuous response scale implies Likert score is meaningless; N= 846 (there was no *don't know* option for this question)	1= Individuals & firms; 2= Individuals, firms, iwi & communities; 3= Individuals, communities, iwi & govt; 4= Local and central govt; 5= Central govt	

Figure 17

People's Perception (% response by category) of the Status and Management of Native Land and Freshwater Plants and Animals in NZ

4.6 Native Bush and Forests

The management of native bush and forests is an ongoing issue in New Zealand, e.g., sustainable logging of indigenous forests and the future of the South Island Landless Natives Act forests in Southland. It is clear from the survey that most New Zealanders believe the quality, condition and quantity of native bush and forests are adequate to very good, and that the condition has hardly changed in the last 5 years (see Figure 18). Management is considered adequate to well managed and has improved over the past five years. Forest management is viewed as best done by a mix of individuals, communities, iwi and government. While most people wanted no change in expenditure, about 35% thought more should be spent on native bush and forests.

There are highly significant correlations ($p < 0.001$) for all but two relationships and both of these concern the changed expenditure question (Appendix 2 - Table E). This divergence is notable in terms of whether respondents wanted a change in the allocation of native bush and forests expenditure, perhaps indicating that although many were happy about the direction of native bush and forests management they nevertheless considered expenditure should remain the same or increase - why this should be the case is unknown, but it may be related to the long history of the forest conservation movement in New Zealand.

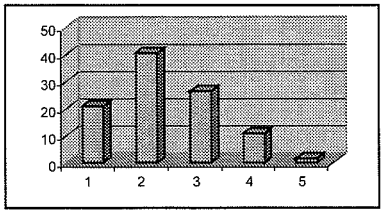
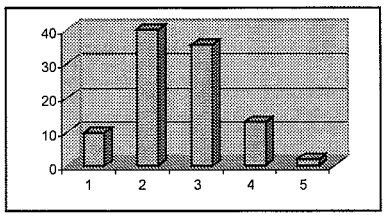
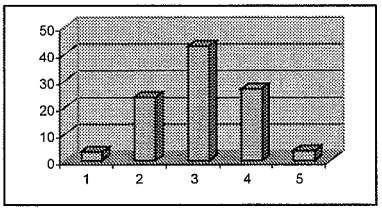
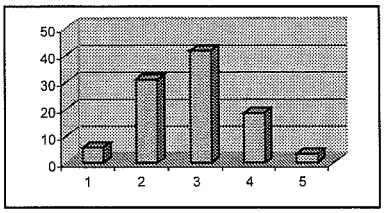
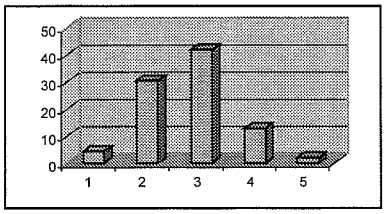
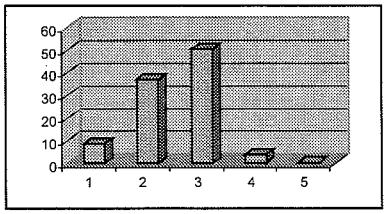
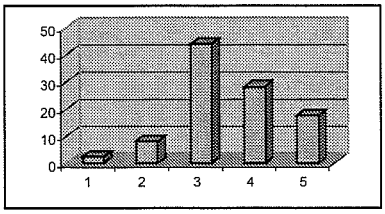
Question	Likert scale category	
Q2: Quality or condition of native bush and forests Mean Likert score = 2.32; N= 856 (excludes don't knows); Don't know = 14	1= very good 2= good 3= adequate 4= bad 5= very bad	
Q3: Quantity of native bush and forest Mean Likert score = 2.58; N= 834 (excludes don't knows); Don't know = 16	1= very high 2= high 3= moderate 4= low 5= very low	
Q4: Condition of native bush and forest compared to 5 years ago Mean Likert score = 3.04; N= 787 (excludes don't knows); Don't know = 62	1= much better 2= better 3= no change 4= worse 5= much worse	
Q6: Currently in NZ the native bush and forest are … Mean Likert score = 2.82; N= 808 (excludes don't knows); Don't know = 42	1= very well managed 2= well managed 3= adequately managed 4= poorly managed 5= very poorly managed	
Q7: Compared to 5 yrs ago management of NZ's native bush and forest is … Mean Likert score = 2.76; N= 770 (excludes don't knows); Don't know = 73	1= much better 2= better 3= the same 4= worse 5= much worse	
Q10: If total government spending was the same as now then in terms of native bush and forest we should … Mean Likert score = 2.51 ; N= 859 (there was no *don't know* option for this question)	1= spend far more 2= spend more 3= no change 4= spend less 5= Spend far less	
Q9: The best managers of native bush and forests are … Non-continuous response scale implies Likert score is meaningless; N= 850 (there was no *don't know* option for this question)	1= Individuals & firms; 2= Individuals, firms, iwi & communities; 3= Individuals, communities, iwi & govt; 4= Local and central govt; 5= Central govt	

Figure 18

People's Perception (% response by category) of the Status and Management of Native Bush and Forests in NZ

4.7 Soils

Soils are the foundation which our primary industry based economy relies upon. From the survey it is clear most New Zealanders believe the quality or condition of soils to be good, with little change having occurred over the last five years (see Figure 19). Management is deemed to be good but unchanged over the past few years and is seen to be most appropriately handled by a combination of central and local government with input from individuals, communities and iwi. There is only slight support for extra funding to go into management of our soils.

There are highly significant ($p < 0.001$) correlations between all but one response to the core questions in this area (Appendix 2 - Table F). Relationships between preferences for who best to manage soils and perceptions of current management were tested and found to be significant (ANOVA Sig of F, $p < 0.01$). This meant people who thought soils were most poorly managed were also more likely to select individuals and firms to manage soils, whereas people who considered soils to be well managed thought the combination of individuals, communities, iwi and government should manage soils. There was a similar finding for the relationships between preference for who best to manage soils and perceived change in management over the last five years (ANOVA Sig of F, $p < 0.01$).

Soils are often the unseen resource that receives little or no media attention and/or public interest. It is clear from MfE (1997) and from soil experts (e.g., Dr Phil Tonkin, Senior Lecturer, Lincoln University, pers. comm. 2001) that all is not at all well with our soils. They are often over-exploited and productivity is sustained through top dressing as basic structural components begin to break down in many areas. MfE (1997: 8:90) concludes that:

> "The issues of more immediate concern to land users and local authorities are the serious problems caused by soil and water degradation. Although significant degradation of both soil and water is confined to only a few regions ... moderate impacts occur in all regions and at least one form of significant impact occurs in several regions."

This is another area where public perception is distant from research and monitoring findings.

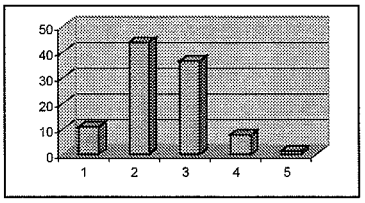
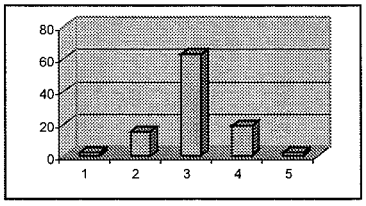
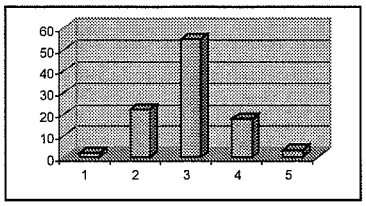
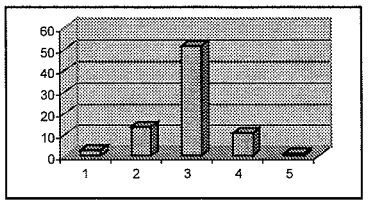
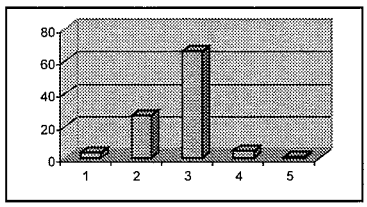
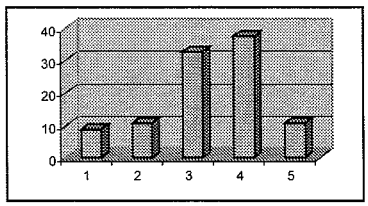
Question	Likert scale category	
Q2: Quality or condition of soils Mean Likert score = 2.45; N= 864 (excludes don't knows); Don't know = 14	1= very good 2= good 3= adequate 4= bad 5= very bad	
Q4: Condition of soils compared to 5 years ago Mean Likert score = 3.05; N= 681 (excludes don't knows); Don't know = 70	1= much better 2= better 3= no change 4= worse 5= much worse	
Q6: Currently in NZ the soils are … Mean Likert score = 2.98; N= 690 (excludes don't knows); Don't know = 157	1= very well managed 2= well managed 3= adequately managed 4= poorly managed 5= very poorly managed	
Q7: Compared to 5 yrs ago management of NZ's soils is … Mean Likert score = 2.93; N= 660 (excludes don't knows); Don't know = 180	1= much better 2= better 3= the same 4= worse 5= much worse	
Q10: If total government spending was the same as now then in terms of soils we should … Mean Likert score = 2.73; N= 849 (there was no *don't know* option for this question)	1= spend far more 2= spend more 3= no change 4= spend less 5= Spend far less	
Q9: The best managers of soils are … Non-continuous response scale implies Likert score is meaningless; N= 838 (there was no *don't know* option for this question)	1= Individuals & firms; 2= Individuals, firms, iwi & communities; 3= Individuals, communities, iwi & govt; 4= Local and central govt; 5= Central govt	

Figure 19
People's Perception (% response by category) of the Status and Management of Soils in NZ

4.8 Coastal Waters and Beaches

It is clear most New Zealanders believe the quality or condition of the coastal environment is good, although a substantial proportion of respondents believe there has been a decline in this condition which has occurred over the last five years (see Figure 20). Management is generally considered to be good and its quality unchanged over the past few years. Management is seen to be most appropriately handled by a combination of central and local government with input also from individuals, communities and iwi. There is a substantial number of people who would support extra funding for coastal management.

There are highly significant ($p < 0.001$) correlations between all but one response to the core questions in this area, i.e., (Appendix 2 - Table G). Relationships between preferences for who best to manage beaches and coastal waters and perceptions of current management were tested and found to be significant (ANOVA Sig of F, $p < 0.01$). This meant people who generally thought beaches and coastal waters were poorly managed, were also more likely to select individuals, firms, iwi and communities to manage this area. By contrast, people who considered beaches and coastal waters to be well managed thought the combination of individuals, communities, iwi and government should manage beaches and coastal waters. There was a similar finding for the relationships between preference for who best to manage beaches and coastal waters and perceived change in management over the last five years (ANOVA Sig of F, $p < 0.01$).

There are no real surprises in terms of these responses. Perhaps of concern to policy makers, given the existence of a clear coastal management framework, which has been in place since 1991, is the perceived decline in environmental quality over the last five years. While MfE (1997: 7: 88) notes that point source discharges have become better managed over the last 20-30 years there may be other factors influencing public concern in this area.

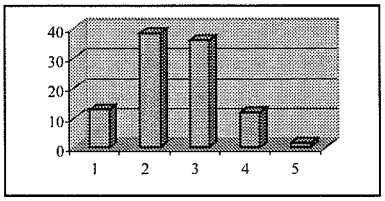
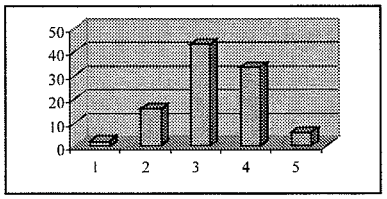
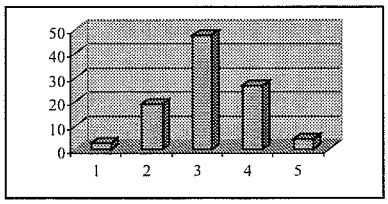
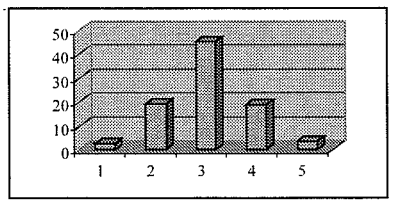
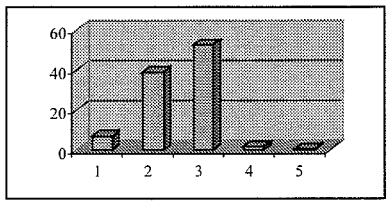
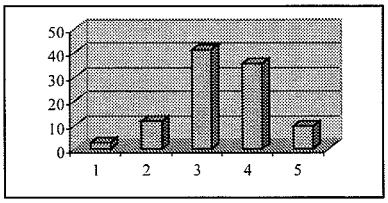
Question	Likert scale category	
Q2: Quality or condition of coastal waters and beaches Mean Likert score = 2.51; N= 852 (excludes don't knows); Don't know = 42	1= very good 2= good 3= adequate 4= bad 5= very bad	
Q4: Condition of coastal waters and beaches compared to 5 years ago Mean Likert score = 3.25; N= 787 (excludes don't knows); Don't know = 65	1= much better 2= better 3= no change 4= worse 5= much worse	
Q6: Currently in NZ the coastal waters and beaches are ... Mean Likert score = 3.11; N= 788 (excludes don't knows); Don't know = 58	1= very well managed 2= well managed 3= adequately managed 4= poorly managed 5= very poorly managed	
Q7: Compared to 5 yrs ago management of NZ's coastal waters and beaches is ... Mean Likert score = 3.01; N= 757 (excludes don't knows); Don't know = 88	1= much better 2= better 3= the same 4= worse 5= much worse	
Q10: If total government spending was the same as now then in terms of coastal waters and beaches we should ... Mean Likert score = 2.50; N= 861 (there was no *don't know* option for this question)	1= spend far more 2= spend more 3= no change 4= spend less 5= Spend far less	
Q9: The best managers of coastal waters and beaches are ... Non-continuous response scale implies Likert score is meaningless; N= 849 (there was no *don't know* option for this question)	1= Individuals & firms; 2= Individuals, firms, iwi & communities; 3= Individuals, communities, iwi & govt; 4= Local and central govt; 5= Central govt	

Figure 20
People's Perception (% response by category) of the Status and Management of Coastal Waters and Beaches in NZ

4.9 Marine Fisheries

Most New Zealanders believe the quality, condition and quantity of marine fisheries are adequate to good, but that the condition has declined markedly in the last 5 years (see Figure 21). Management is deemed adequate to poor and is seen to be most appropriately handled by a broad array of people from individuals, communities, iwi, local and central government. While most people wanted no change in expenditure, over 20% thought more should be spent.

There are highly significant ($p < 0.001$) correlations between responses to most, but not all questions (Appendix 2 - Table H). This divergence is most notable in terms of whether respondents wanted a change in the allocation of marine fisheries expenditure, perhaps indicating that although many expressed concern about the direction of marine fisheries' stocks they nevertheless considered expenditure should remain the same.

Questions about the sustainable management of marine fisheries are often topical in New Zealand. While internationally NZ is viewed as leading the world in terms of many aspects of fisheries management (see Hughey 1998 for example), within the country there is much debate about the direction of management. The Ministry of Fisheries has been consulting with the NZ public about what role recreational fishers should have in fisheries management. In addition there are new moves to establish the framework for integrated fisheries plans. Findings from this survey indicate that New Zealanders are divided about who should manage fisheries. It seems clear though, that an approach, which maintains a role for central government while involving individuals, communities and iwi, would find favour with most people. Also notable are the numbers of people who expressed 'don't knows' for questions 3, 4, 6 and 7, the proportions ranging from roughly 15-23% of respondents. These figures should concern policy makers who rely on the public input for informed decision making.

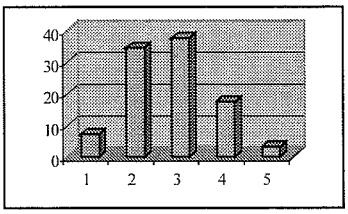
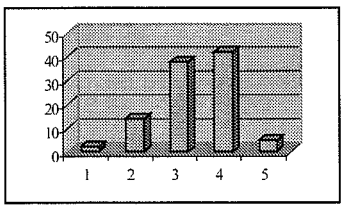
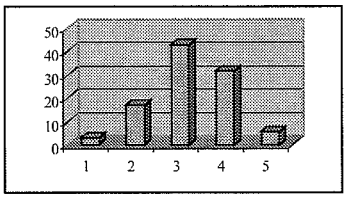
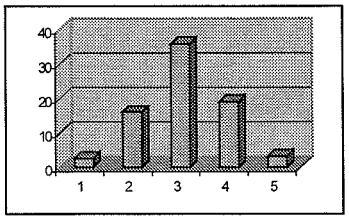
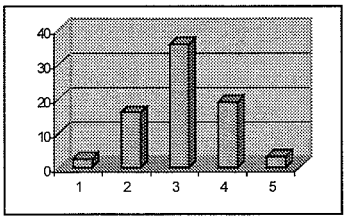
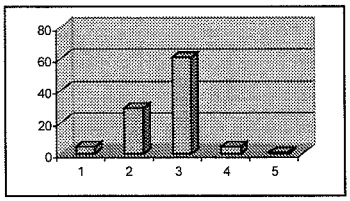
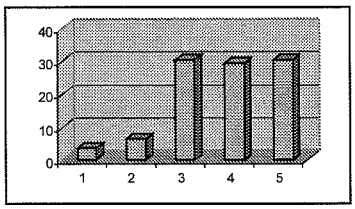
Question	Likert scale category	
Q2: Quality or condition of marine fisheries Mean Likert score = 2.75; N= 765 (excludes don't knows); Don't know = 19	1= very good 2= good 3= adequate 4= bad 5= very bad	
Q3: Quantity of marine fisheries Mean Likert score = 2.84; N= 719 (excludes don't knows); Don't know = 127	1= very high 2= high 3= moderate 4= low 5= very low	
Q4: Condition of marine fisheries compared to 5 years ago Mean Likert score = 3.33; N= 653 (excludes don't knows); Don't know = 197	1= much better 2= better 3= no change 4= worse 5= much worse	
Q6: Currently in NZ the marine fisheries are … Mean Likert score = 3.2; N= 658 (excludes don't knows); Don't know = 190	1= very well managed; 2= well managed 3= adequately managed 4= poorly managed 5= very poorly managed	
Q7: Compared to 5 yrs ago management of NZ's marine fisheries is … Mean Likert score = 3.06; N= 644 (excludes don't knows); Don't know = 199	1= much better; 2= better 3= the same 4= worse 5= much worse	
Q10: If total government spending was the same as now then in terms of marine fisheries we should … Mean Likert score = 2.68; N= 853 (there was no *don't know* option for this question)	1= spend far more; 2= spend more 3= no change 4= spend less 5= Spend far less	
Q9: The best managers of marine fisheries are … Non-continuous response scale implies Likert score is meaningless; N=835 (there was no *don't know* option for this question)	1= Individuals & firms; 2= Individuals, firms, iwi & communities; 3= Individuals, communities, iwi & govt; 4= Local and central govt; 5= Central govt	

Figure 21
People's Perception (% response by category) of the Status and Management of Marine Fisheries in NZ

4.10 Fresh Water

Most of those surveyed believe the quality or condition and abundance of fresh water is adequate to good, however there seems to have been worsening of water quality over the last five years (see Figure 22). Management is deemed to be adequate and largely unchanged over the past few years and is seen to be most appropriately handled by a combination of central and local government with input also from individuals, communities and iwi. There is strong support for extra funding to go into management of our fresh waters.

There are highly significant ($p < 0.001$) correlations between all responses to the core questions in this area (Appendix 2 - Table I), e.g., most of those who think the quality or condition of freshwater is good also think management is adequate to good and that more should be spend on freshwater management.

MfE (1997: 7: 88) concluded that:

> "Water quality is generally high around the coast, in deep lakes, and in the headwaters of most rivers, and in many cases this is maintained into lowland areas. However, water quality deteriorates in streams, rivers and lakes which drain agricultural catchments, with agricultural run-off causing elevated nutrient and sediment loads."

With regard to this conclusion the survey findings are equivocal, with most people thinking water quality or condition to be adequate or good. More analysis would be required to determine if there was a rural-urban difference of perception here.

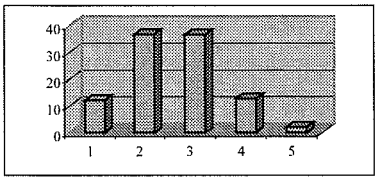
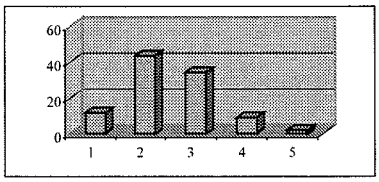
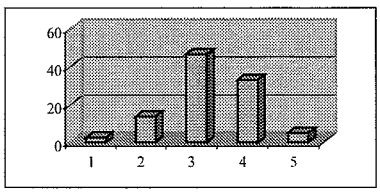
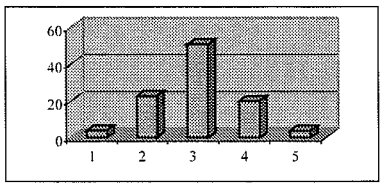
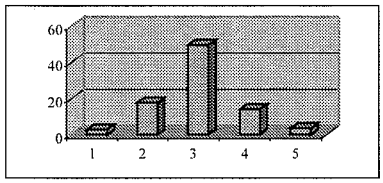
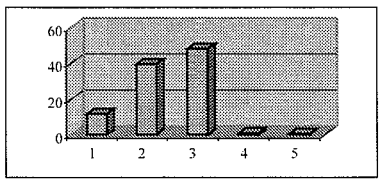
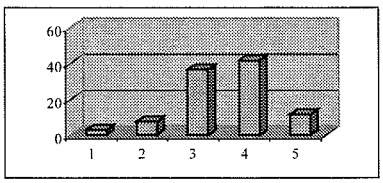
Question	Likert scale category	
Q2: Quality or condition of fresh water Mean Likert score = 2.56; N= 842 (excludes don't knows); Don't know = 33	1= very good 2= good 3= adequate 4= bad 5= very bad	
Q3: Amount of fresh water Mean Likert score = 2.46; N= 809 (excludes don't knows); Don't know = 42	1= very high 2= high 3= moderate 4= low 5= very low	
Q4: Condition of fresh water quality compared to 5 years ago Mean Likert score = 3.24; N= 775 (excludes don't knows); Don't know = 68	1= much better 2= better 3= no change 4= worse 5= much worse	
Q6: Currently in NZ the fresh waters are … Mean Likert score = 2.97; N= 757 (excludes don't knows); Don't know = 89	1= very well managed 2= well managed 3= adequately managed 4= poorly managed 5= very poorly managed	
Q7: Compared to 5 yrs ago management of NZ's fresh water is … Mean Likert score = 2.97; N= 730 (excludes don't knows); Don't know = 107	1= much better 2= better 3= the same 4= worse 5= much worse	
Q10: If total government spending was the same as now then in terms of fresh water we should … Mean Likert score = 2.39; N= 860 (there was no *don't know* option for this question)	1= spend far more 2= spend more 3= no change 4= spend less 5= Spend far less	
Q9: The best managers of fresh water are … Non-continuous response scale implies Likert score is meaningless; N= 850 (there was no *don't know* option for this question)	1= Individuals & firms; 2= Individuals, firms, iwi & communities; 3= Individuals, communities, iwi & govt; 4= Local and central govt; 5= Central govt	

Figure 22
People's Perception (% response by category) of the Status and Management of Fresh Water in NZ

4.11 Wetlands

New Zealanders generally believe the quality or condition of wetlands is adequate to good, and while some think the extent of wetlands is low and some high, the greatest proportion think we have a moderate area of wetlands (note however that there is a large 'don't know' response to some of the wetland questions). From the responses there seems to be no perceived change in wetland status over the last five years (see Figure 23). Management is deemed to be adequate and largely unchanged over the past few years and is seen to be most appropriately handled by a combination of central and local government with input also from individuals, communities and iwi. There is some support for extra funding to go into management of wetlands but most think there should be no change in expenditure.

There are highly significant ($p < 0.001$) correlations between all responses to the core questions in this area (Appendix 2 - Table J). For example, those who think the condition of wetlands has not changed over the last 5 years also tend to believe there should be no change in government spending on wetlands ($r = -0.161$, $p < 0.001$).

It is somewhat surprising that most people think there is a moderate area of wetlands in New Zealand when in fact the area of wetlands is hugely reduced over former times, i.e., an estimated 10% of the pre human extent of wetlands remains in New Zealand (MfE 1997).

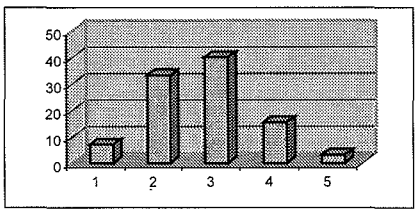
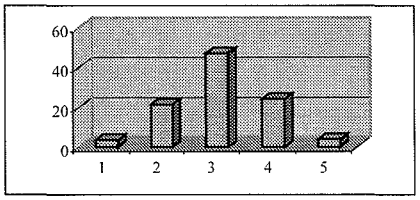
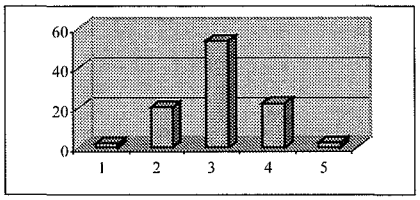
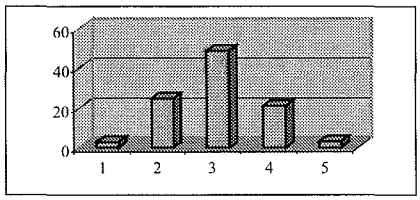
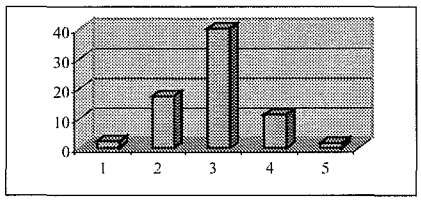
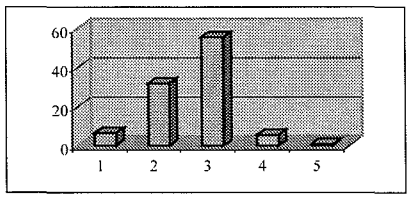
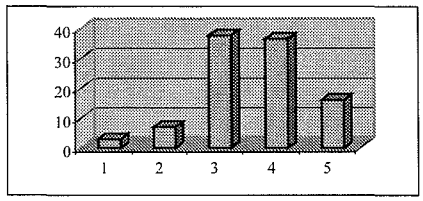
Question	Likert scale category	
Q2: Quality or condition of wetlands Mean Likert score = 2.74; N= 735 (excludes don't knows); Don't know = 22	1= very good 2= good 3= adequate 4= bad 5= very bad	
Q3: Quantity of wetlands Mean Likert score = 3.03; N= 672 (excludes don't knows); Don't know = 180	1= very high 2= high 3= moderate 4= low 5= very low	
Q4: Condition of wetlands compared to 5 years ago Mean Likert score = 3.20; N= 601 (excludes don't knows); Don't know = 239	1= much better 2= better 3= no change 4= worse 5= much worse	
Q6: Currently in NZ the wetlands are ... Mean Likert score = 2.97; N= 620 (excludes don't knows); Don't know = 222	1= very well managed 2= well managed 3= adequately managed 4= poorly managed 5= very poorly managed	
Q7: Compared to 5 yrs ago management of NZ's wetlands is ... Mean Likert score = 2.89; N= 607 (excludes don't knows); Don't know = 234	1= much better 2= better 3= the same 4= worse 5= much worse	
Q10: If total government spending was the same as now then in terms of wetlands we should ... Mean Likert score = 2.62; N= 851 (there was no *don't know* option for this question)	1= spend far more 2= spend more 3= no change 4= spend less 5= Spend far less	
Q9: The best managers of wetlands are ... Non-continuous response scale implies Likert score is meaningless; N= 824 (there was no *don't know* option for this question)	1= Individuals & firms; 2= Individuals, firms, iwi & communities; 3= Individuals, communities, iwi & govt; 4= Local and central govt; 5= Central govt	

Figure 23
People's Perception (% response by category) of the Status and Management of Wetlands in NZ

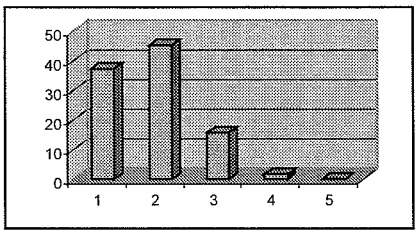
4.12 New Zealand's Natural Environment Compared to Other Developed Countries

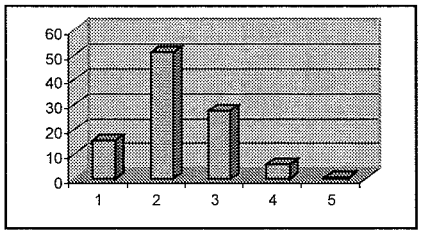
Most people think the natural environment in NZ compared to that of other developed countries is good to very good (Figure 24). Furthermore over 60% think the condition of the NZ environment has become better or much better compared to that of other developed countries. It follows that respondents thought management is better and improved compared to these other countries.

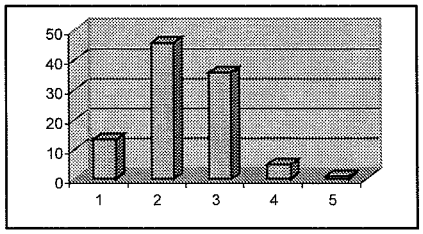
There are highly significant ($p < 0.001$) correlations between all responses to the core questions in this area (Appendix 2 - Table K). For example those people who think the quality of condition of NZ's natural environment compared to other developed countries is good to very good also think the state of NZ's environment, its current management, and management compared to 5 years ago, are also improved.

Despite Massey University's recent findings that 42% of people do not believe New Zealand is clean and green (Massey University 2001), there is a general perception that this is indeed the case. Findings from this survey are not surprising and reinforce the view that New Zealanders believe they live in a clean and green environment and that others do not.

Question	Likert scale category
Q2: Quality or condition of the natural environment in NZ compared to other developed countries Mean Likert score = 1.83; N= 821 (excludes don't knows); Don't know = 15	1= very good 2= good 3= adequate 4= bad 5= very bad
Q4: Condition of the natural environment in NZ compared to other developed countries compared to 5 years ago Mean Likert score = 2.26; N= 762 (excludes don't knows); Don't know = 95	1= much better 2= better 3= no change 4= worse 5= much worse
Q6: Currently the natural environment in NZ compared to other developed countries is … Mean Likert score = 2.35; N= 747 (excludes don't knows); Don't know = 105	1= very well managed 2= well managed 3= adequately managed 4= poorly managed 5= very poorly managed
Q7: Compared to 5 yrs ago management of the natural environment in NZ compared to other developed countries is … Mean Likert score = 2.33; N= 704 (excludes don't knows); Don't know = 139	1= much better 2= better 3= the same 4= worse 5= much worse







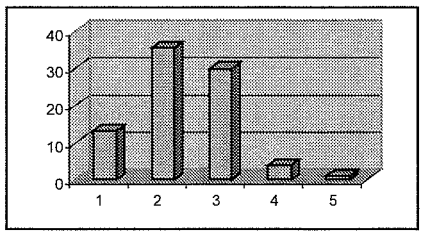


Figure 24
People's Perception (% response by category) of the Status and Management of the Natural Environment in NZ Compared to Other Developed Countries

Chapter 5
Overall Discussion and Conclusions

5.1 Main Findings

No other work that the authors are aware of has attempted to systematically determine perceptions of the state of the environment from a public survey, while attempting to apply the Pressure-State-Response model. Designing the survey around this model was not easy and one difficulty was in asking questions that made sense and would also contribute to the credibility of the study. The words 'state' and 'pressure' are sometimes difficult to articulate within survey questions. Nevertheless, attempts were made to develop appropriate wording and in most cases this seemed to work. As a consequence the results of the survey generally seem to be plausible. Given the large sample size, the high response rate and small margin of error, the results in this study provide an accurate representation of New Zealanders' perceptions of the environment. High numbers of respondents stated they lacked knowledge about some resources (soils, wetlands, marine reserves, oil and gas reserves), and their unwillingness to give uninformed responses should add credibility to the results presented.

A general finding from this report is that on average New Zealanders consider the state of their environment to be adequate to good. Many New Zealanders also still think the country is clean and green. While the environment overall and the urban environment in particular are thought of very highly, the same findings do not occur for a number of other resources. Notably the beach and coastal environment and marine fisheries are considered to have declined in condition in recent years.

New Zealand's management of the environment is not highly rated by survey respondents. From the environment issues questions (Table 9) respondents give the lowest ratings to management of farm effluent and runoff, and hazardous chemicals use and disposal. Questions about management of media reveal that respondents rate management of air quality, coastal water and beaches and marine fisheries lowest, and similarly give lowest ratings for the change in management of those resources over the last five years. Respondents with low education levels and low employment rates generally gave higher ratings for environment management than did other respondents.

Some interesting differences appear in respondent's preferences for who should manage sectors of the environment. While a combination of individuals, iwi, local and central government is acceptable for most parts of the environment, respondents judge marine reserves and marine fisheries should be managed by central government.

Pests and weeds, dumping of solid wastes, hazardous chemicals, sewage and stormwater are perceived to be significant cause of damage to many parts of the environment.

Desire for expenditure re-allocation was explored in an open way and respondent's choice in general is for more expenditure on education, health, law and order. Amongst the environment issues the public gave highest ratings to more expenditure on pests and weeds, endangered species, air quality and fresh water.

Seventy percent of New Zealanders report that they acted in an environment friendly way during the past year. Those actions generally involve low cost or effort. Less than thirty

percent of respondents commute regularly by public transport or restore or replant natural habitat.

New Zealand's preparedness for natural hazard events is generally perceived to be weak. Respondents rated lowly both emergency services and their own household's preparedness for a range of natural hazard events.

5.2 Discussion of Findings

Relative to many other countries it is probably true that the state of the New Zealand environment is adequate to good. However, relative to even a few decades ago the picture is much more complex, e.g.,

- the quantity and quality of fresh waters in many rural South Island streams and rivers has declined although it might have improved in the North Island (Bryce Johnson, National Director, Fish and Game New Zealand, pers. comm. 2001);

- while threatened and endangered species management has improved, the numbers of species considered threatened has increased and habitat loss continues (DoC and MfE 2000);

- air quality has declined in many areas (MfE 1997);

- the quality of water discharged into the coastal marine environment has probably improved (MfE 1997).

Overall judgments about the state of the NZ environment and trends in the state are not easy. Respondents to the survey appear to be aware of some of these divergent trends and gave differing ratings to the state of parts of the environment, their management and changes in management quality.

Is New Zealand clean and green? While this question was purposely not asked there is growing evidence that this is not strictly the case (see MfE 1997) and this is not widely recognised by members of the public. Perhaps the best examples of this from the survey are soil and fresh water where people tended to rate the state of these resources in New Zealand as good to adequate, when scientific measures indicate the state is worse than survey respondents believe (see MfE 1997). Conversely, for at least marine fisheries, it is possible their state is better than the perception held by the public. It is also surprising how high a rating New Zealanders give to the natural environment in towns and cities - it would be interesting to compare Christchurch, the Garden City data, to the rest of the country.

Where there is evidence of divergence between scientific measures of the state of the environment, and New Zealander's perceptions of its state, provision of more information to the public about the scientific state of the environment is needed. New Zealanders state they can identify causes of environment harm in many cases. Environment managers should consider whether those causes identified are the major factors and whether they can be tackled more vigorously. Similarly emergency services managers should read the judgements of the public reported in tables 21-24 and consider how to respond to those low ratings of preparedness for natural hazards events.

5.3 Further Research Opportunities

There is an extremely large data set from this survey and this report only covers the key findings. Examples of possible further research areas include:

- Inter island comparisons between resources and issues, or for some areas regional council or district council based analyses which could be used in council state of the environment reporting.

- Detailed examination of perceived state versus the scientific measures of state as contained in MfE (1997) or via the government's new Environmental Performance Indicators programme.

- Further analysis of responses could be completed to identify clusters of respondents whose perceptions of the state of the environment and environment management consistently differ from the mean.

Among the most interesting results in this study are the higher ratings for state of the environment provided by low income and unemployed people. Several explanations can be advanced for these results but further research is essential to determine the cause(s).

5.4 Areas for Survey Improvement

Many respondents wrote comments on their questionnaires that were extremely supportive of this research. Nevertheless there are areas for further improvement and these will be worked on for the 2002 survey, e.g.

- Is the five year reference point for change to have occurred, too short a time? Consideration will be given to increasing this to 10 or 20 years, although there are implications here for young respondents.

- How do members of the public form their perceptions about the environment and its management? Consideration will be given to asking questions about the role of news media, location and other influences on shaping perceptions.

5.5 Implications for Policy Makers

Some of the findings from this survey should prompt policy makers into action. For example:

- In terms of the marine environment it is clear the public considers the state of marine fisheries is only adequate, and that marine fisheries are not well managed. If these perceptions are not correct policy makers should inform the public of the facts.
- Respondents rate management of air quality, coastal water and beaches lowest, and similarly give lowest ratings for the change in management of those resources over the last five years. If these perceptions are not correct policy makers should inform the public of the facts.

- The public perceive air quality has declined in the last five years – is this is the case and if so what integrated approaches are policy makers taking to improve the situation?

- The public give the lowest ratings to management of farm effluent and runoff, and hazardous chemicals use and disposal. Policy makers should consider if policies are in place, or are needed to combat these problems.

- In terms of natural hazards the public think the authorities are poorly prepared, while even individuals are poorly prepared – perhaps more public awareness is required in this area.

References

Department of Conservation and Ministry for the Environment. 2000. The New Zealand Biodiversity Strategy – our chance to turn the tide. DoC and MfE, Wellington.

Gendall, P. J., Hosie, J. and Russell, D. (1993). New Zealanders' Attitudes to the Environment. International Social Survey Programme, Department of Marketing, Massey University, Palmerston North, New Zealand.

Heylen Research Centre (1993). Conservation and Recreation in New Zealand : a survey of public opinion. Heylen Research Centre and DoC, Wellington.

Hini, D., Gendall, P. and Kearns, Z. (1995). The Link Between Environmental Attitudes and Behaviour. Marketing Bulletin, 6: 22-31.

Hughey, K.F.D., Rixecker, S.S., Montgomery, R. and Bührs, T. (eds) (1998). New Zealand's State of the Environment Report: A Critical Response. Environmental Management and Design Division, Lincoln University.

Hughey, K.F.D., Cullen, R. and Kerr, G.N. (2000). Stakeholder groups in fisheries management. Marine Policy 24(2): 119-127.

Jones, E. M. and Dunlap R. E. (1992). The social bases of environmental concern: Have they changed over time? Rural Sociology 37(1): 28-47.

Massey University (2001). New Zealanders and the Environment. Department of Marketing, Massey University.

Ministry for the Environment (1997). The State of New Zealand's Environment. Wellington: MfE & GP Publications.

Organisation for Economic Co-Operation and Development (OECD) (1996). Environmental Performance Reviews. New Zealand. Paris: OECD.

Appendix 1
Demographic Profile of Respondents

Item	Freq.	%		Freq.	%
Sex (n=883)			**Region (n= 886)**		
Male	389	44.1	Northern (Auckland)	250	28.2
Female	494	55.9	Central (Wellington- Waikato)	370	41.4
			Southern (South Island)	266	30
Education (n=464)			**Current situation (n=626)**		
Attended primary school	37	4.2	Unemployed	31	3.5
High school no qualifications	161	18.4	Student	37	4.2
High school with qualifications	192	21.9	Retired	47	5.4
Trade certificate or equivalent	193	22	Home duties	181	20.6
Undergraduate	104	11.9	Unpaid voluntary work	81	9.2
diploma/certificate			Paid employment	19	2.2
Bachelors degree	120	13.7	Other	481	54.8
Postgraduate	69	7.9			
Industry (n=847)			**Income (n=820)**		
Resource based	114	13.7	< $10000	152	18.5
Manufacturing and transport	103	12.4	$10001-$20000	180	22
Accommodation, retail and	262	31.4	$20001-$30000	137	16.7
leisure services			$30001-$40000	122	14.9
Government services and defence	43	5.2	$40001-$50000	95	11.6
Health services	111	12.4	$50001-$70000	67	8.2
Education	80	9.6	$70001-$100000	38	4.6
Communication and financial	121	14.5	$100000+	29	3.5
services					
Occupation (n=810)			**Employment status(n=864)**		
Legislators administrators and	81	10	More than 30hrs per week	418	48.6
managers			Less than 30 hrs per week	109	12.7
Professionals	182	22.5	Not in paid employment	333	38.7
Technicians and associated	174	21.5			
professionals					
Clerks	214	26.4			
Sales and service workers	65	8			
Agriculture and fisheries workers	69	8.5			
Other	26	3.2			

Appendix 2
Correlations Between Variables

Table A: Correlations and significance levels between perceptions of various aspects of management of the natural environment in towns and cities in New Zealand.

Pearson Correlation N	Availability of parks and reserves in towns and cities in NZ	State of NZ natural environment in towns and cities compared to 5 yrs ago	Current management of natural environment in towns and cities in NZ	Management of natural environment in towns and cities in NZ compared to 5 yrs ago
Quality/ condition of NZ's natural environment in towns and cities	.411*** 816	.264*** 799	.414*** 807	.224*** 773
Availability of parks and reserves in towns and cities in NZ		.266*** 801	.402*** 785	.286*** 747
State of NZ natural environment in towns and cities compared to 5 yrs ago			.407*** 767	.543*** 741
Current management of natural environment in towns and cities in NZ				.503*** 775

Significance levels (2-tailed T): * = <0.05; ** = <0.01; *** = <0.001

Table B: Correlations and significance levels between perceptions of various aspects of natural environments outside of towns and cities in New Zealand.

Pearson Correlation N	State of NZ's natural environments outside of towns and cities compared to 5 yrs ago	Current management of natural environments outside of towns and cities in NZ	Management of natural environments outside of towns and cities in NZ compared to 5 yrs ago
Quality/ condition of NZ's natural environments outside of towns and cities	.283*** 760	.421*** 754	.284*** 738
State of NZ's natural environments outside of towns and cities compared to 5 yrs ago		.415*** 715	.493*** 707
Current management of natural environments outside of towns and cities in NZ			.492*** 735

Significance levels (2-tailed T): * = <0.05; ** = <0.01; *** = <0.001

Table C: Correlations and significance levels between perceptions of various aspects of air management in New Zealand.

Pearson Correlation N	State of NZ air compared to 5 yrs ago	Current management of air quality in NZ	Management of air in NZ compared to 5 yrs ago	Change in the allocation of air quality expenditure
Quality/ condition of NZ's air	.37*** 797	.49*** 780	.35*** 748	-.32*** 834
State of NZ air compared to 5 yrs ago		.52*** 750	.56*** 731	-.27*** 796
Current management of air quality in NZ			.49*** 752	-.34*** 785
Management of air in NZ compared to 5 yrs ago				-.240*** 754

Significance levels: * = <0.05; ** = <0.01; *** = <0.001

Table D: Correlations and significance levels between perceptions of various aspects of native land and freshwater plants and animal management in New Zealand.

Pearson Correlation N	Diversity of native land and freshwater plants and animals in NZ	Condition (state) of NZ's native land and freshwater plants and animals compared to 5 yrs ago	Current managemt of native land and freshwater plants and animals in NZ	Managemt of native plants and animals in NZ compared to 5 yrs ago	Change in the allocation of endangered species' expenditure
Quality/ condition of NZ's native land and freshwater plants and animals	.436*** 753	.377*** 740	.531*** 749	.345*** 736	-.111** 821
Diversity of native land and freshwater plants and animals in NZ		.296*** 716	.329*** 698	.247*** 692	-.040 759
Condition (State) of NZ's native land and freshwater plants and animals compared to 5 yrs ago			.469*** 703	.502*** 701	-.078 745
Current management of native land and freshwater plants and animals in NZ				.528*** 731	-.090* 755
Management of native plants and animals in NZ compared to 5 yrs ago					-.001 743

Significance levels (2-tailed T): * = <0.05; ** = <0.01; *** = <0.001

Table E: Correlations and significance levels between perceptions of various aspects of native bush and forest management in New Zealand.

Pearson Correlation N	Amount of native bush and forests in NZ	State of NZ native bush and forests compared to 5 yrs ago	Current managemt of native bush and forests in NZ	Management of native bush and forests in NZ compared to 5 yrs ago	Change in the allocation of native bush and forests expenditure
Quality/ condition of NZ's native bush and forests	.569*** 813	.459*** 767	.551*** 784	.360*** 748	-.188 828
Amount of native bush and forests in NZ		.364*** 774	.506*** 769	.322*** 738	-.133*** 810
State of NZ native bush and forests compared to 5 yrs ago			.551*** 733	.539*** 716	-.072* 763
Current management of native bush and forests in NZ				.555*** 754	-.129*** 785
Management of native bush and forests in NZ compared to 5 yrs ago					-.017 751

Significance levels (2-tailed T): * = <0.05; ** = <0.01; *** = <0.001

Table F: Correlations and significance levels between perceptions of various aspects of soil management in New Zealand.

Pearson Correlation N	Condition (state) of NZ soils compared to 5 yrs ago	Current management of soils in NZ	Management of soils in NZ compared to 5 yrs ago	Change in the allocation of soils expenditure
Quality/ condition (state) of NZ's soils	.379*** 657	.520*** 658	.295*** 630	-.222*** 760
Condition (state) of NZ soils compared to 5 yrs ago		-.215*** 671	.604*** 601	-.141*** 654
Current management of soils in NZ			.563*** 613	-.215*** 671
Management of soils in NZ compared to 5 yrs ago				-.061 642

Significance levels (2-tailed T): * = <0.05; ** = <0.01; *** = <0.001

Table G: Correlations and significance levels between perceptions of various aspects of coastal waters and beaches management in New Zealand.

Pearson Correlation N	State of NZ coastal waters and beaches compared to 5 yrs ago	Current management of coastal waters and beaches in NZ	Management of coastal waters and beaches in NZ compared to 5 yrs ago	Change in the allocation of coastal waters and beaches expenditure
Quality/ condition of NZ's coastal waters and beaches	.430*** 773	.513*** 765	.396*** 739	-.233*** 825
State of NZ coastal waters and beaches compared to 5 yrs ago		.613*** 726	.628*** 711	-.221*** 766
Current management of coastal waters and beaches in NZ			.608*** 738	-.300 768
Management of coastal waters and beaches in NZ compared to 5 yrs ago				-.184*** 739

Significance levels (2-tailed T): * = <0.05; ** = <0.01; *** = <0.001

Table H: Correlations and significance levels between perceptions of various aspects of marine fisheries management in New Zealand.

Pearson Correlation N	Quantity of marine fisheries in NZ	State of NZ's marine fisheries compared to 5 yrs ago	Current managemt of marine fisheries in NZ	Management of marine fisheries in NZ compared to 5 yrs ago	Change in the allocation of marine fisheries expenditure
Quality/ condition of NZ's marine fisheries	.577*** 683	.475*** 631	.546*** 634	.434*** 617	-.047*** 750
Quantity of marine fisheries in NZ		.392*** 620	.434*** 602	.360*** 586	-.043 700
State of NZ's marine fisheries compared to 5 yrs ago			.685*** 593	.630*** 580	.095* 642
Current management of marine fisheries in NZ				.689*** 610	-.115** 648
Management of marine fisheries in NZ compared to 5 yrs ago					-.058 633

Significance levels (2-tailed T): * = <0.05; ** = <0.01; *** = <0.001

Table I: Correlations and significance levels between perceptions of various aspects of fresh water management in New Zealand.

Pearson Correlation N	Amount of fresh water in NZ	Condition (State) of NZ fresh water quality compared to 5 yrs ago	Current managemt of fresh water in NZ	Management of fresh water in NZ compared to 5 yrs ago	Change in the allocation of fresh water expenditure
Quality/ condition of NZ's fresh water	.550*** 788	.409*** 751	.544*** 736	.417*** 712	-.161*** 813
Amount of fresh water in NZ		.346*** 741	.475*** 709	.412*** 685	-.165*** 781
Condition (state) of NZ fresh water quality compared to 5 yrs ago			.535*** 696	.563*** 680	-.192*** 752
Current management of fresh water in NZ				.580*** 707	-.216*** 740
Management of fresh water in NZ compared to 5 yrs ago					-.168*** 713

Significance levels (2-tailed T): * = <0.05; ** = <0.01; *** = <0.001

Table J: Correlations and significance levels between perceptions of various aspects of wetland management in New Zealand.

Pearson Correlation N	Amt of wetland in NZ	State (condition) of NZ wetlands compared to 5 yrs ago	Current managemt of wetlands in NZ	Managemt of wetlands in NZ compared to 5 yrs ago	Change in the allocation of wetlands expend-iture
Quality/ condition of NZ's wetlands	.588*** 640	.422*** 578	.575*** 596	.394*** 582	-.232*** 716
Amount (area) of wetlands in NZ		.430*** 576	.567*** 567	.408*** 556	-.252*** 658
State (condition) of NZ wetlands compared to 5 yrs ago			.572*** 541	.619*** 540	-.161*** 590
Current management of wetlands in NZ				.618*** 580	-.298*** 607
Management of wetlands in NZ compared to 5 yrs ago					-.146*** 596

Significance levels (2-tailed T): * = <0.05; ** = <0.01; *** = <0.001

Table K: Correlations and significance levels between perceptions of various aspects of NZ's natural environment compared to other developed countries.

Pearson Correlation N	State of NZ's natural environment compared to other developed countries compared to 5 yrs ago	Current management of NZ's natural environment compared to other developed countries	Management of NZ's natural environment compared to other developed countries compared to 5 yrs ago
Quality/ condition of NZ's natural environment compared to other developed countries	.419*** 747	.513*** 731	.390 688
State of NZ's natural environment compared to other developed countries compared to 5 yrs ago		.575*** 702	.651*** 670
Current management of NZ's natural environment compared to other developed countries			.647*** 691

Significance levels (2-tailed T): * = <0.05; ** = <0.01; *** = <0.001