Public Perceptions of New Zealand's Environment: 2008

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ISBN 978-0-473-14623-8 (pdf)
ISBN 978-0-473-14219-3 (papper back)

Published in New Zealand by

EOS Ecology
P.O. Box 4262
Christchurch

Design and layout by

EOS Ecology, Christchurch

Printed by

Copyland, Christchurch

Reference information

We suggest this publication be referenced as:

Hughey, K.F.D., Kerr, G.N. and Cullen, R. 2008. Public Perceptions of New Zealand's Environment: 2008. EOS Ecology, Christchurch. vi+114 pp. ISBN 978-0-473-14219-3

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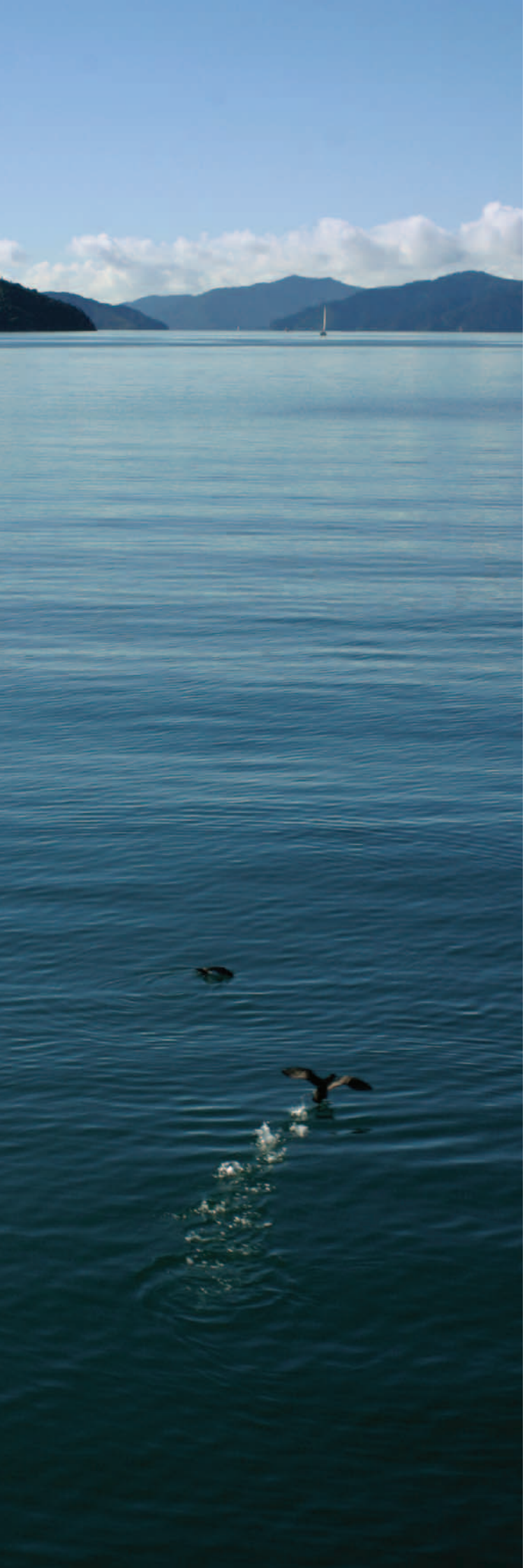

SHELLEY MCMURTRIE

Sooty shearwater, Marlborough Sounds.

SUMMARY

The fifth biennial survey of people's perceptions of the state of the New Zealand environment was undertaken in February–March 2008. The survey is based on the Pressure-State-Response (PSR) model of state of the environment reporting. It tests New Zealanders' perceptions of all the main resource areas and in 2008 also looked more specifically at the freshwater environment (including repeating some aspects of the 2004 case study), recreation, and conservation management. Two thousand people aged 18 and over were randomly selected from the New Zealand electoral roll. An effective response rate of 40% was achieved. Data have been analysed descriptively and the 2008 survey responses were compared with responses from the 2006, 2004, 2002, and 2000 surveys. Statistical analyses of the responses were completed to determine the roles of several socio-demographic variables.

Amongst a very large set of PSR-related findings some that stand out include:

- New Zealanders continued to consider the state and management of the New Zealand environment to be good, and better than in other developed countries.
- Native forest and bush was rated to be in the best state of the 11 components of the environment studied. Rivers and lakes, marine fisheries and wetlands continued to be perceived to be in the worst state, but were still rated highly.
- Management of 11 out of 13 components of the environment studied has improved significantly over the course of the five surveys. Rivers and lakes, groundwater, and air quality were judged to be the least well managed of the 11 resource areas.
- Management of farm effluent and runoff continued to be perceived to be the least-well-managed of the environmental problems investigated.
- Water pollution and water related issues were rated as the most important environmental issue facing New Zealand. On a global basis, climate change or global warming was seen as the most important issue for around one third of respondents.
- Regional variation was a key factor in responses, especially regarding perceptions of 'air' and aspects of fresh water quality and management.

Overall findings regarding the freshwater case studies were similar between the 2004 and 2008 surveys. The general state of fresh water is good, but there are issues at regional and local levels with streams and sometimes with lakes. Ethnicity was an important determinant of freshwater perceptions, with New Zealand European and Maori respondents almost always more concerned than people of other ethnicities—the consistent pattern is startling.

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KEN HUGHEY

Fishing in the Canterbury High Country, South Island.

ACKNOWLEDGEMENTS

We thank Ministry for the Environment for ongoing part funding of these surveys, and the Department of Conservation for contributing to this survey. Andrew Cook did the survey coding, much of the data analysis, and graph preparation—we thank him for this work. We also thank Rowena Hughey for some follow-up data coding.

Shelley McMurtrie, Rosemary Dahl, and Ferne McKenzie (DoC) are thanked for contributing photos, and Al Nisbet for permission to reproduce his cartoon.

The authors; Ken Hughey (top), Geoff Kerr (middle), Ross Cullen (bottom).

SHUTTERSTOCK

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INTRODUCTION

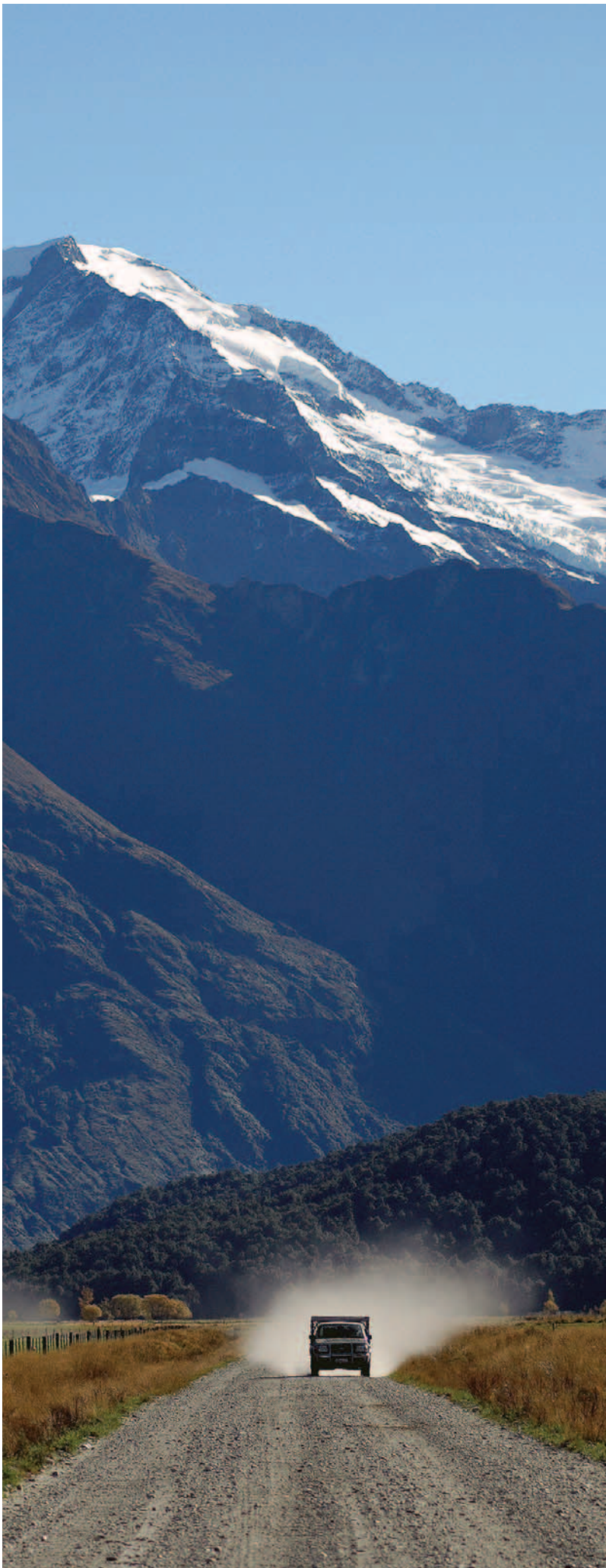
1.1 BACKGROUND

The first State of the Environment Report (SER) based on a survey of New Zealanders' perceptions of the environment was performed in 2000 using a survey questionnaire constructed around a Pressure-State-Response model. Hughey *et al.* (2001) provides background, justification of the survey approach used, and results. The OECD (1996) and Ministry for the Environment (1997) explain the Pressure-State-Response model, which is used internationally as the basis for environmental reporting. The 2000 survey (Hughey *et al.* 2001) was designed to be undertaken biennially and subsequent surveys were undertaken in 2002, 2004 and 2006 (Hughey *et al.* 2002a, 2004, 2006). Some findings from the 2006 survey were included in OECD (2007). This publication reports the results of the fifth biennial survey undertaken in 2008 and includes a comparison with previous survey findings.

1.2 RESEARCH OBJECTIVES

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 environmental issues of public concern as a contribution to public debate and a means of alerting government and others to these issues
- Provide opportunities for organisations and other researchers to derive one-off research data for individual areas of interest, including teaching purposes
- Report biennially, via a published report and other research publications, on findings from the research (see the separate list of survey-related publications at the end of the Reference list)



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SURVEY METHOD

A postal questionnaire based on the Pressure-State-Response (PSR) model and previous surveys in this series was used to gather information on New Zealanders' 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 2008 QUESTIONNAIRE

Questionnaire items were presented in an A5-size booklet with questions on facing pages (see Appendix 1). The booklet had eighteen pages of questions. A letter of introduction was included stating the purpose of the questionnaire, introducing the topics in the questionnaire and inviting voluntary participation. Questions were asked in sets with a response scale provided for each question. Respondents were instructed to either circle a number or tick a box to indicate their response. The questionnaire contained a total of 203 questions.

The PSR framework guided the development of survey questions. Two sets of questions assessed perceptions of the state of the environment and two questions assessed perceptions of the quality of resource management (response). For all of these measures a 'don't know' option was provided. Perceived pressures were assessed by one set of questions.

Further questions supplemented the PSR framework. Respondents were asked what was the most important environmental issue facing New Zealand and also the world today and why these issues were chosen.

Participation in fifteen activities was measured to explore relationships between environmental behaviour and responses to the PSR framework. Twelve questions sought socio-demographic information. The dynamics of relationships between socio-demographic information and concern for the environment have been well documented (e.g., Jones and Dunlap, 1992) and these are being explored biennially. A question on ethnic origin was introduced in 2002, and it revealed substantial differences in responses to some questions. The question on ethnic origin was retained in following surveys with an Asian ethnic origin category being included in the 2006 survey. A question on respondent's place of residence was added to the 2006 survey, organised by regional council boundaries. A further question determined whether respondents lived in an urban area (town or city of 1,000 people or more) or rural area (countryside or a town of less than 1,000 people). In 2008, an additional question on respondent's occupation was included in the survey.

Knowledge, standard of living, and 'clean green'

The questionnaire began by asking for a self-assessment of respondents' knowledge of the environment, and their assessment of the overall standard of living in New Zealand with the invitation: 'We would like your opinion on the following issues'. The questions were: 'Your knowledge of environmental issues is... , The overall standard of living in New Zealand is … , The overall state of the natural environment in New Zealand is …' Measurements were taken on five-point scales anchored by 'very good' and 'very bad'. The fourth question asked for an assessment of how 'clean and green' New Zealand is. In 2002 respondents were asked if they agreed with a statement: *New Zealand's environment is regarded as "clean and green"*, which was changed slightly in 2004 to read *New Zealand's environment is "clean and green"*. Measurement was on a five-point scale anchored by 'strongly agree' and 'strongly disagree'.

The state of the environment

To measure the state of the environment two sets of questions were asked about (i) the quality or condition, and (ii) the availability or amount of various resources. In the 2000-2004 surveys a third question set asked whether the environment had changed over the last five years. This question was omitted from the 2006 questionnaire as analysis of the previous survey data showed that results remained consistent over the years and by 2006 sufficient perceptions data were available from previous surveys. This change was retained for the 2008 survey.

The first question set was preceded by the instruction: 'Please indicate what you think the condition of each of the following is'. Followed by: 'The condition of New Zealand's …'. The eleven aspects were then presented with a five-point measurement scale 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 ten natural resources. These were measured by asking: 'Now we would like your opinion on some of our natural resources'. The set of ten natural resources was preceded by: 'New Zealand's …'. Five-point scales provided for measurement were anchored by 'very high' and 'very low'.

Adequacy of environmental management

Information on the adequacy of environmental management was sought by asking two sets of questions, the first regarding the management of six specific resources and the second designed to measure perceptions about current management of aspects of New Zealand's environment.

The first set of questions asked 'What do you think of the management of the following items?', followed by: 'Management of New Zealand's …'. Six specific 'management of resource' issues (e.g., sewage disposal) were then presented, measured along a five-point scale anchored by 'very good' and 'very bad'.

The next set of questions on the current management of aspects of New Zealand's environment presented thirteen items preceded by: 'What do you think of the management of

SHELLEY MCMURTRIE

Two sets of questions were asked to measure perceptions of the environment: some concerning the quality or condition of resources, and others about their availability. Left: The remaining fragments of forest cover on Banks Peninsula are being supplemented by native trees regenerating through gorse. Right: Flea Bay: access to forest on the Peninsula has been improved by the construction of the Banks Peninsula Track and the support of local farmers.

each of the following?' followed by 'Currently New Zealand's….' These items were each presented with a five-point scale anchored by 'very well managed' and 'extremely poorly managed'.

Pressures on the environment

The PSR framework includes pressures on the environment. Perceived causes of damage to parts of the New Zealand environment were measured by presenting a table containing ten resources with fifteen potential causes of damage. Respondents were instructed to select up to three causes. This approach was designed to ease the cognitive burden that would have been placed on respondents if they were required to select the single most important item from the fifteen presented. Respondents were invited to respond with the invitation: 'Please tell us what you think are the main causes of damage to parts of the New Zealand environment by ticking up to three causes on each row across the page'.

Participation in environmental activities

Measurements were taken of respondent participation in fifteen activities related to the environment. In 2000 respondents were asked: 'Please indicate if in the last twelve months you have…' followed by thirteen environmental activities. Measurements were taken using either 'Yes', 'No' or 'don't know' options. The question was modified slightly in the 2002 survey by adding 'Regularly' as an option in addition to the 'Yes' response. This has been retained through following surveys, with the addition of two activities in 2006, i.e., 'Reduced, or limited your use of fresh water', and 'Made a financial donation to a non-government environmental organisation (e.g., Forest and Bird)'.

Freshwater Resource Questions

In 2008 questions regarding the quality and management of freshwater resources, namely rivers and streams, aquifers (groundwater) and lakes, were asked. The same questions had been asked in the 2004 survey in a large freshwater-based case study. Two sets of questions concerned the quality of water in New Zealand and the respondent's region. Two following sets of questions queried the respondent's opinion on the management of freshwater resources by their Regional Council and the policy making by the Ministry for the Environment. These questions were presented with a five-point Likert scale anchored by 'extremely good' and 'extremely poor'. Respondents were then asked whether they agreed or disagreed with eight statements concerning water take from large rivers, small lowland streams and aquifers. They were also asked about lowland stream management, water quality, condition, and whether water quality had been damaged by dairy farming. Seven of these statements were the same as those presented in 2004.

Resource-based activities

The 2008 survey asked a question about the number of days spent participating in 19 resource-based activities in 2007. Measurements ranged from 0 days, through to 21 or more days. A further question was asked about whether respondents had visited a National Park in 2007. Those who had visited a national park over this time were asked to identify how many times they had visited each of the 14 national parks.

Conservation in New Zealand

The 2008 survey includes a number of questions concerning conservation in New Zealand, including attitudes towards the

environment, importance of conservation activities, and activities and effectiveness of the Department of Conservation (DoC). The section began with a set of questions on attitudes towards the environment. Twenty statements were presented reflecting differing attitudes towards the environment, with a seven point Likert scale anchored by 'very strongly agree' and 'very strongly disagree'. Minor wording changes were made to those reported in Winter and Lockwood (2004) and Johnson *et al.* (2007) in order to accommodate the different type of survey. A question was then asked on the respondent's interpretation of the term 'conservation', with eleven responses provided to choose from. Respondents were able to choose as many responses as applied.

The importance of conservation activities was measured. Eleven conservation activities were presented with a five point Likert scale anchored by 'extremely important' and 'not at all important'. A question on the overall importance of conservation in New Zealand was then asked, measured using the same Likert scale.

The next five questions related to the activities and effectiveness of management by the DoC. The first question presented information about the New Zealand Government's expenditure on conservation and then sought the respondent's opinion on whether the Government should spend less, more or the same percentage on conservation activities. The performance of the DoC against eleven functions was measured using a five point Likert scale anchored by 'very good' and 'very poor'. An additional option, 'didn't know DoC did this', was provided. A further question presented seven activities (e.g., controlling soil erosion) and asked respondents to indicate which activities the DoC contributed to. Respondents were able to choose as many responses as applicable. The personal importance of the work done by the DoC was measured using a five point Likert scale anchored by 'extremely important' and 'not at all important', followed by a question measuring the overall performance of DoC using a five point Likert scale anchored by 'very good' and 'very poor'.

Environmental issues

As in previous years, the survey ended by asking 'What do you think is the most important environmental issue facing New Zealand today? The 2006 survey added the question 'What do you think is the most important environmental issue facing the world today?' In addition, for both these questions respondents were asked 'Why did you choose this issue?' This set of questions has been retained in the 2008 survey. An open space was provided at the end of the survey for respondents to add anything further that they wished to say.

Socio-demographic information and representativeness

Information was sought regarding gender, number of household members, age, country of birth, ethnicity, region, rural or urban residence, education, current situation (e.g., student, retired or in paid employment), the industry the person worked in (or had last worked in), occupation and personal income. Where possible these were measured using categories closely corresponding to data categories reported in the 2006 New Zealand Census. Key socio-demographic information for the 2008 survey is provided in Appendix 2. In the 2000, 2002 and 2004 surveys, numbering of each survey allowed identification of respondents' residential locations, which were subsequently categorised into three regions: Northern, representing north of the Bombay Hills; Central, being the rest of the North Island; and Southern, the South Island. In the 2006 survey a specific question enabled respondents to identify which regional council area they lived in, with subsequent tabulation allowing Northern, Central, and Southern 'mega' regions to be identified. This change was retained for the 2008 survey.

To determine representativeness of the sample it was compared with currently available official statistics (Statistics NZ 2006, Census of NZ 2006).

The following key points can be drawn about the survey sample:

- Females are over-represented
- Those aged under 50 are under-represented
- Those earning less than $20,000 per annum are under-represented
- Those with no educational qualifications are under-represented
- NZ European respondents are slightly over-represented while Pacific Islanders in particular are highly under-represented

Despite the difference of these distributions from the 2006 Census distributions and from related data, the large sample and high response rate are judged to be an adequate basis for making comment on New Zealanders' views about the environment.

2.2 PRE-TESTING

Pre-testing followed a cognitive interview process as described in Dillman (1998). Several individuals were interviewed about each of the questions in the 2000 survey and, following drafting, were also asked about new questions in the 2002, 2004, 2006 and 2008 surveys. In addition, a small number of individuals completed the 2008 questionnaire and subsequently provided comments about the questionnaire and the questionnaire topics. DoC staff worked closely with us on design of the conservation-related questions. Subsequently, some minor adjustments were made to the questionnaire. The survey instrument has been scrutinised and approved by the Lincoln University Human Ethics Committee.

2.3 METHODS OF ANALYSIS

Descriptive data are provided in Section 3, along with a comparison of 2008 survey results with those from previous surveys. Relationships between selected PSR framework components and socio-demographics are also presented in Section 3. Chi-square tests (χ^2) were used to test for changes in responses. Data aggregation was necessary in some areas because there were too few valid responses to enable appropriate testing to be undertaken. Due to the large number of relationships tested, in general only summarised results for significant relationships ($p<0.05$ or greater) are reported.

2.4 DISTRIBUTION

Two thousand questionnaires were distributed to randomly selected individuals drawn from the most recently available New Zealand electoral roll. The questionnaire and the letter of introduction were posted with a freepost return envelope. The questionnaires were posted on 15th February 2008. In addition, a follow-up postcard was sent on 7th March 2008 and a second questionnaire posting to non-respondents was made on 3rd April 2008. The closing date was 30th April 2008.

2.5 RESPONSE

Effective survey response rates have been:

2000	*48%*	*N = 894*
2002	*45%*	*N = 836*
2004	*43%*	*N = 820*
2006	*46%*	*N = 880*
2008	*40%*	*N = 752*

All surveys had maximum margins of error of 3% at the 95% confidence level.

2.6 MAJOR CHANGES IN THE 2008 SURVEY

In summary the following changes and additions have been made from the 2006 survey:

- Whereas the major case study in 2006 addressed land transport, the major 2008 study concerned conservation
- Questions on freshwater resource management, a subset of those included in the 2004 survey, have been included in the 2008 survey
- A new set of questions was asked on resource-based activities and National Park visitation
- Questions about sources and reliability of environmental information, about priorities for government, and regarding institutional effectiveness in environmental management included in the 2006 survey were not included in the 2008 survey
- A question on respondent occupation was included in the socio-demographic information section.

03

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Seven-finger and tree ferns in the New Zealand bush

PRESSURE-STATE-RESPONSE ANALYSIS BY QUESTION

3.1 KNOWLEDGE OF THE ENVIRONMENT, STANDARD OF LIVING, STATE OF THE ENVIRONMENT AND 'CLEAN AND GREEN'

The 2008 Survey

This section reports findings grouped by question type, which provides the clearest depiction of the relative evaluations of different environments. Chapter 4 presents an overview of all results for each environment. Appendix 3 reports data for each of the items addressed in this chapter.

Most people considered their environmental knowledge to be 'adequate' (53.7%) or 'good' (28.8%, Figure 3.1). The vast majority considered the standard of living in New Zealand to be 'good' or 'very good' (81.2%, Figure 3.2). The state of the New Zealand environment is considered to be 'adequate' to 'good' (80.8%, Figure 3.3). Respondents were asked the extent to which they agreed or otherwise with the statement that New Zealand's environment is 'clean and green'. Although most people agreed with the statement (48.8%), there was also a high number who neither agreed nor disagreed (28.7%), and 21.9% who disagreed (Figure 3.4).

Trends 2000–2008

In each survey most respondents reported they had 'adequate' or 'good' knowledge of environmental issues. Very few respondents reported 'bad' or 'very bad' knowledge. There was a slight increase in percentage of respondents who considered their knowledge to be 'very good' in the 2008 survey. Changes over the five surveys were only marginally statistically significant ($p=0.06$).

As Figure 3.2 shows, over the period 2000 to 2004 the overall standard of living in New Zealand was viewed increasingly positively. The 2006 survey had slight reductions in the good and very good categories and an increase in the 'adequate' response. This change was reinforced in 2008. The overall change over the five surveys, with 'bad' and 'very bad' combined, has high statistical significance ($p<0.001$), but is of small magnitude.

Figure 3.4 shows that in 2002, two thirds of respondents either 'agreed' or 'strongly agreed' that New Zealand's environment is 'clean and green'. However, in 2004 this decreased to just over 50% of respondents and that level was maintained in 2006. There has been a further slight decline in 2008. It seems that more people are unconvinced of New Zealand's 'clean and green' status, as shown by the increasing number of respondents who did not agree with the statement. The difference in responses between the five surveys is statistically significant ($p<0.001$). Note that the wording of the question changed between 2002 and 2004, with the original statement being 'New Zealand's environment is **regarded as** "clean and green"' (emphasis added). In 2004 this changed to 'New Zealand's

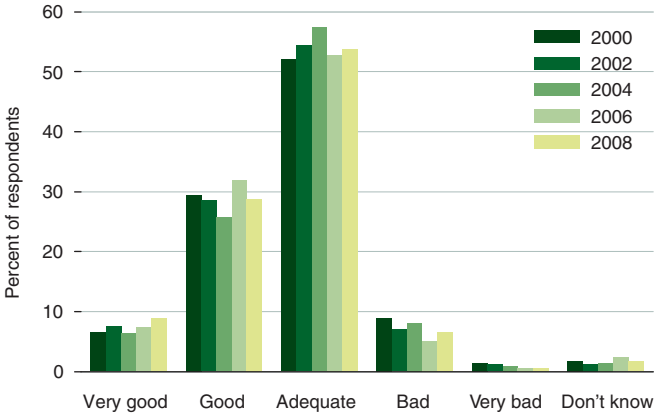

Figure 3.1. Knowledge of environmental issues.

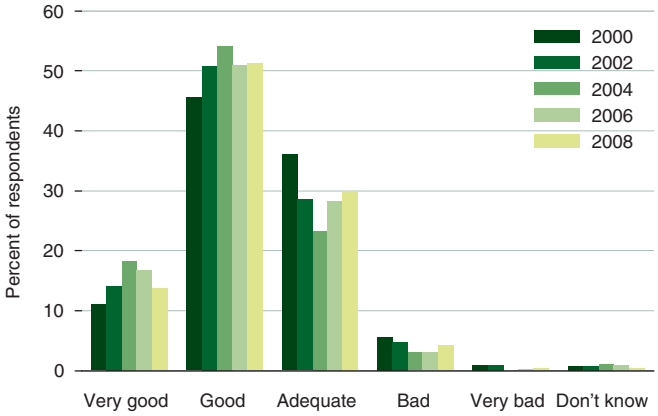

Figure 3.2. Standard of living in New Zealand.

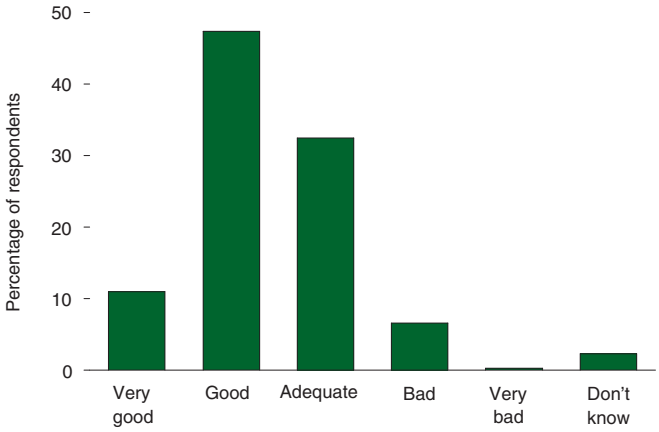

Figure 3.3. State of New Zealand's natural environment, 2008.

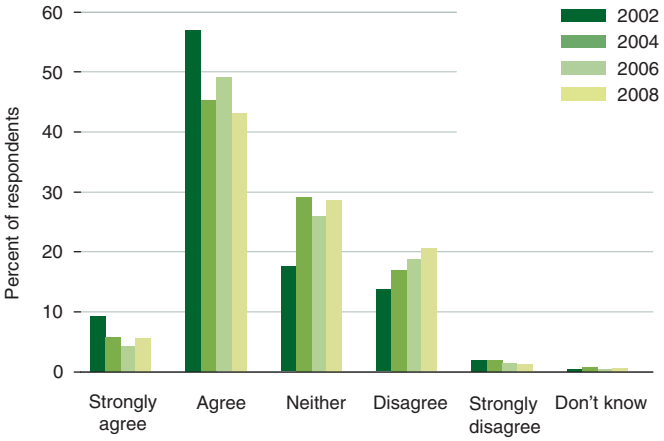

Figure 3.4. New Zealand's environment is 'clean and green'.

Table 3.1. Significant changes (cells with asterisks) in 'state' and 'response' ratings between the 2000 and 2008 periods (note however that for rivers and lakes, and for groundwater, data are only for 2004-2008). (⇓) = deterioration; (⇑) improvement; NA = not asked in all five surveys. Cells with only asterisks indicate significant changes between years, but with no consistent trend.

	State	Availability	Management
Natural environment in towns and cities	**	NA	
Air	***(⇓)	NA	***(⇑)
Native land & freshwater plants & animals			***(⇑)
Native bush and forests	***(⇑)		***(⇑)
Soils	***	NA	*(⇑)
Coastal waters & beaches	***(⇑)	NA	***(⇑)
Marine fisheries	***	**	**(⇑)
Marine reserves	NA	***	**(⇑)
Rivers and lakes		**(⇓)	**(⇑)
Groundwater		***(⇓)	
National Parks	NA		***(⇑)
Wetlands			***(⇑)
NZ's natural environment compared to other developed countries			***(⇑)

*The number of asterisks indicates the strength of significance: * Significant at p<0.05, ** Significant at p<0.01, *** Significant at p<0.001.*

environment is "clean and green"', with the same five-point scale. Care should therefore be taken in comparing results. In 2002 people may have been reporting their perceptions of other people's views, whereas the 2004 wording (maintained from there on) was designed to encourage survey respondents to report their own views.

3.2 CHANGES IN RATINGS FOR STATE AND MANAGEMENT OF THE ENVIRONMENT

Table 3.1 presents a summary of significant changes between 2000 and 2008 in ratings of the state of the environment and its management. Fresh water was split into 'water in rivers and lakes' and 'groundwater' for the 2004, 2006 and 2008 surveys, and the category 'other natural environments' was excluded from the 2004 and subsequent surveys. Consequently, ratings about these items cannot be compared over the five surveys, although the two freshwater categories are now included given there are three surveys to draw on.

In the 2006 survey (Hughey *et al.* 2006:17) statistical testing showed a significant difference in responses between surveys in 15 cases, with 11 items exhibiting clear trends over the four surveys, and they were:

Condition of air quality	*Worse*
Management of native land and freshwater plants and animals	*Better*
Management of native forests and bush	*Better*
State of coastal waters and beaches	*Better*
Management of coastal waters and beaches	*Better*
Management of marine fisheries	*Better*
Area of marine reserves	*Better*
Management of marine reserves	*Better*
Management of national parks	*Better*
Management of wetlands	*Better*
Management of NZ's natural environment compared to other developed countries	*Better*

Addition of the fifth (2008) survey data set has led to a few changes in trends (Table 3.1). Most notable is the perceived overall improvement of management of all resources (apart from the natural environment in towns and cities, and groundwater) over the course of the 2000-2008 survey periods. In contrast, there are few significant changes to evaluations of 'state' or 'availability' over time, suggesting that there may be a lag between improved management and improved outcomes.

3.3 THE STATE OF THE ENVIRONMENT

3.3.1 Quality of the New Zealand environment

The 2008 Survey

The quality of the New Zealand environment was measured on five-point Likert scales ranging from 'very good' to 'very bad'. Figure 3.5 shows that respondents generally rated the state of the New Zealand environment to be 'good' or 'adequate'. However, New Zealand's natural environment was rated to be 'good' or 'very good' when compared with other developed nations. In 2008 native bush and forests were considered to be in the best condition of all the items tested. Rivers and lakes were considered to be in the worst condition, with 22.1% of respondents rating them as 'bad' or 'very bad'. Wetlands, marine fisheries and groundwater received the largest number of 'don't know' responses (each with more than 10%).

Trends 2000–2006

Figure 3.6 shows mean Likert scores for 11 environmental aspects, including nine that have been included in all five surveys. Most aspects showed an improvement in perceived quality from 2000 to 2002, then a decline or a relatively static position from 2002 to 2008. The exceptions are air quality, which shows a slight, but significant, declining trend over all five surveys ($p<0.001$), and coastal waters and beaches, which show a significant improvement ($p<0.001$) over the five surveys.

The state of New Zealand's environment compared to other developed countries received the best rating each year despite a small decline since 2002, with a mean value between 'good' and 'very good'. All other environmental aspects were rated as 'adequate' or 'good', with native bush and air quality receiving slightly higher ratings, and marine fisheries and wetlands receiving lower ratings. Rivers and lakes, measured as a discrete resource from 2004 to 2008, received the lowest ratings.

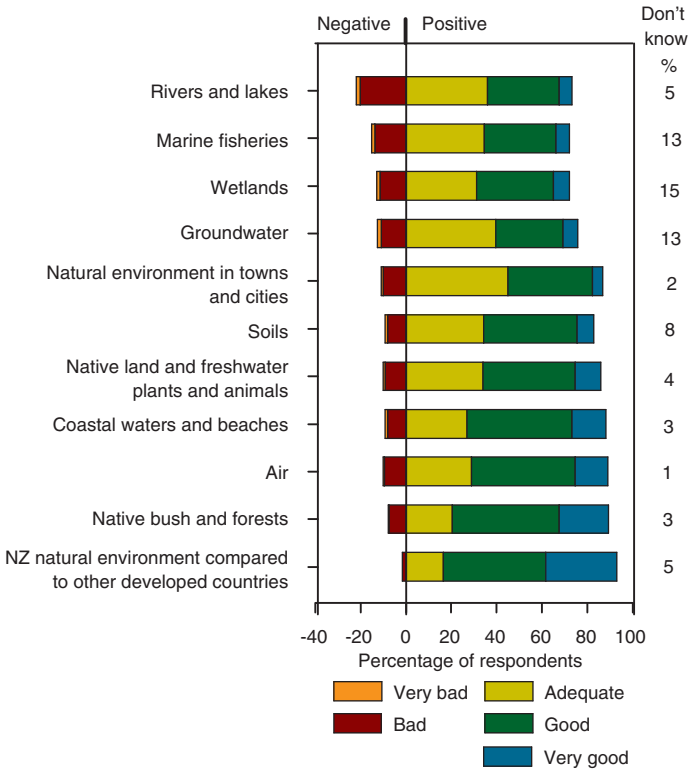

Figure 3.5. Perceived state of the environment.

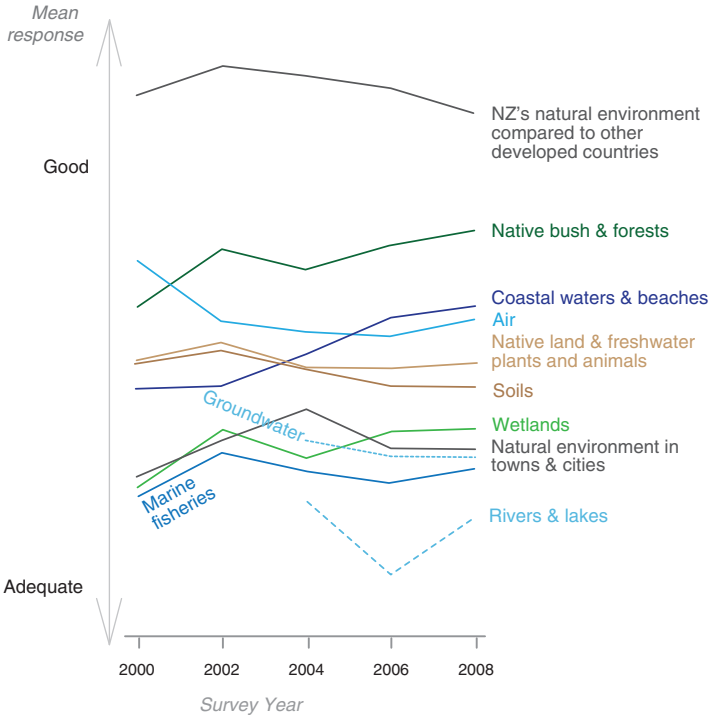

Figure 3.6. Trends in perceived state of the environment.

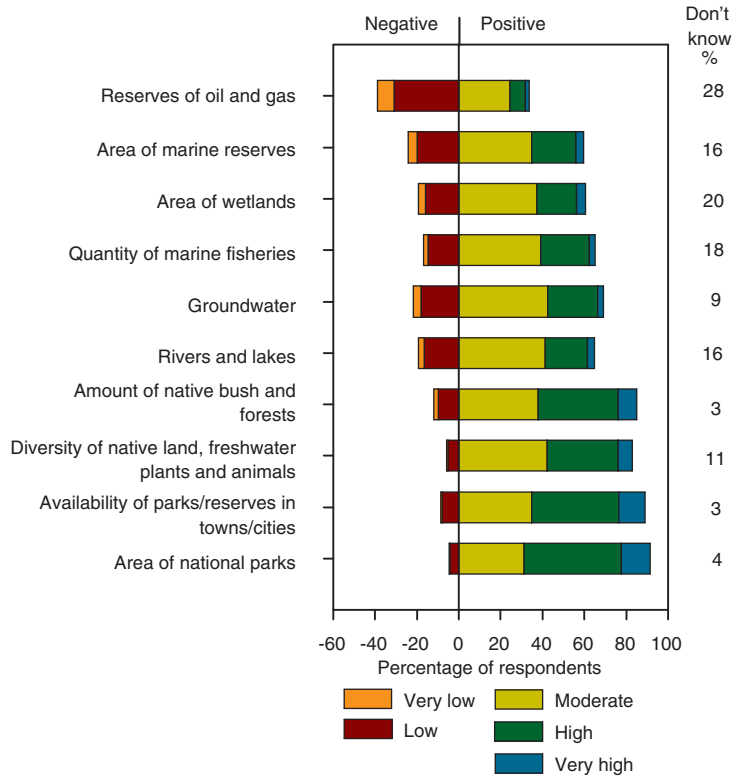

Figure 3.7. Perceived availability of natural resources.

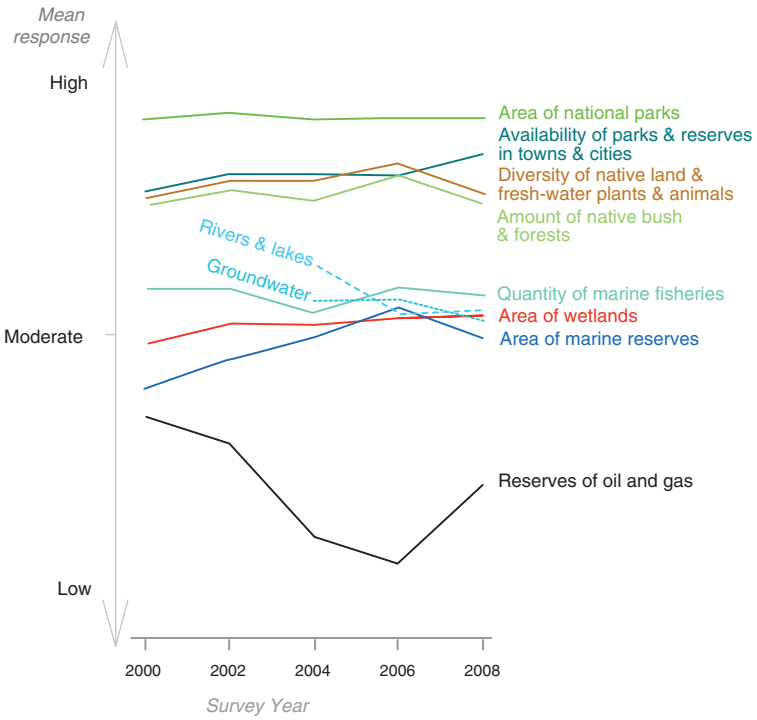

Figure 3.8. Trends in perceived availability of natural resources.

3.3.2 Resource availability

The 2008 Survey

Respondents' assessments of New Zealand resource availability are shown in Figure 3.7. The lowest availability rating was for reserves of oil and gas, with approximately 39% of respondents rating availability as 'very low' or 'low'. Area of marine reserves, area of wetlands, quantity of marine fisheries, and availability of groundwater for human use were considered to have 'moderate' to 'low' availability. The area of national parks had the highest rating, with around 60% of respondents rating it 'high' or 'very high'. The availability of parks and reserves in towns and cities, the diversity of native land and fresh water plants and animals, the amount of native bush and forests, and the amount of fresh water in rivers and lakes were also rated 'high' or 'moderate'. Several resources received a high number of 'don't know' responses: reserves of oil and gas (28%), area of wetlands (20%) and quantity of marine fisheries (18%).

Trends 2000–2008

Figure 3.8 shows mean Likert scores for the eight natural resources that were included in all five surveys, and the two additional resources included only from 2004 to 2008. Perceptions on the reserves of oil and gas changed appreciably between 2006 and 2008, with an overall improvement occurring ($p<0.001$). Ratings of the area of marine reserves retains a significant improving trend ($p<0.001$) despite a decline in 2008.

The remaining natural resource ratings changed little over the five surveys and all retained their relative positions, despite some demonstrating considerable variation over this time, e.g., marine fisheries. It is interesting to note the change in spread from 2000, with 2008 results showing groupings of native bush, animals, and parks and reserves at the higher availability end of the scale, marine reserves, fisheries, rivers and lakes, groundwater and wetlands converging to a moderate level, and with reserves of oil and gas standing out as the only natural resource rated as having low availability.

3.4 MANAGEMENT OF THE ENVIRONMENT

3.4.1 Management of environmental activities

The 2008 Survey

Survey respondents were asked to evaluate the management of six items on a five-point Likert scale that ranged from 'very good' to 'very bad' (Figure 3.9). A high percentage of respondents thought that the management of farm effluent and runoff (51.6%) was 'bad' or 'very bad'. Pest and weed control had high frequencies of 'good' or 'very good' management ratings (28.4%), and 'bad' or 'very bad' ratings (26.1%). The management of solid waste and sewage disposal were mainly seen as adequate. Hazardous chemicals use and disposal had the largest 'don't know' response (21.2%), followed by farm effluent and runoff (13.6%) and industrial impact (11.7%).

Trends 2000–2008

For the first time over the five survey period the mean rating of quality of management activities has risen above adequate for two activities, namely pest and weed control, and sewage disposal. However, Figure 3.10 also shows an improvement in people's rating of the management of solid waste disposal, hazardous chemicals use and disposal (despite a decline in 2006), and (for 2002–2004 only) industrial impact on the environment. The exception is the management of farm effluent and runoff, for which the rating was much worse in 2002 than in 2000, but showed a slight improvement in 2004 and again in 2006, before once again declining in 2008.

There are significant differences in ratings of all management activities over the five surveys (Table 3.2).

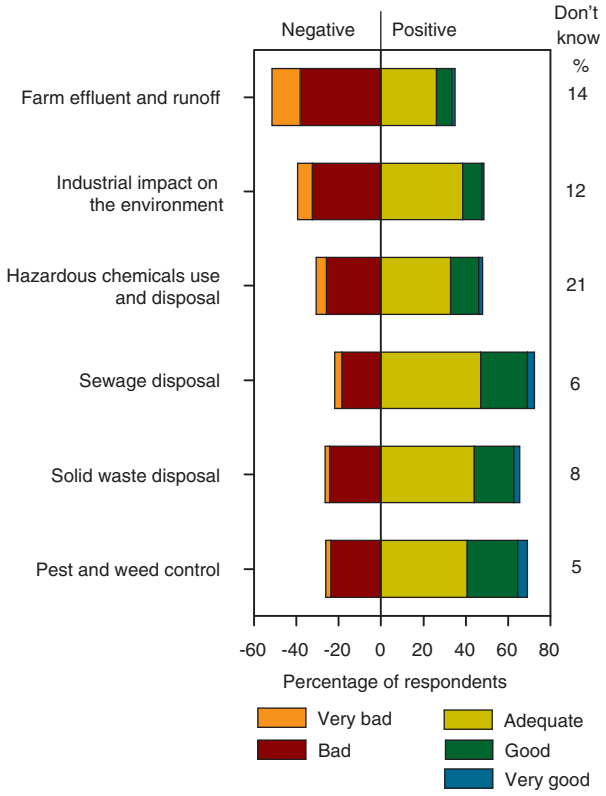

Figure 3.9. Perceived quality of management activities.

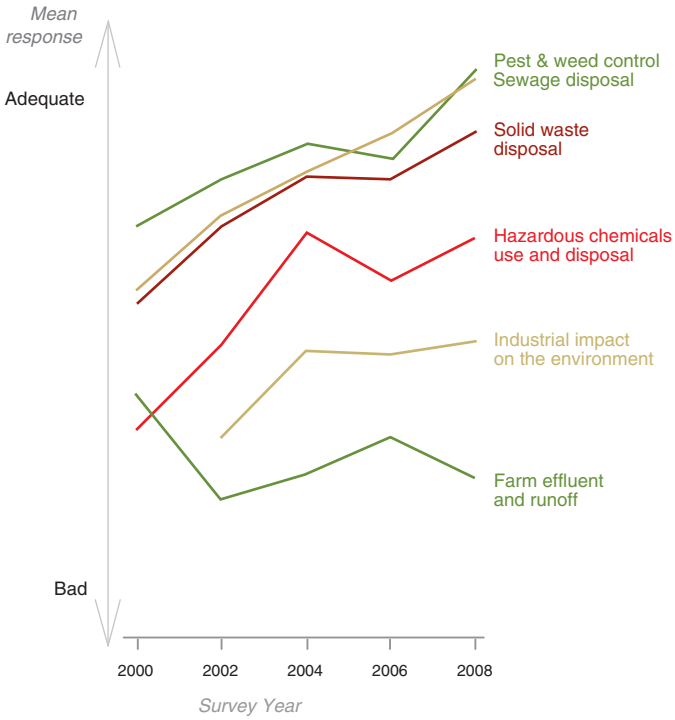

Figure 3.10. Trends in perceived quality of management activities.

Table 3.2. Trends in perceptions of management activities.

Management activity	*Probability*	*Trend*
Pest and weed control	*p<0.001*	*consistent improvement 2000–2004; slight decline 2006; major improvement 2008*
Solid waste disposal	*p<0.001*	*consistent improvement 2000–2004; steady 2006; improvement 2008*
Sewage disposal	*p<0.001*	*consistent improvement*
Farm effluent and runoff	*p<0.001*	*declined 2000–2002; slight improvement 2002–2006; decline 2008*
Hazardous chemicals use and disposal	*p<0.001*	*consistent improvement 2000–2004; decline 2006; improvement 2008*
Industrial impact on the environment	*p<0.05*	*improved between 2002 and 2004; steady 2006–2008*

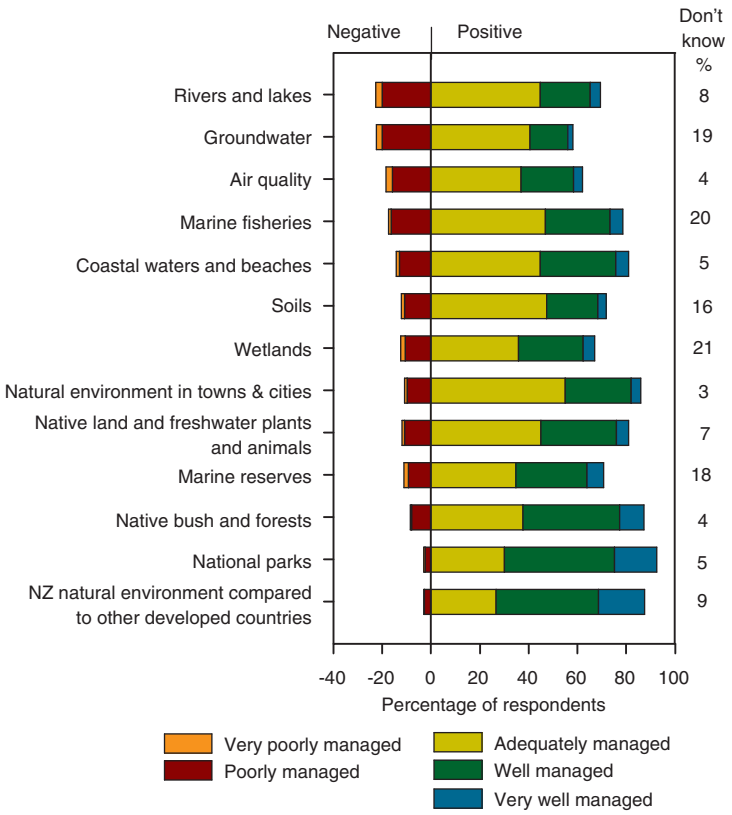

Figure 3.11. Perceived quality of management.

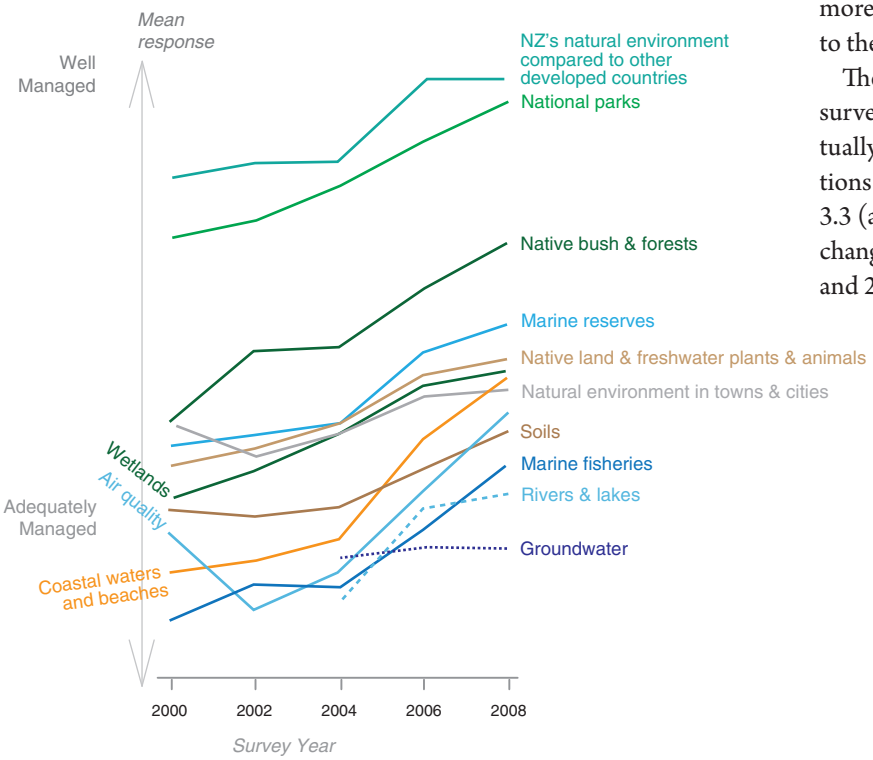

Figure 3.12. Trends in perceived quality of management.

3.4.2. Current management of the environment

The 2008 Survey

The quality of management of thirteen environments or resources was assessed on a scale ranging from 'very well managed' to 'very poorly managed' (Figure 3.11). In general, most environmental features were considered to be 'adequately managed'. However, over 20% of respondents felt that rivers and lakes, and groundwater were either 'poorly managed' or 'very poorly managed'. Over half the respondents rated national parks (62.5%) and New Zealand's natural environment compared to other developed countries (59.8%) as either 'very well managed' or 'well managed'. There were high rates of 'don't know' responses for marine fisheries (19.6%), marine reserves (18%), groundwater (19.4%) and wetlands (20.5%).

Trends 2000–2008

Mean Likert scores for most resources correspond with resources being 'adequately managed' (Figure 3.12). Exceptions are national parks and New Zealand's natural environment compared to other developed countries, whose management is judged more positively, with the mean scores being nearer to the 'well managed' end of the scale.

The most evident emergent trend over the five surveys, for all resources examined, has been virtually uninterrupted and now significant perceptions of improved management, as shown in Table 3.3 (and see also Table 3.1). The biggest perceived changes for most resources occurred between 2004 and 2006.

3.5 MAIN CAUSES OF DAMAGE TO THE ENVIRONMENT

The 2008 Survey

Respondents were instructed to select what they considered to be the main causes of damage from a list of 15 items for ten components of the environment. They could select up to three causes for each environmental component. The responses for each component are shown in Table 3.4. Colour coding helps to interpret the table, with red text cells signifying the most frequently cited cause of damage to individual environmental components, orange indicating the second most frequently cited main cause, and the third most frequent response in light orange.

For some environmental components, people have very clear ideas about sources of harm. For example, motor vehicles and transport (94%), as well as industrial activities (73%), were clearly judged to be the main causes of damage to air. Similarly, sewage and stormwater was judged to be the main cause of damage to beaches and coastal waters, with 71% of respondents nominating this cause, while 83% percent of respondents identified commercial fishing as a major problem for marine fisheries.

Reading across the rows of Table 3.4 identifies sources of harm that are important across different areas of the environment. Pests and weeds, farming, and sewage and storm water were perceived to be a main cause of damage for four of the environmental components addressed in the question. Mining (as was the case in 2006) did not feature amongst the top causes of damage for any environmental component.

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Commercial fishing was judged to be the main cause of damage to marine fisheries, pests and weeds the most damaging to native forests, and sewage and stormwater the main cause of damage to beaches. Top: Fishing boats at Westport. Middle: Trapping for predators in Flea Bay, Banks Peninsula. Bottom: Stormwater outfall, New Brighton beach, Christchurch.

Table 3.3. Mean Likert scores for management of resources 2000-2008 (including rivers and lakes, and groundwater 2004-2008).

	Mean Likert score (1= very well managed; 5= very poorly managed					
Perception of management of …	**2000**	**2002**	**2004**	**2006**	**2008**	**Change 2008–2000**
Natural environment in towns and cities	2.82	2.88	2.85	2.77	2.76	-0.06
Air quality	3.03	3.19	3.11	2.95	2.81	-0.22
Native land and freshwater plants and animals	2.90	2.87	2.84	2.73	2.70	-0.20
Native bush and forests	2.82	2.69	2.67	2.56	2.47	-0.35
Soils	2.98	3.00	2.98	2.91	2.83	-0.15
Coastal waters and beaches	3.11	3.09	3.05	2.86	2.73	-0.38
Marine fisheries	3.20	3.14	3.14	3.03	2.90	-0.30
Marine reserves	2.87	2.85	2.83	2.68	2.63	-0.24
Rivers and lakes			3.16	2.99	2.97	-0.19
Groundwater			3.08	3.06	3.06	-0.02
National parks	2.46	2.43	2.37	2.28	2.20	-0.24
Wetlands	2.97	2.91	2.84	2.75	2.72	-0.25
Natural environment compared with other developed countries	2.35	2.32	2.32	2.16	2.16	-0.19

Table 3.4. Perceived main causes of damage to the environment.
The fill colours (■ ■ ■) indicate in order the three most-frequently-cited cause of damage to the individual environmental component.

	Air	Native land and freshwater plants and animals	Native forests and bush	Soil	Beaches & coastal waters	Marine fisheries	Marine reserves	National parks	Wetlands	Fresh waters
Motor vehicles and transport	94%	3%	4%	2%	6%	1%	4%	13%	7%	3%
Household waste and emissions	24%	13%	3%	19%	16%	8%	6%	4%	9%	21%
Industrial activities	73%	25%	10%	27%	18%	14%	12%	9%	17%	31%
Pests and weeds	3%	49%	60%	20%	6%	7%	11%	59%	42%	21%
Farming	11%	39%	27%	36%	7%	4%	7%	8%	34%	46%
Forestry	1%	13%	40%	12%	1%	1%	2%	16%	8%	5%
Urban development	19%	29%	34%	11%	23%	4%	5%	12%	31%	15%
Mining	2%	9%	17%	18%	1%	1%	2%	6%	5%	4%
Sewage and storm water	5%	21%	3%	21%	71%	43%	36%	7%	26%	44%
Tourism	2%	7%	13%	2%	13%	6%	15%	44%	8%	6%
Commercial fishing	1%	3%	1%	5%	24%	83%	47%	2%	1%	3%
Recreational fishing	0%	2%	1%	0%	7%	25%	29%	1%	2%	5%
Dumping of solid waste	10%	19%	11%	37%	20%	18%	16%	9%	17%	19%
Hazardous chemicals	21%	19%	6%	41%	16%	16%	14%	6%	14%	24%
Other	1%	0%	0%	1%	2%	2%	2%	1%	1%	1%

Note: Percentages in each column do not add to 100% because respondents identified up to three causes for each environmental component.

Trends 2000–2008

Respondents' judgements of the main causes of damage to the 10 environmental components which were included in all five surveys are shown in Figures 3.13 (a–j). These figures contain an enormous amount of information. In order to clarify the important changes that have occurred over the five surveys, Table 3.5 identifies the changes between 2000 and 2008 that are statistically significant.

The three most notable results in Table 3.5 are:

- The dramatic increase in negative judgements about the environmental impacts of farming. Farming has received significant increases in blame for environmental damage to all resources other than marine reserves and national parks;
- Growing concern about urban development effects on air, native land and freshwater plants and animals, native forests and bush, beaches and coastal waters, and wetlands; and
- Reductions in negative judgements about the environmental impacts of hazardous chemicals, to all 10 resources evaluated.

Other things increasingly rated as harming the environment were:

Item	*Increasingly rated as a main cause of damage to:*
Household wastes and emissions	*Soils*
Pests and weeds	*Marine fisheries, Wetlands*
Commercial fishing	*Marine reserves*
Recreational fishing	*Marine reserves*

Responses are consistent across years for a number of items. Motor vehicles and industrial activities clearly rate as the main causes of damage to air in each year the survey was undertaken. Similarly, sewage and stormwater clearly rates as the main cause of damage to beaches and coastal waters, and commercial fishing as the main cause of damage to marine fisheries, followed by sewage and stormwater.

There were no clear main causes of damage to marine reserves, with responses spread between commercial fishing, sewage and stormwater, recreational fishing, hazardous chemicals, dumping of solid waste, and tourism. Main causes of damage to soils and wetlands were also spread relatively evenly over several categories.

Farming and increased urban development were rated by respondents as two areas significantly damaging to the environment, especially in the 2008 survey. Below: The Canterbury Plains around Rangiora have followed a pattern of lowland forest being turned into farmland, followed by urban sprawl and the conversion of some farms into lifestyle blocks. Bottom: Central pivot irrigator on the Canterbury Plains.

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Table 3.5. Significant changes (cells with asterisks) in ratings of main causes of damage between the 2000 and 2008 surveys. Green shaded cells (and negative percent figures) show a reduction in this cause of damage to the relevant resource. Orange shaded cells (and positive percent figures) show an increase in this cause of damage to the related resource. Note that the percent figures refer to percentage points of change, e.g., farming has increased as a cause of damage to fresh water by 22 percentage points (from 24.7% in 2000 to 46.2% in 2008, an increase of 87.1%).

	Air	Native land and freshwater plants and animals	Native forests and bush	Soil	Beaches & coastal waters	Marine fisheries	Marine reserves	National parks	Wetlands	Fresh waters
Motor vehicles and transport	1%	-2%	-2%		2%			-2%		
Household waste and emissions	** -7%	1%		* 4%	** -7%	1%	-1%		*** -1%	-2%
Industrial activities	0%	1%	-3%	-1%	* -2%	* -3%	-2%	2%	*** -5%	* -5%
Pests and weeds		-5%	-1%	-1%		*** 2%	1%	2%	*** 3%	1%
Farming	*** 8%	*** 17%	*** 9%	*** 12%	*** 4%	*** 2%		0%	*** 5%	*** 22%
Forestry		* -5%	** -8%	3%				*** -7%	0%	-1%
Urban development	* 4%	ns 3%	** 7%	ns -2%	** 6%		ns -1%	ns -1%	*** 3%	ns 3%
Mining		-2%	3%	-2%				-2%	0%	** -4%
Sewage and storm water	0%	* -5%		1%	-3%	-1%	-3%		0%	-3%
Tourism		0%	-3%		0%	0%	-2%	2%	2%	-1%
Commercial fishing					3%	2%	* 6%			
Recreational fishing					1%	4%	* 6%			
Dumping of solid waste	0%	-4%	0%	*** -11%	*** -8%	-2%	-3%	-3%	*** -7%	* -5%
Hazardous chemicals	*** -9%	** -7%	* -3%	*** -13%	*** -9%	*** -13%	*** -11%	*** -1%	*** -8%	*** -15%

*The number of asterisks indicates the strength of significance: * Significant at p<0.05, ** Significant at p<0.01, *** Significant at p<0.001, no asterisk = not significant. Empty cells indicate less than 5% of respondents chose this as one of the main causes of damage to this resource.*

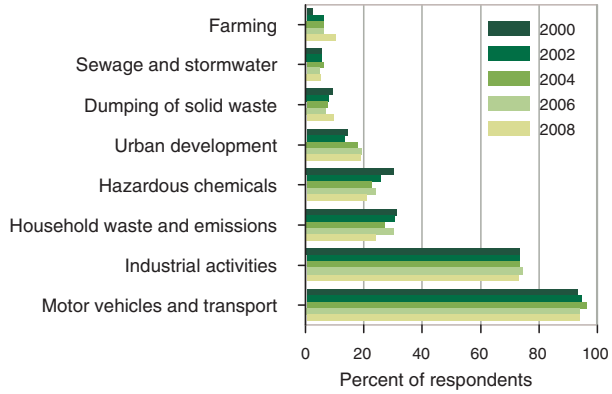

Figure 3.13a. Perceived main causes of damage to air. Categories less then 5% are omitted.

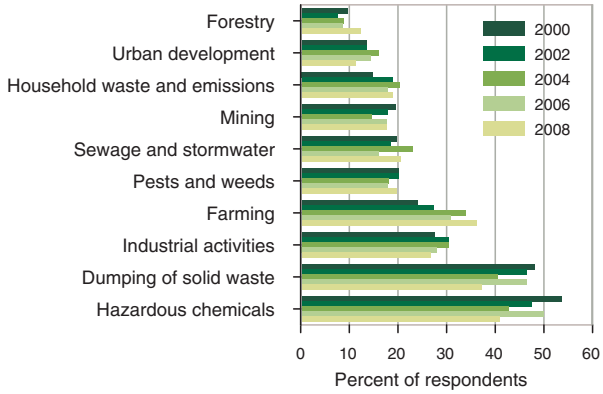

Figure 3.13d. Perceived main causes of damage to soils. Categories less than 5% are omitted.

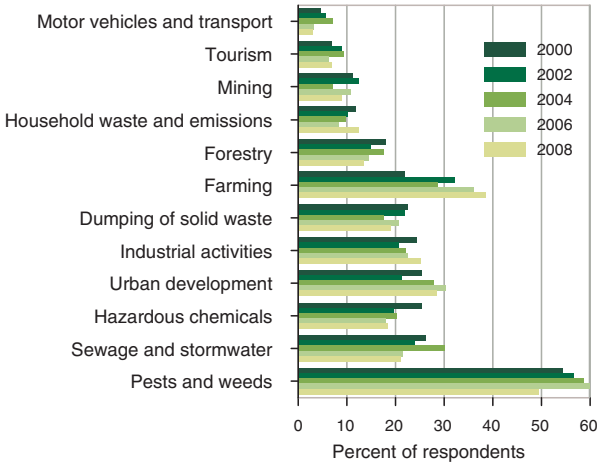

Figure 3.13b. Perceived main causes of damage to native land and freshwater plants and animals. Categories less than 5% are omitted.

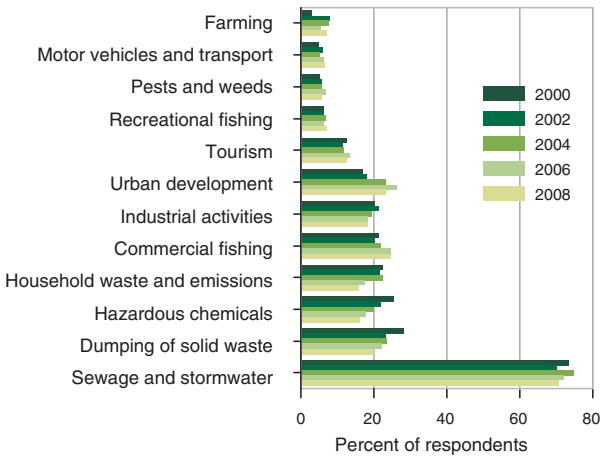

Figure 3.13e. Perceived main causes of damage to beaches and coastal waters. Categories less than 5% are omitted.

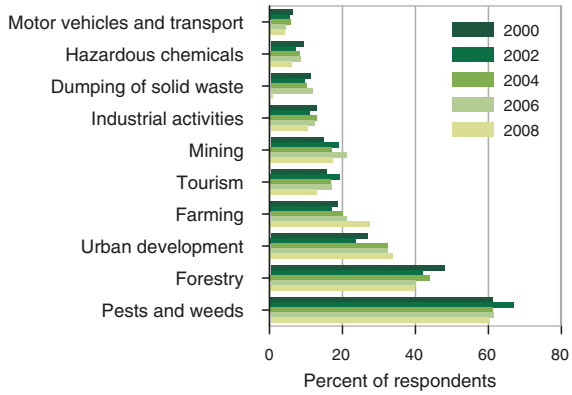

Figure 3.13c. Perceived main causes of damage to native forests and bush. Categories less than 5% are omitted.

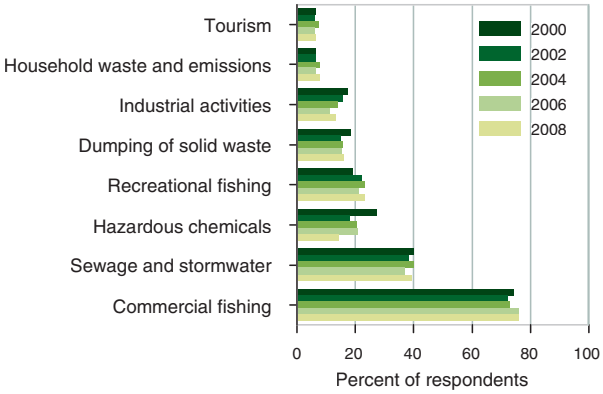

Figure 3.13f. Perceived main causes of damage to marine fisheries. Categories less than 5% are omitted.

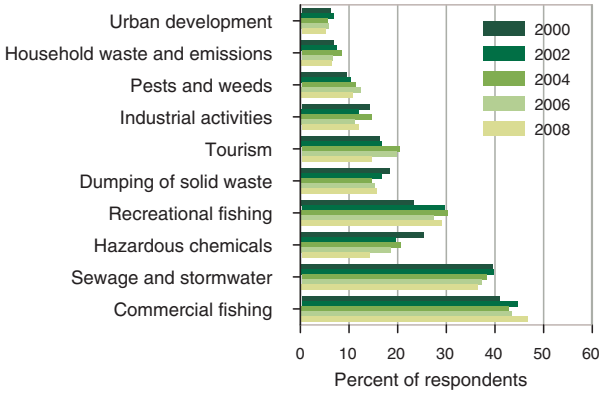

Figure 3.13g. Perceived main causes of damage to marine reserves. Categories less than 5% are omitted.

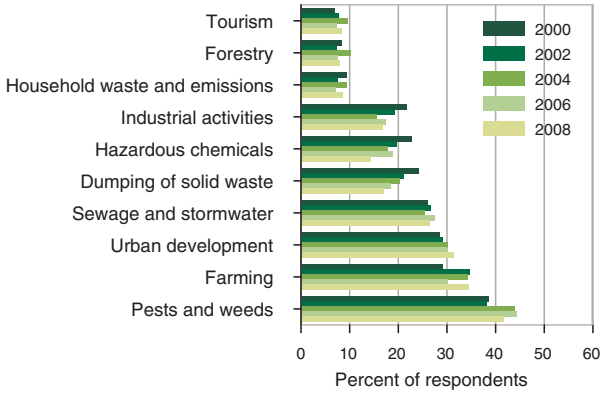

Figure 3.13j. Perceived main causes of damage to wetlands. Categories less than 5% are omitted.

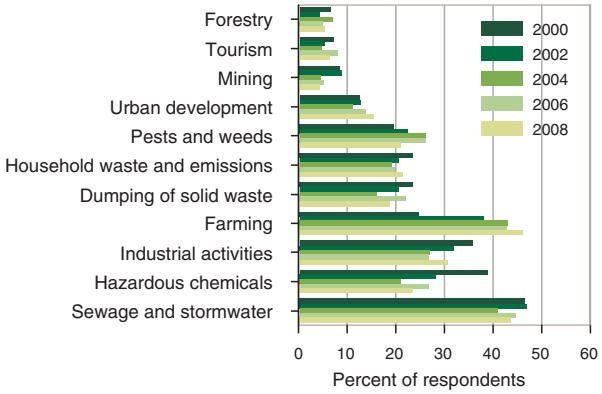

Figure 3.13h. Perceived main causes of damage to fresh waters. Categories less than 5% are omitted.

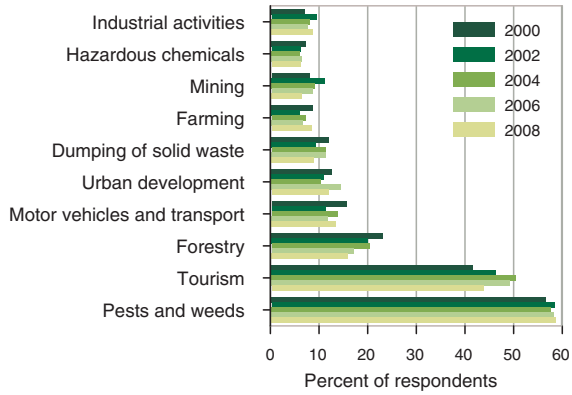

Figure 3.13i. Perceived main causes of damage to national parks. Categories less than 5% are omitted.

Farming was perceived as the single greatest cause of damage to freshwater systems in New Zealand; the percentage of respondents holding this view has almost doubled since the 2000 survey. Below: a farm stream near Blenheim.

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3.5.1 Ethnicity

Differences between ethnic group ratings of main causes of damage to two key resources were explored: air, and fresh waters. There are no overall significant differences in ratings of causes of damage to air ($p=0.48$) (Figure 3.14). Within-category analysis of the different causes was then undertaken, showing that people of 'other ethnicity' were more likely to attribute cause of damage to air to urban development than were NZ European or Maori respondents ($p<0.05$).

Although the overall ethnic analysis of damage to fresh waters was not significant ($p=0.10$) (Figure 3.15), some further within-category analysis was undertaken. Whereas NZ Europeans were more likely than others to have defined farming as a key cause of damage to fresh waters ($p<0.01$), they were less likely to have identified hazardous chemicals ($p<0.01$), than were Maori or 'other ethnicity' respondents.

3.5.2 Regional differences

For spatial analysis the nation was divided into three regions. The Southern Region consisted of the South Island, the Northern Region was defined as the Auckland and Northland Regional Council areas, and the Central Region was the remainder of the North Island. Statistical tests identified significant regional differences for air ($p<0.05$) but not for fresh waters ($p=0.16$).

Southern respondents were far more likely to identify household waste and emissions as a major cause of damage to air ($p<0.001$) than were either Northern or Central respondents.

Northern respondents were more likely to identify household waste and emissions as a major cause of damage to fresh waters ($p<0.05$, Figure 3.17) than were Central, or Southern respondents in particular. The difference in the responses on farming were not significant ($p=0.195$).

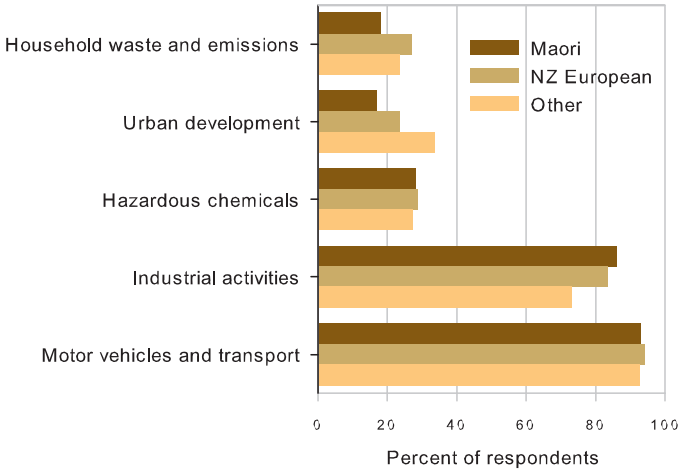

Figure 3.14. Perceived main causes of damage to air, by ethnicity. Categories less than 10% are omitted.

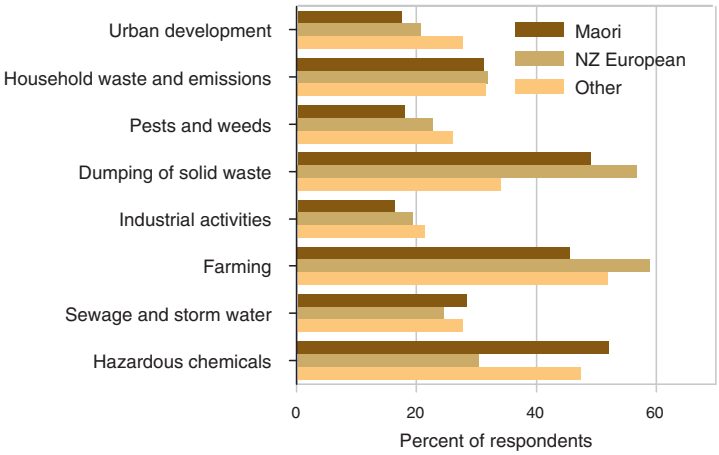

Figure 3.15. Perceived main causes of damage to fresh waters, by ethnicity. Categories less than 10% are omitted.

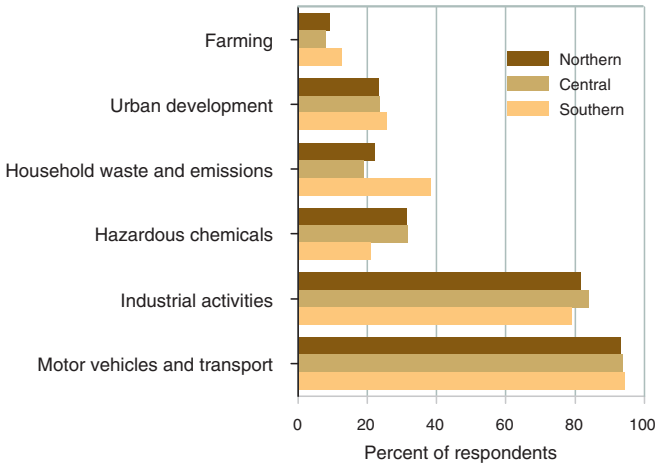

Figure 3.16. Perceived main causes of damage to air, by region. Categories less than 10% are omitted.

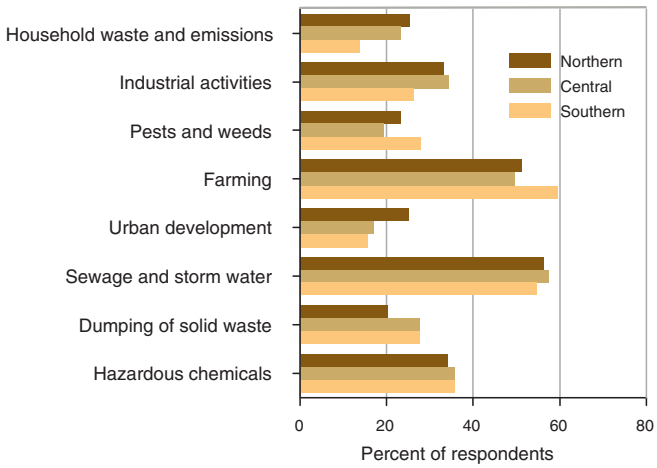

Figure 3.17. Perceived main causes of damage to fresh waters, by region. Categories less than 10% are omitted.

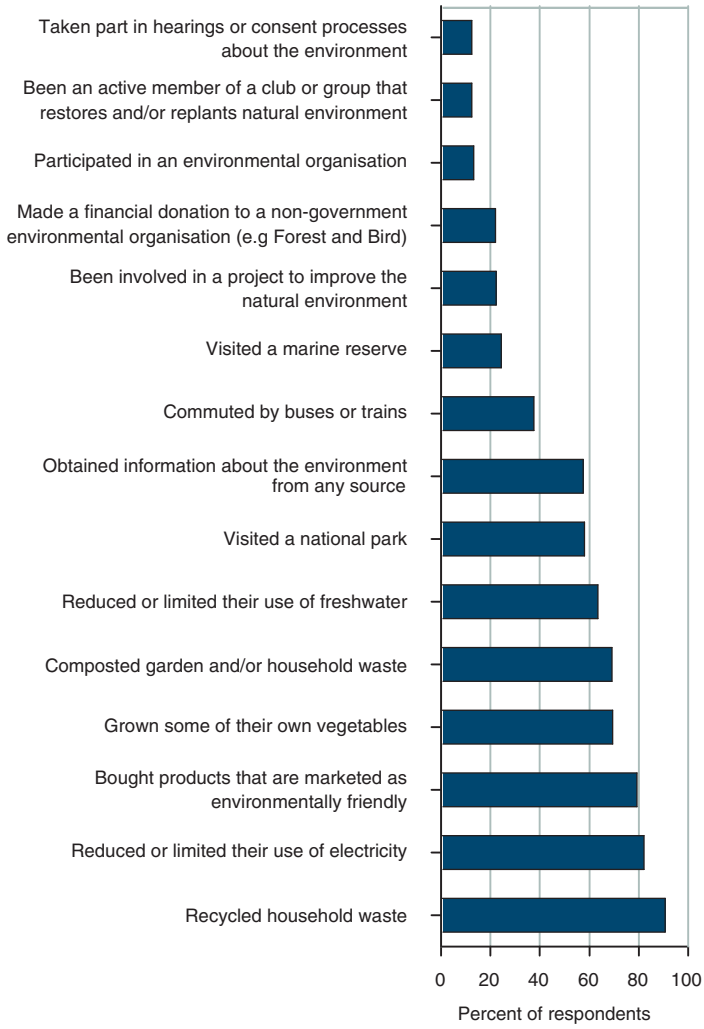

Figure 3.18. Reported participation in environmental activities, 2008.

3.6 PARTICIPATION IN ENVIRONMENTAL ACTIVITIES

The 2008 Survey

Participation in a range of environmental activities has been monitored since 2000. However, in 2002 the question was modified and as a result only data and analysis from the 2002, 2004, 2006 and 2008 surveys are presented here. Figure 3.18 shows levels of participation in 15 environment related activities during the preceding twelve months. Around 80% or more of respondents to the 2008 survey recycled household waste, bought products marketed as environmentally friendly, or had reduced or limited their use of electricity. Over half had composted garden and/or household waste, grown some of their own vegetables, reduced or limited their use of fresh water, visited a national park, or obtained information about the environment from any source. Few respondents, however, had been involved in the restoration or replanting of the natural environment, had participated in an environmental organisation, or had taken part in hearings or consent processes about the environment. Two activities added to the survey in 2006 were 'Reduced or limited your use of fresh water' (63.4% participation) and 'Made a financial donation to a non government environmental organisation (e.g., Forest and Bird)' (22.0% participation).

Rates of participation were evaluated against age, education and ethnicity. While participation rates do vary by socio-demographics, these variations are mostly insignificant (e.g., $p>0.05$ for all age and ethnic evaluations). There were some significant variations however, in terms of education, namely:

- Those with a trade or higher qualification were around 2.5 times as likely to participate in an environmental organisation than were others with lesser qualifications ($p=0.001$)
- Those with a trade or higher qualification were around twice as likely to be an active member of a club or group that restores and/or replants natural environments than were others with lesser qualifications ($p<0.05$)

These results indicate that there is an overall high level of participation in many environmental activities, irrespective of most socio-demographic influences. This conclusion is only slightly modified by the finding that participation in environmental organisations and restoration activities is strongest amongst those with high levels of education, a perhaps unsurprising finding.

Trends 2002–2008

Figure 3.19 shows the extent of between-survey reported changes in behaviour. Table 3.6 shows a comparison of participation in activities between the 2000 and 2008 surveys. Significant increase in participation is reported by respondents in limiting their use of electricity, commuting by buses or trains, recycling household waste and obtaining information about the environment. The first, second and third of these increases are likely explained by national energy savings and recycling campaigns and response to price signals such as energy and transport costs. Two significant decreases occurred—visits to marine reserves and visits to national parks. Why these decreases have occurred is unknown. Perhaps increasing transport costs have also played a role here.

3.7 MAJOR ENVIRONMENTAL ISSUES—NEW ZEALAND AND THE WORLD

Respondents were asked, in two open-ended questions, to identify the most important environmental issues facing New Zealand and the World today. Responses to these questions are difficult to code (i.e., there is likely to be some within and between survey variability) and to analyse (e.g., should all fresh-water-related items be clustered or should some attempt be made to subcategorise where possible?). Furthermore, there is evidence that some respondents are influenced by the case-study focus of the survey. For example, in 2006 transport was the case study and transport was identified as a significant New Zealand issue—neither was the case in 2008. Because of these difficulties some care needs to be taken when evaluating within- and between-year responses.

Table 3.6. Significant changes in participation in environmentally-related activities between the 2000 and 2008 surveys. Green shaded cells show a significant increase in this activity. Red shaded cells show a significant decrease in this activity.

Activity and significance of change between surveys	Percent participation 2000	Percent participation 2008
Reduced or limited electricity use ***	62%	83%
Commuted by buses or trains ***	18%	38%
Recycled household waste ***	85%	91%
Bought products that are marketed as environmentally friendly (NS)	86%	84%
Composted garden and/or household waste (NS)	71%	69%
Grown some of their own vegetables (NS)	71%	70%
Been involved in a project to improve the natural environment (NS)	22%	22%
Been an active member of a club or group that restores and/or replants natural environments (NS)	12%	13%
Obtained information about the environment from any source *	53%	58%
Taken part in hearings or consent processes about the environment (NS)	14%	13%
Participated in an environmental organisation (NS)	13%	13%
Visited a marine reserve ***	36%	25%
Visited a national park ***	66%	58%

*The number of asterisks indicates the strength of significance: * Significant at p<0.05, ** Significant at p<0.01, *** Significant at p<0.001, ns = not significant.*

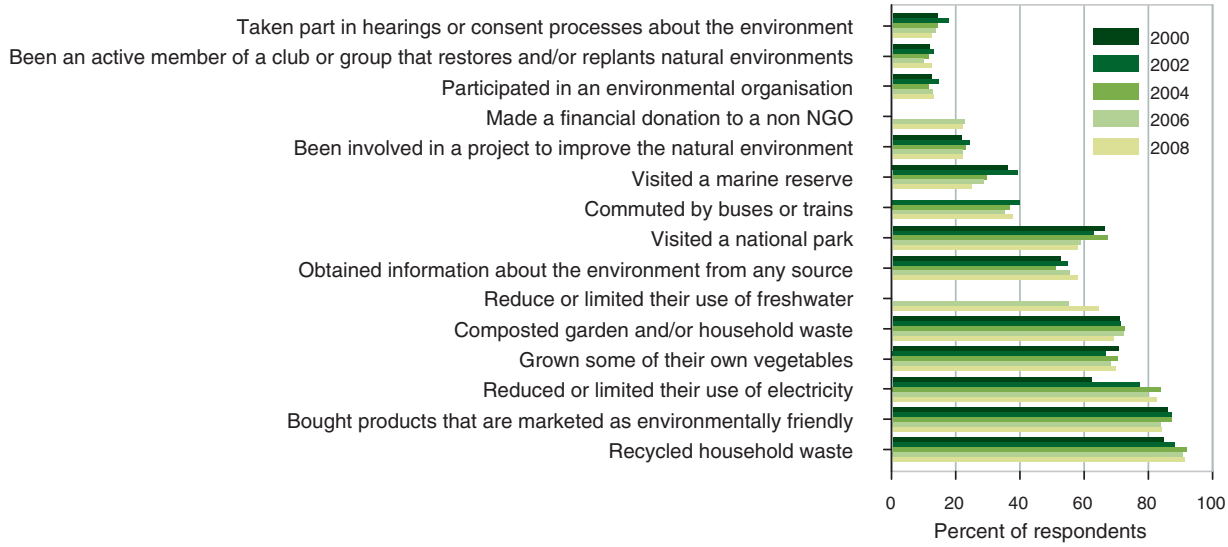

Figure 3.19. Trends in reported participation in environmental activities.

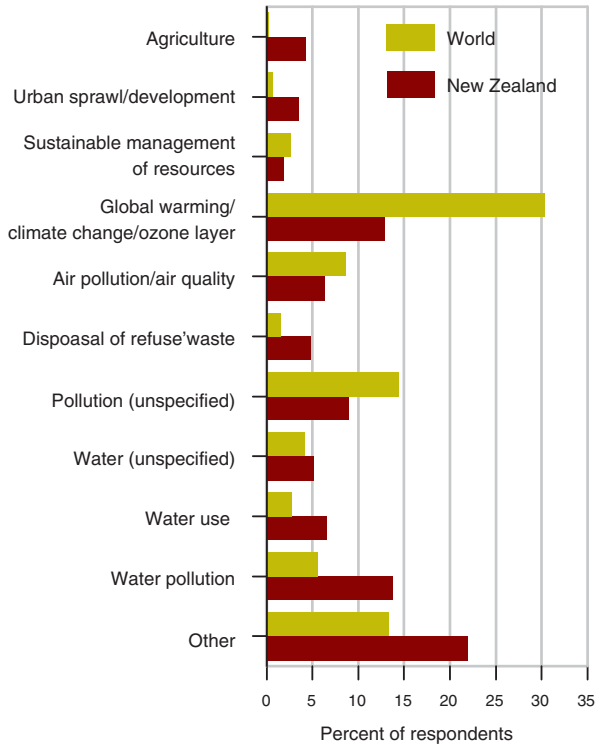

Figure 3.20. Most important issues facing New Zealand and the World (Note – items only included where at least 5% of respondents identified the issue for either New Zealand or the World).

The 2008 Survey

'Water quality and/or water pollution' (14.2% of respondents) was identified as the most important environmental issue facing New Zealand (Figure 3.20). Respondents identified 'Global warming/climate change/ozone layer' (30.9%) as the single biggest issue facing the world, followed by various forms of pollution (24.2% total across all pollution categories).

Comparing responses for New Zealand and the World indicates that New Zealanders are much more concerned about 'Global warming/ climate change/ozone layer' at the global level, whereas domestically the concern is about matters the country can do something about, such as water pollution.

Trends 2002–2008

There were highly significant differences between the surveys ($p<0.001$). The major change has been the increased response for 'water pollution' and other fresh-water-related issues as the single most important environmental issue(s), increasing significantly ($p<0.001$) from 6.9% in 2002 to a combined total of around 32.3% in 2008. This increase is closely associated with a major decline in the 'other' category perhaps indicating the greater awareness and knowledge of fresh water related issues. There was also a notable increase over the surveys for 'global warming/climate change' (6.3 to 16.3%).

Issues to decline over the surveys were 'introduced pests/weeds/diseases' (10.5% to negligible in 2008), and 'air pollution/air quality' (17.4 to 7.9%).

04

SHUTTERSTOCK

Geothermal power generation in the central North Island

INDIVIDUAL RESOURCES

In section 3 the Pressure-State-Response (PSR) model was used as a framework to examine perceptions of the New Zealand environment across all resource areas. In this section each resource area is examined in turn. The following individual resource areas are addressed:

- Natural environment in towns and cities
- Air
- Native land and freshwater plants and animals
- Native bush and forests
- Soils
- Coastal waters and beaches
- Marine fisheries
- Fresh waters (incorporating rivers and lakes and groundwater)
- National parks
- Wetlands
- New Zealand's natural environment compared to other developed countries.

Each set of graphs represents an analysis of the data presented in Section 3, and included in Appendix 3. Thus, each graph typically contains five important elements:

- 2000 survey data
- 2002 survey data
- 2004 survey data
- 2006 survey data
- 2008 survey data.

Chi-square tests of the significance of the difference between the distributions were undertaken wherever possible, but only significant differences are reported. Significance levels indicate a change in the distribution of responses between the five surveys. Probabilities of these outcomes occurring by chance, where significant, are given alongside the graph title.

A comparative analysis of each resource area precedes presentation of the graphs. This analysis, where available, incorporates relevant biophysical PSR trend data for comparative purposes. The Ministry for the Environment's report, *Environment 2007* (MfE 2007), released in early 2008 provides the primary reference point for this comparison. However, that report is not particularly comprehensive so where necessary other published biophysical data is used, including the OECD (2007) country report for New Zealand. We have used Esty *et al.* (2008) for the global context—their Environmental Performance Index (EPI) is the mostly widely cited source of international data. In this situation performance data for New Zealand are compared to four other countries (see Table 4.1).

4.1 NATURAL ENVIRONMENT IN TOWNS AND CITIES

Scientific information on state and trends

Most New Zealanders, in common with other 'developed' countries, live in urban environments. There is no national set of urban environmental indicators (although see below regarding the Big Cities Project) and hence it is not possible empirically to determine state of the environment trends for the urban environment. However, there is increasing research and management interest in questions around urban sustainability and quality of life. In terms of policy initiatives the Ministry for the Environment has introduced the New

Table 4.1. Summary ranking and individual resource reporting data from the EPI for New Zealand and four other 'developed' countries (Data source: Esty et al. 2008, extracted and summarised from Data Spreadsheet for 2008 EPI).

Country	EPI country score (/100) (rank from 149 nations)	Air – Health impacts (/100)	Water – environmental effect (/100)	Biodiversity (/100)	Fisheries (/100)	Marine Protected Areas (/100)
New Zealand	88.9 (7th)	97.9	98.9	61.9	86.3	2.0
Sweden	93.1 (2nd)	97.9	97.1	58.0	78.4	26.0
United Kingdom	86.3 (14th)	97.9	87.4	47.2	47.3	3.0
United States	81.0 (39th)	94.8	73.1	65.3	72.4	38.0
Australia	79.8 (46th)	97.9	62.5	78.1	96.7	78.0

Zealand Urban Design Protocol (MfE 2005). The Protocol is part of the Government's Sustainable Development Programme of Action and Urban Affairs portfolio and aims to make New Zealand's towns and cities more successful by using quality urban design to help them become:

- Competitive places that thrive economically and facilitate creativity and innovation
- Liveable places that provide a choice of housing, work and lifestyle options
- Environmentally responsible places that manage all aspects of the environment sustainably
- Inclusive places that offer opportunities for all citizens
- Distinctive places that have a strong identity and sense of place
- Well-governed places that have a shared vision and sense of direction.

In addition the Government's Urban and Economic Development Office (GUEDO), located in Auckland, gives a shared focus to urban sustainability initiatives (see www.mfe.govt.nz).

This initiative has been complemented by activities of the Big Cities Project (http://www.bigcities.govt.nz/). This latter project has incorporated perceptions surveys (Gravitas Research and Strategy Ltd 2005) and developed a set of quality of life indicators which include the natural environment. These latter indicators are reported in Quality of Life '07 (see The Metropolitan Sector Group 2007). In terms of biodiversity, the study reports on three indicators:

- Initiatives councils have taken to address biodiversity through their Long Term Council Community Plans
- Hectares of privately owned open space covered by QEII Trust registered covenants
- Number of ecological heritage sites.

Unfortunately, none of these indicators is a particularly robust measure of the status of the natural environment and therefore they are of limited comparative utility. Despite this concern, there are indications that the state of some aspects of particular natural environments in urban areas around New Zealand is improving (e.g., riparian management, sand dune management, and management of weeds and pests in native bush, K. Hughey, pers. obs.).

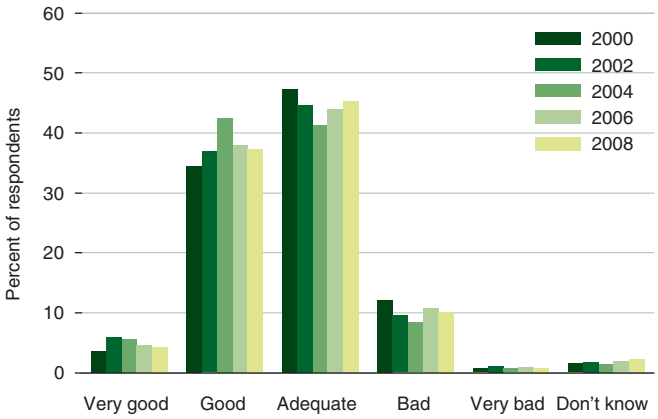

Figure 4.1a. Perceived condition of the natural environment in towns and cities ($p<0.01$).

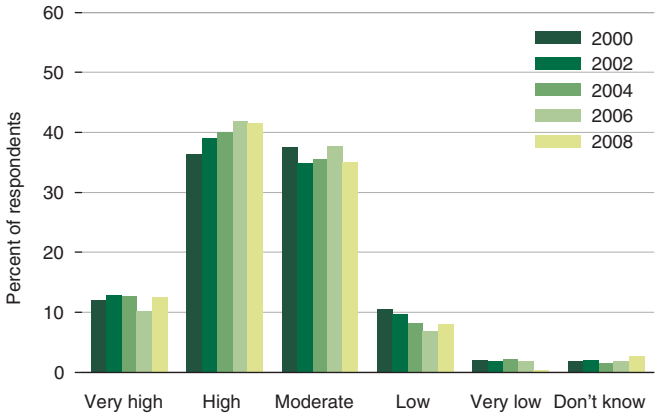

Figure 4.1b. Perceived availability of parks and reserves in towns and cities ($p=0.05$).

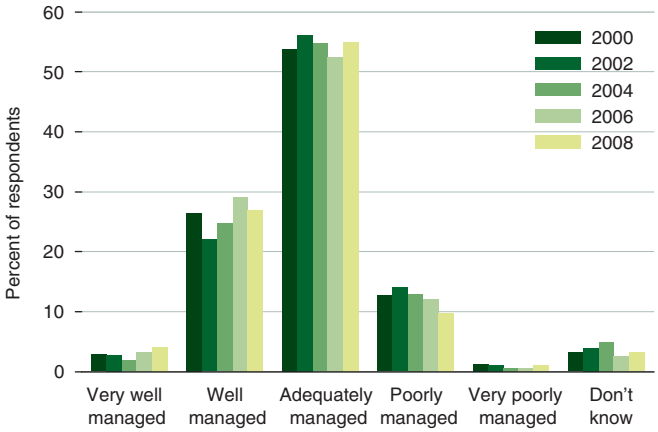

Figure 4.1c. Current management of the natural environment in towns and cities.

Perceptions of state, pressures and management trends

It is clear from all five surveys that most people consider the natural environment in towns and cities to be 'adequate' or 'good' (Figure 4.1a). The availability of parks and reserves is 'moderate' or 'high' and increasing significantly (Figure 4.1b). All 'indicators' in this set scored positively, unlike any other environmental component that was examined. The natural environment in towns and cities is considered to be adequately to well managed (Figure 4.1c).

Commentary

With most New Zealanders living in an urban environment their knowledge of environmental issues associated with this context should be high—this is borne out by the low levels of 'don't know' responses. Although not explored in any detail, it does seem surprising that issues such as relatively poor air quality (especially in Auckland and Christchurch) do not appear to have resulted in any downgrading of people's perceptions—this might be because people perceive this survey question to relate more to other aspects of town and city environments, such as parks, reserves, stream and beach frontages. Having said this, MfE (2007) have highlighted the many water quality issues associated with urban streams and rivers. While highly speculative, it might be that respondent understanding of the natural environment in towns and cities is relatively narrow and largely limited to cosmetic and space related issues—this matter requires further research.

4.2 AIR

Scientific information on state and trends

Superficially conflicting views have often been expressed about air quality in New Zealand. On the one hand there continues to be concern amongst scientists about the health effects of air pollution, including increased mortality from vehicle emissions in the greater Auckland region (Fisher *et al.* 2007) and links between increases in air-borne particulates and increased mortality and increased respiratory hospital admissions in Christchurch (Hales *et al.* 2000). On the other hand, MfE (2007: 163) reports that "levels of PM10 particulates and carbon monoxide have fallen in Auckland and Christchurch over the past 10 years". Further analysis of the information available from MfE indicates that in general air quality in New Zealand is good in most locations. However, "about 65 per cent of New Zealanders live in a gazetted airshed as a result of New Zealand having a highly urbanised population" (MfE 2007: 156). Statistics New Zealand (2002: 31) conclude that "trends in air quality over the past 20 years indicate that air quality in New Zealand is getting better in some respects but getting worse in others". There are air pollution issues in New Zealand's largest cities (North Shore City Council *et al.* 2003: 105). On the other hand, New Zealand's air quality ranks highly compared to most other nations (Esty *et al.* 2005) and compares well with the other four nations in Table 4.1, reflecting the fact that over much of the country air quality is very high. This analysis leads to the conclusion that while 'rural' air quality is high there are significant problems in several major urban areas and thus the state of air quality should at best be considered as 'adequate'.

Respondents considered the state of the natural environment in urban areas to be generally good, perhaps based mostly on the increasing availability of parks and reserves. Below: an urban bush walk in Auckland.

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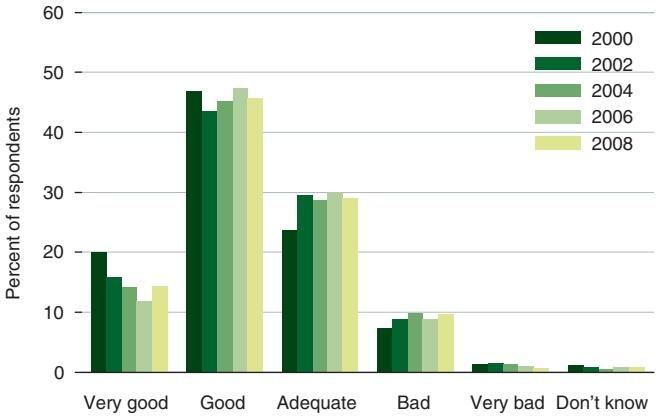

Figure 4.2a. Perceived state of air quality ($p<0.001$).

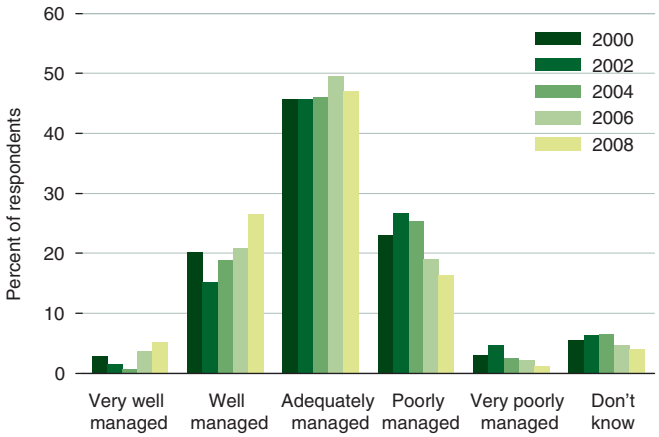

Figure 4.2b. Perceptions about management of air quality ($p<0.001$).

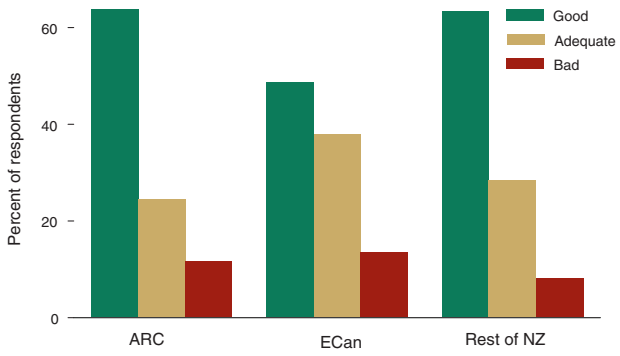

Figure 4.2c. Perceived state of air quality by regional council ($p<0.05$).

Overall then, while there are problems there are also examples of places where some major pollutants are reducing. For example, annual total suspended particulate levels in Auckland (MfE 2007: 159), Nitrogen Dioxide in Christchurch (p167), Carbon Monoxide in Auckland and Christchurch (p171), and Sulphur Dioxide in Auckland and Christchurch (p173) have all declined over a variety of time periods.

Perceptions of state, pressures and management trends

From all five surveys it is clear that New Zealanders consider air quality to be good, but an increasing and significant number of respondents believe its condition has declined since 2000 (Figure 4.2a).

The main pressures on air are considered to be 'motor vehicles and transport' and 'industrial activities' (Figure 3.13a).

Most respondents over all five surveys consider the quality of air management to be adequate and improving significantly ($p<0.001$).

The 2008 survey was subjected to a limited regional level analysis with respondents from the Canterbury and Auckland regional councils separated and compared to the rest of New Zealand (Figure 4.2c). Findings are broadly consistent with those from North Shore City Council *et al.* (2003). Canterbury residents were more likely to express a negative view compared to the rest of New Zealand, although on average Aucklanders did not appear to have the same level of concern as Cantabrians did about air quality.

Commentary

Continued public awareness and debate over transport and related air quality issues may be contributing to changes in responses, especially in the Auckland dominated northern region. Frequent discussion about climate change and vehicle emissions has kept matters of air quality in the media. MfE introduced National Environmental Standards for Air Quality in 2004 (MfE 2004). The 14 standards include:

- seven standards banning activities that discharge significant quantities of dioxins and other toxics into the air
- five standards for ambient (outdoor) air quality
- a design standard for new wood burners installed in urban areas
- a requirement for landfills over 1 million tonnes of refuse to collect greenhouse gas emissions.

Release of these standards created much public debate, especially in Christchurch and Auckland, throughout 2005 and much of 2006. In combination these policy initiatives and associated environmental and health problems have helped maintain interest in air quality issues.

4.3 NATIVE LAND AND FRESHWATER PLANTS AND ANIMALS

Scientific information on state and trends

While Esty *et al.* (2005: Appendix B: 200) ranked New Zealand very poorly in terms of biodiversity performance—indeed one of the worst of 142 nations evaluated, the evaluation of Esty *et al.* (2008: Table 4.1) indicates New Zealand is performing reasonably well compared to similar countries (albeit given these have vastly differing biodiversity contexts). Both findings perhaps are predictable. In the first instance, New Zealand has a disastrous record of extinctions of bird, bat, freshwater fish and other species, and many species remain under threat. However, credit needs to be given for New Zealand's improving conservation efforts (e.g., a huge increase in the area of land subject to pest control by DoC since 2000 (MfE 2007: 395)) which is reflected partly in the Esty *et al.* (2008) evaluation.

Even given the above mixed scorecards, conservation of New Zealand's native plants and animals remains one of the country's main environmental issues (DoC and MfE 2000). New Zealand's diverse flora and fauna comprises many endangered plants and animals, some of which, e.g., kiwi and kakapo, remain as national symbols and attract high levels of media interest and corporate sponsorship. Hitchmough *et al.* (2005) re-evaluated the risk of extinction for New Zealand's threatened and potentially threatened species of animals and non-vascular plants using the New Zealand Threat Classification System. The number of species listed as threatened increased to 2788 in 2005 from 2372 in 2002.

Another study found that seven selected native species used as indicators of biodiversity levels have shown a marked reduction in range since human settlement, and six have declined further since the 1970s (MfE 2007: 377–391).

Based on the above, the state of New Zealand's biodiversity can be regarded as bad or very bad. This is perhaps a contentious conclusion given that the New Zealand archipelago is considered a biodiversity 'hotspot' (Given and Mittermeier 1999). Despite this recognition the state of a major component of the indigenous biodiversity is clearly in significant decline.

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Respondents did not seem to be aware of the seriousness of the biodiversity crisis in New Zealand, continuing to rate the diversity of native terrestrial flora and fauna as adequate to good. Native species, however continue to decline. Above: an introduced wasp attacking a native moth, and an Australian white-tailed spider preying on a native spider.

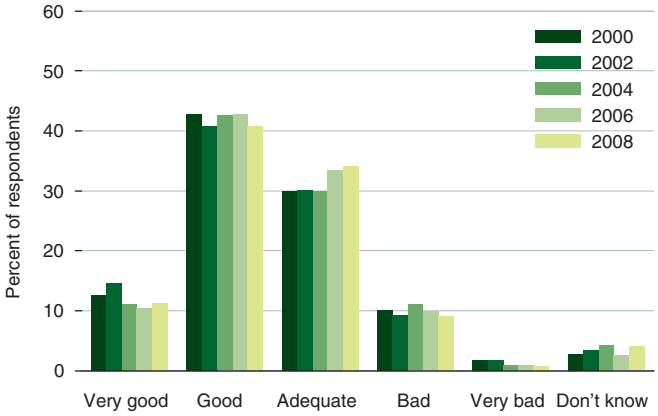

Figure 4.3a. Perceived state of native land and freshwater plants and animals.

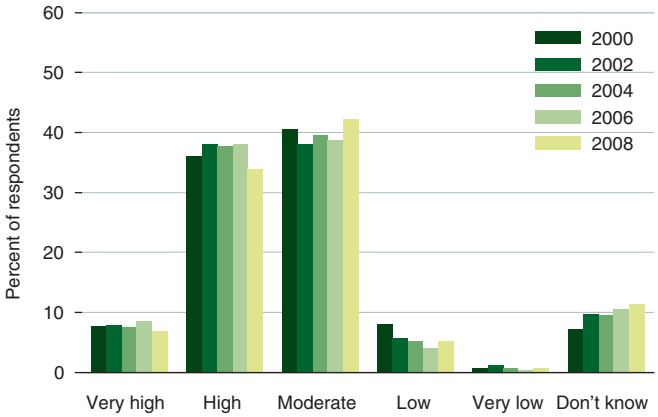

Figure 4.3b. Perceived diversity of native land and freshwater plants and animals.

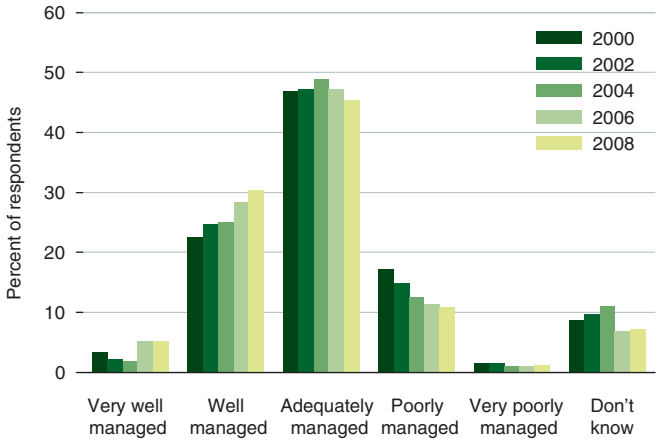

Figure 4.3c. Perceptions about management of native land and freshwater plants and animals

Perceptions of state, pressures and management trends

Survey respondents have continued to rate the condition (Figure 4.3a) and diversity (Figure 4.3b) of native land and freshwater plants and animals as adequate to good. Key pressures have been identified (Figure 3.13b) as pests and weeds (55–60% of respondents), forestry, urban development and, increasingly, farming (22–36%). An increasing proportion of respondents is rating management of native land and freshwater plants and animals well to very well managed (Figure 4.3c) ($p<0.001$).

Commentary

Why respondents continue to rate the condition of New Zealand's native plants and animals as 'adequate' or 'good' remains surprising when clearly it is not the case. There are thousands of threatened and endangered species in New Zealand (Hitchmough *et al.* 2005), key indicator species' ranges continue to decline (MfE 2007) and the conclusions drawn in the comparative global performance reported by Esty *et al.* (2005) attest to the poor biodiversity performance of New Zealand, both in comparison to other environmental resources and in international comparisons. We continue to suggest the need for more research in this area, but it might be hypothesised that the enormous amount of apparently 'good' news about endangered species management projects (e.g., every extra kakapo is treated with acclaim by the media) is masking the true gravity of the biodiversity crisis in New Zealand. Equally, respondents who continue to attribute forestry as a major cause of decline (around 40% in 2008) are ignoring the fact that there is relatively little indigenous forest logging occurring in New Zealand. This conclusion needs to be tempered by the fact that OECD (2007) reported that 175km^2 of indigenous habitat disappeared from 1996–2002 and experts say the true figure is at least double that. Equally, loss of biodiversity to urban development is likely to be miniscule compared to losses due to farming intensification and other activities, given the enormous differences in scale.

4.4 NATIVE BUSH AND FORESTS

Scientific information on state and trends

The ongoing need for sustainable and conservation-based management of native bush and forests is now little debated in New Zealand. While there are some contentious issues, including sustainable logging of indigenous forests and the future of the South Island Landless Natives Act forests in Southland, mostly the emphasis is on protecting what remains, especially from pests and weeds. New Zealand's original forest cover has been reduced from around 85% of terrestrial area to about 24% (MfE 2007: 216). About 80% of this remaining forest is now managed for conservation purposes by the Department of Conservation (Ministry of Agriculture and Forestry 2001). However, MfE (2007: 401) reported that over the last decade "the clearance of native forests has reduced to low levels as a result of sectoral initiatives and stronger legislation, such as the New Zealand Forest Accord 1991 and amendments to the Forests Act 1949, the latter of which largely stopped the clear-felling of native forest. However, other types of New Zealand native land cover, such as broadleaved native hardwoods, mānuka and kānuka, matagouri, and tall tussock grassland, continue to be modified. The OECD (2007) note that a net loss occurred of nearly 175 km^2 of indigenous habitat from 1996–2002. Despite these losses an ongoing increase in conservation covenants on private land has been reported (MfE 2007: 401).

The state of native forests varies, but is not reported on in the national State of the Environment Report (MfE 2007). It is widely believed that browsing pressure from possums, goats, deer, and other introduced species is substantially modifying many forest environments. It has been suggested that "alien species threaten a third of our protected forests (1.8 million hectares) (such that) when not being smothered or overshadowed by exotic weeds, native plants are being eaten by browsing and grazing animals" (DoC, undated). Some very large pest control programmes, particularly those targeting possums, are attempting to redress some of this damage (MfE 2007: 395). However, there is no comprehensive monitoring programme based on a universal set of indicators against which to report trends (see, for example, Central Government Coordinating Group of Biodiversity Chief Executives 2003: 12).

The overall state of native bush and forests is likely to be mixed and to range from good to very poor.

Although the state of native forest in New Zealand is probably declining, respondents perceive it to have improved substantially over the past five surveys. Below: Southern beech forest on the Wharfedale Track, Mount Oxford.

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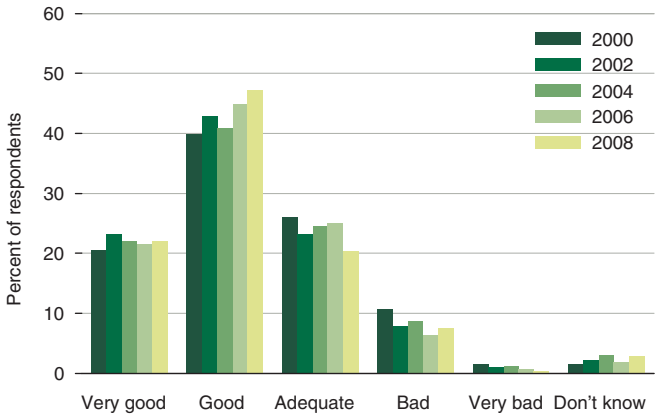

Figure 4.4a. Perceived condition of native bush and forests (p<0.001).

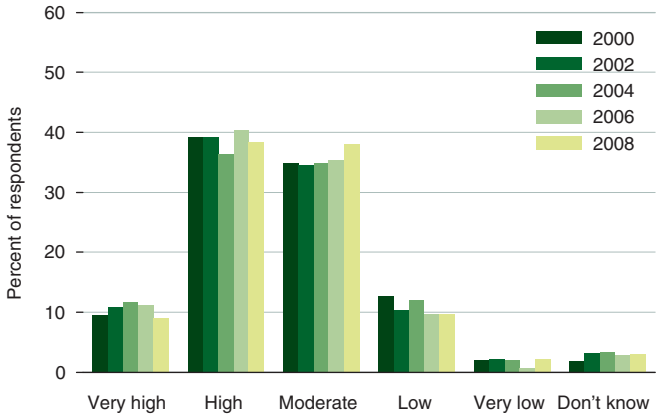

Figure 4.4b. Perceived quantity of native bush and forests.

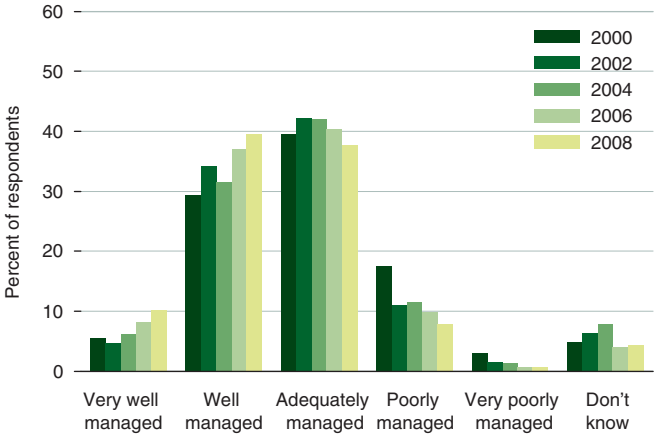

Figure 4.4c. Perceptions about management of native bush and forests (p<0.001).

Perceptions of state, pressures and management trends

Both the perceived condition (Figure 4.4a) (p<0.001) and perceived quality of management (Figure 4.4c) (p<0.001) have improved considerably over the five surveys. Respondents consider condition of native bush and forests to be adequate to very good, with management being adequate to good and improving. Most respondents report a moderate to high amount of native bush and forests. The main perceived pressures (Figure 3.13c) have been 'pests and weeds' (61–67% of respondents), 'forestry' (42–48%), 'urban development' and 'farming'.

Commentary

It remains difficult to accurately determine trends in condition and amount of native bush and forests in New Zealand. However, despite a lack of recent overall scientific trend data it seems likely that the overall extent of native bush and forest is declining slowly, and its overall quality is probably declining as a result of pest and weed damage. These trends do not appear to be reflected in the public response, which views native bush and forests very positively, possibly because of the large number of pest control programmes underway, and restoration programmes such as Project Crimson (2008) which is designed to protect pohutakawa trees. It is also surprising that respondents continue to identify forestry and urban development as the second and third most important causes of damage to native forests and bush. There is little indigenous forestry logging occurring in New Zealand and urban development into forest areas is absolutely minimal, especially compared to the relatively much larger impacts from farming intensification.

4.5 SOILS

Scientific information on state and trends

MfE (2007: 237, citing Sustainable Land Use Research Initiative, no date) note that 17% of New Zealand's GDP depends on the top 150 mm of the country's soil. Soils are critical resources for agriculture, horticulture and forestry, yet they remain a largely unnoticed resource that receives little or no media attention and/or public interest. It is clear from the State of the Environment Report (MfE 2007) that all is not well with our soils. For example, there are accelerated rates of soil erosion in areas such as the East Coast of the North Island, and erosion was exacerbated by heavy rains during 2005–2006 in the Manawatu and Wanganui regions of the lower west of the North Island. Soils are often over-exploited and productivity is sustained through topdressing as basic structural components begin to break down in many areas. A growing pressure on the health of the country's soils is urban and rural lifestyle subdivision, which is putting pressure on versatile soils in some areas (MfE 2007: 253).

However, in some other respects the results are reassuring. For example, data from the 500 soils project funded by the Ministry for the Environment's Sustainable Management Fund (and others) showed that:

> *"Overall, New Zealand soils are in reasonable shape. But about 20% of the soils surveyed caused us some concern, chiefly because of an excess of fertilisers, rather than a deficit. Also, more than a third of soils used for pastures and cropping were compacted more than is advisable"* (Sparling 2003: 2).

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Erosion has a significant impact on soils in many parts of New Zealand. Right: Natural erosion in the Craigieburn Forest Park near Cass Saddle.

More recent monitoring reported by Sparling (2007; cited in MfE 2007: 237) shows:

- "widespread moderate compaction under pastures and some cropping land uses;
- a loss of organic matter and soil structural stability under cropping; and
- nitrogen build-up under some dairy pastures, coupled with high levels of available phosphate".

Soils are likely to be another area where public perception differs from research and monitoring findings. Given the scientific findings about soil deterioration and the importance of soils, it is somewhat surprising that soils are not even mentioned in Statistics New Zealand (2002) efforts to monitor progress 'towards a sustainable New Zealand'.

The state of soils in New Zealand is clearly mixed, but overall they are in reasonable shape.

Perceptions of state, pressures and management trends

Most respondents believe the quality or condition of soils is good to adequate (Figure 4.5a). The main pressures on soils (Figure 3.13d) are 'hazardous chemicals' (41–54% of respondents), 'dumping of solid waste' (37–48%) and 'farming' (24–36%), with the latter increasing significantly since the first survey in 2000. Around half the respondents thought management was adequate (Figure 4.5b), but (consistent with other surveys) slightly less than 20% of respondents expressed a 'don't know' opinion about the quality of soil management.

Commentary

Without easily understood or widely available or publicised information it is difficult for the public to judge trends in the state of soils in New Zealand. Despite this problem, around 90% of respondents are prepared to express an opinion on soil condition, although around 20% express 'don't know' responses to the other questions. In a general sense people's perceptions roughly match the overall view that soils are in reasonable shape, although there clearly are many issues at local levels associated with particular land management practices, including urban and life style sprawl and land use intensification.

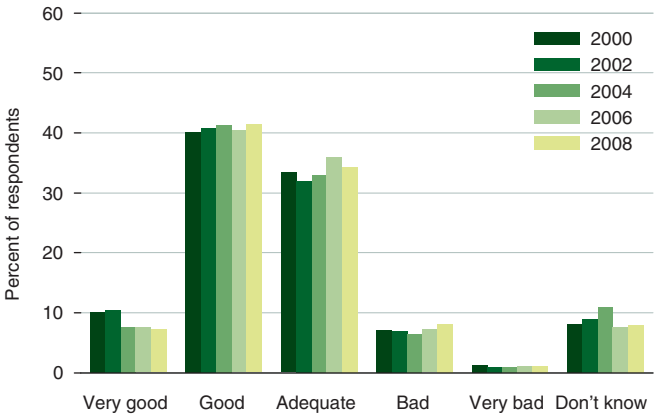


Figure 4.5a. Perceived quality or condition of soils ($p<0.001$).

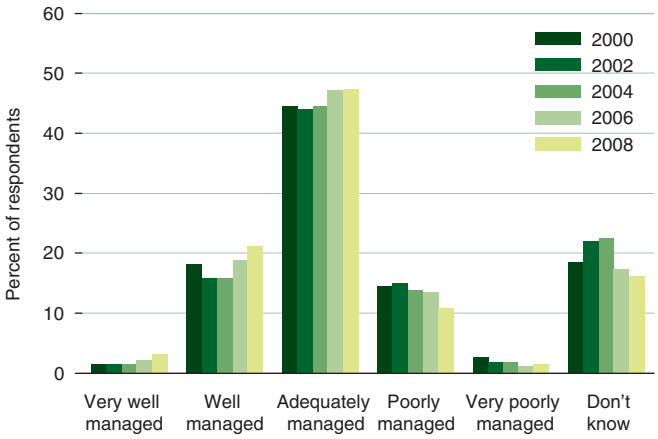


Figure 4.5b. Perceptions about management of soils ($p<0.05$).

4.6 COASTAL WATERS AND BEACHES

Scientific information on state and trends

New Zealand has the fourth largest Exclusive Economic Zone and the eighth longest coastline of any nation. About 80% of the coast is directly exposed to the sea, with the remainder in sheltered harbours and estuaries (MfE 2007). It is near the latter areas where most of the New Zealand population lives. No overall trends in the state of coastal waters and beaches have been reported, but MfE (2007) reports a loss of mangroves during the 20th century, continued discharges of concentrated nutrients into estuaries and harbours, ongoing reclamations and extensive development on previously undeveloped coastlines. MfE (2007: 313) reported that "over the 2006/2007 summer, 80 per cent of the 380 monitored beaches had safe levels of bacteria almost all the time. Only 1 per cent of sites breached bacterial guidelines regularly. Water quality at our beaches appears to have improved in recent years."

Despite reclamations, loss of some mangroves, and localised water pollution, the overall state of New Zealand's coastal waters and beaches can be considered to be good or very good.

Perceptions of state, pressures and management trends

The 2008 survey has demonstrated the continuation of a trend toward perceptions of improving condition (Figure 4.6a) of coastal waters and beaches and of their management (Figure 4.6b). These increasingly positive views resulted in big increases between 2004 and 2006 in particular, with continued improvement in 2008. Overall, respondents now consider the resource to be in an adequate to good condition and coastal waters and beaches to be adequately to well managed. In terms of pressures (Figure 3.13e), 'sewage and stormwater' continues to be, by far, the largest perceived contributor (70–75%).

Commentary

Reasons for the continued trend of more positive responses about coastal waters and beach conditions and management remain largely unknown. While MfE (1997: section 7:88) notes that point source discharges have become better managed over the last 20–30 years, and MfE (2007) suggests an ongoing improvement in swimming beach water quality, there may be other factors influencing the degree of positive feeling by the public in this area.

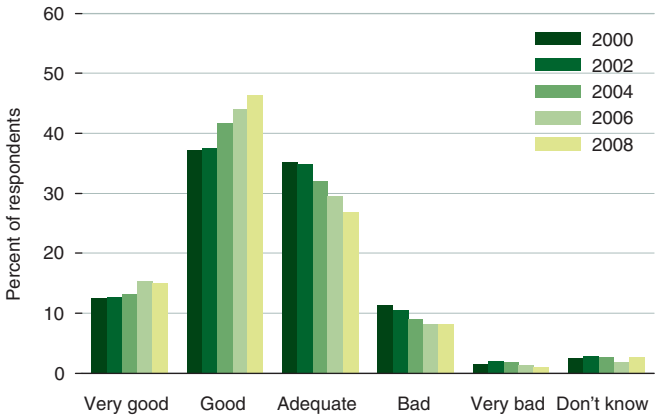


Figure 4.6a. Perceived quality or condition of coastal waters and beaches ($p<0.001$).

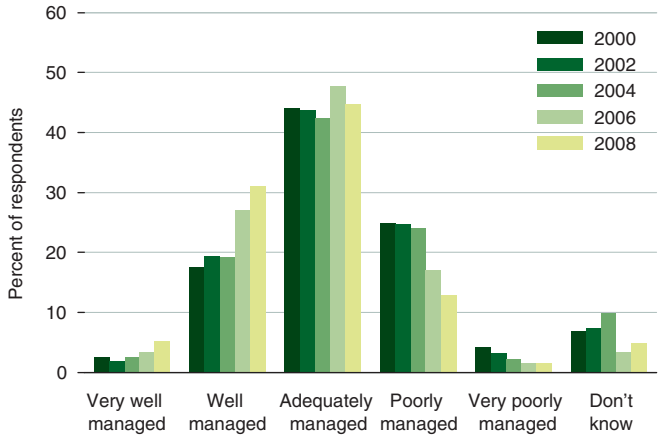


Figure 4.6b. Perceptions about management of coastal waters and beaches ($p<0.001$).

SHELLEY MCMURTRIE

The view of respondents towards the condition of coastal waters and beaches has continued to improve over the five surveys. Right: Stingray Bay, in Te Whanganui a Hei Marine Reserve, Coromandel.

4.7 MARINE FISHERIES

Scientific information on state and trends

Scientific and public debate continues about the state of New Zealand's fish stocks. The Quota Management System (QMS) is credited with improving profitability and efficiency of fisheries (Batstone & Sharp 1999; Kerr *et al.* 2003), but not all fishery management problems have been solved. In particular, some fish stocks have declined, some species outside the QMS are under pressure, and illegal fishing activities, including poaching, high grading and misreporting of bycatch, and the environmental effects of fishing are all recognised as being important (Ministry of Fisheries 2004).

Ministry of Fisheries (2008a) reports that there are currently 129 species, separated into 97 species groupings, that are managed by New Zealand's Quota Management System (QMS). Of 99 fish stocks with sufficient information to assess stock trend, 85% have been fished sustainably and 15% have been overfished and are being rebuilt (MfE 2007: 341). Measures of fisheries habitat sustainability have been defined but do not provide information on sea floor impacts (MfE 2007: 319). There have been some well publicised errors in quota setting. For example, the initial quota for Orange Roughy (1983/84) in the Challenger region was 4,950 tonnes per year. By the 1987/88 fishing year this quota had increased to 12,000 tonnes. Since the early 1990s, in response to declining fish stocks, the quota was steadily reduced until a quota of 1 tonne was set in the 2000/01 fishing year. Questions about the sustainable management of New Zealand's marine fisheries remain topical. While some aspects of New Zealand fisheries management are viewed internationally as world-leading (Hughey *et al.* 2002b), within New Zealand there is much debate about the direction of management. There are initiatives underway to establish integrated fisheries plans, including stakeholder-led fisheries plans and Ministry-led fisheries plans to overcome remaining management issues (Ministry of Fisheries 2008b).

The overall state of marine fisheries (including habitat) in New Zealand is therefore very mixed, from very good to very bad, and consequently can be regarded as only adequate at best.

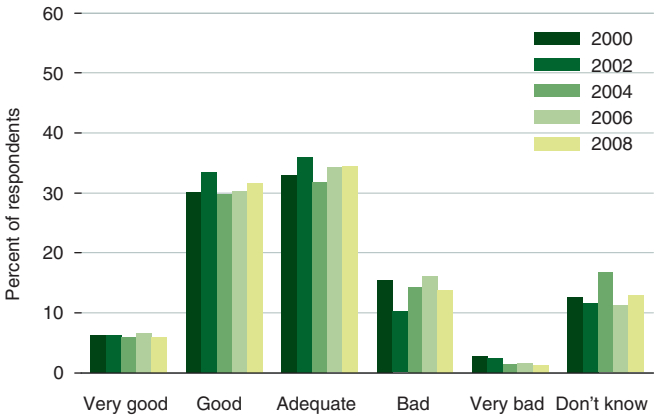


Figure 4.7a. Perceived quality or condition of marine fisheries ($p<0.001$).

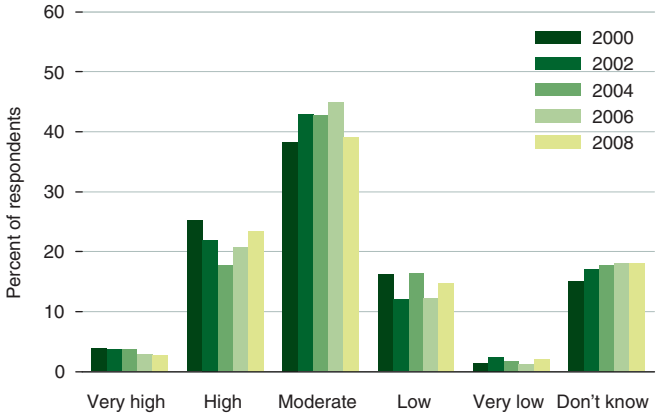


Figure 4.7b. Perceived quantity of marine fisheries ($p<0.01$).

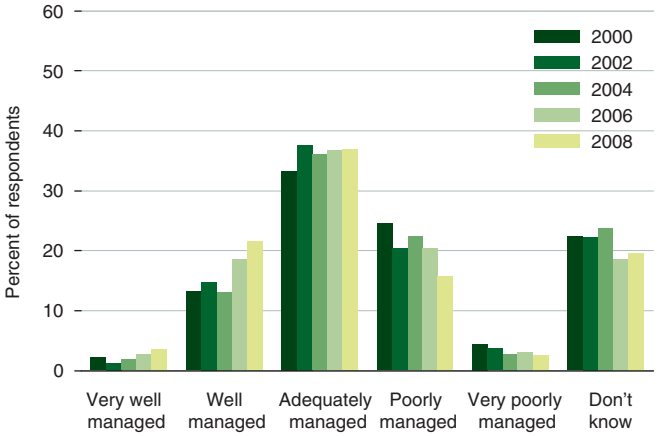
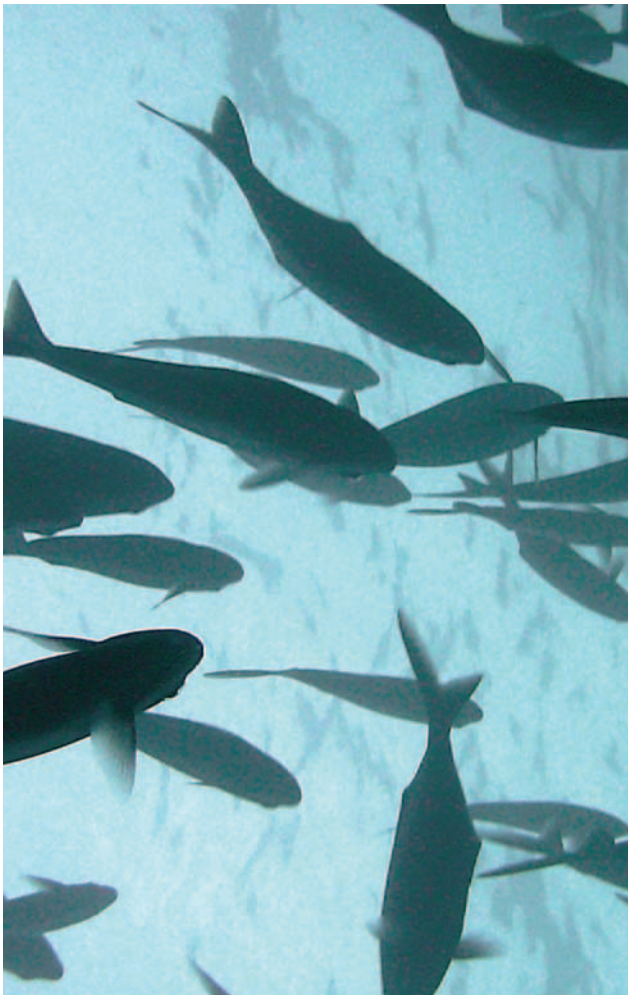


Figure 4.7c. Perceptions about management of marine fisheries ($p<0.01$).

ROSEMARY DAHL

Survey respondents generally perceived New Zealand to have a 'moderate' number of marine reserves, although these protect only 0.7% of our EEZ. They also considered commercial but not recreational fishing a major impact on marine fisheries, although this is not always the case. Above: Poor Knights Island Marine Reserve. Below: Schooling fish at the Poor Knights.



ROSEMARY DAHL

Perceptions of state, pressures and management trends

Respondents considered the quality or condition of NZ fisheries to be adequate to good (Figure 4.7a), with the quantity of fish stocks considered to be adequate (Figure 4.7b) by most respondents who expressed an opinion. Key pressures on marine fisheries (Figure 3.13f) are perceived to be 'commercial fishing' (72–76% of respondents), 'sewage and stormwater' (37–40%) and 'recreational fishing' (19–23%). As with all other resources, there is a perceived improvement in management over time, with the modal response being 'adequate' (Figure 4.7c).

Commentary

In all five surveys large numbers of people expressed 'don't know' responses for many marine fishery-related questions, the proportions ranging from around 12–24% of respondents. The high rates of 'don't know' responses might, in part, reflect the high level of scientific uncertainty about the status of many marine fisheries and may also reflect ongoing claims and counter claims made by fishery and environmental organisations about the status of New Zealand marine fisheries (see, for example, Anderton 2006). Perhaps the biggest surprise is the lack of recognition of 'recreational fishing' as a key pressure on marine fisheries, which it clearly is in some cases (e.g., snapper).

4.8. MARINE RESERVES

Scientific information on state and trends

There are 31 marine reserves in New Zealand, representing 0.7% of New Zealand's Exclusive Economic Zone (EEZ) (MfE 2007: 314). This fraction is very low when compared to terrestrial reserves which cover about 30% of New Zealand's land area.

The overall state of resources in these 31 reserves has not been quantified, but is likely to be very high compared to surrounding areas (see Willis *et al.* 2003a re snapper abundance). However, internationally there is a lack of empirical research that demonstrates gains in resource quality inside marine reserves (Willis *et al.* 2003b: 101). More recent research indicates that marine reserves are playing a role in fisheries replenishment and habitat restoration (Langlois and Ballantine 2005, Langlois *et al.* 2006). It is also clear that the marine reserves network remains far from representative of the diversity of marine environments present in the New Zealand EEZ.

Given the above observations it appears likely that, while the existing marine reserves are in good condition, the overall network of reserves is insufficient to meet basic conservation requirements.

Perceptions of state, pressures and management trends

Most respondents think there is a moderate quantity of marine reserves in New Zealand. The most frequently identified pressures (Figure 3.13g) are 'commercial fishing' (41–47% of respondents), 'sewage and stormwater' (36–40%) and 'recreational fishing' (23–30%). Marine reserves are considered to be adequately to well managed, with this perception improving significantly over time.

Commentary

Given the tiny fraction of New Zealand's marine area in reserves, it may appear surprising that so few people consider there to be a 'low' or 'very low' quantity of marine reserves in New Zealand (i.e., only about one quarter of all respondents provide this response in 2008). However, most of New Zealand's marine reserves are near major cities or tourism destinations, which may have led to the impression that marine reserves are more common than they really are. Respondents may also be unaware of the magnitude of New Zealand's EEZ (the fourth largest in the world), and perceptions of the marine area may be focused on the coastal zone. There are other differences between marine and terrestrial reserves. Harvest of native terrestrial species is generally forbidden—wherever they occur. However, 33.8% of survey respondents participate in marine recreational fishing, a figure consistent with estimates in Hughey *et al.* (2002a) and may fear a loss of recreational fishing opportunities with an increase in marine reserves—an outcome that does not apply to terrestrial reserves. It is notable that marine recreational fishers frequently express strong opposition to marine reserve proposals (Hughey 2000), although there are notable exceptions, such as the 10 reserves proposed and implemented by fishers in the Fiordland area (Challis and McCrone 2005).

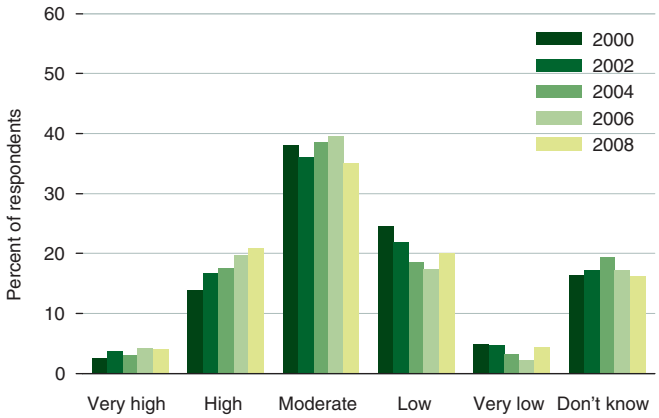


Figure 4.8a. Perceived area of marine reserves ($p<0.001$).

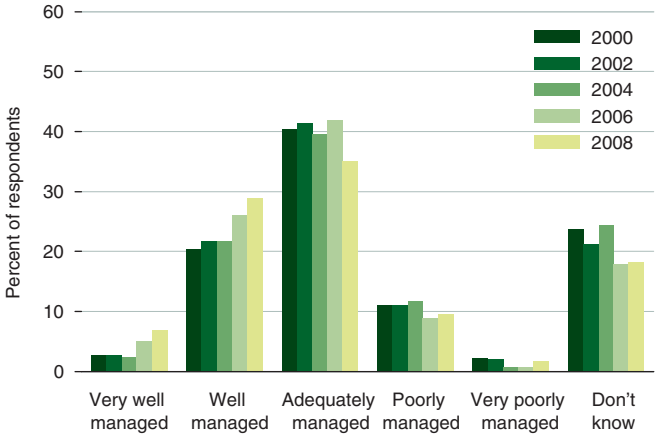


Figure 4.8b. Perceptions about management of marine reserves ($p<0.01$).

4.9 RIVERS, LAKES AND GROUNDWATER

Scientific information on state and trends

MfE (2007: 304) conclude that: "Water quality in New Zealand is still generally good by international standards, and a large proportion of our water resources remain free of land-use pressures. Nevertheless, water quality continues to decline in areas that are dominated by agricultural and urban land use" (and see also Environment Waikato 2008). Water quantity is reported as being a more significant concern, with MfE (2007: 304) reporting that "while water is generally in good supply in most regions, many large river and aquifer systems are now fully allocated (that is, no further water can be taken from them without causing environmental harm or affecting existing users)".

Recent reports by Hamill (2006) for lakes, and by Scarsbrook (2006) for rivers provide more refined contexts. While for lakes there are some examples of improving trends (e.g., trophic status), such findings are moderated by the fact that these trends are for lakes already in 'pristine' condition (Hamill 2006: vi). A more disturbing finding is that, of 46 monitored lakes, half showed a decline in ecological condition and only 22% had improved (Hamill 2006). There is a different picture emerging for the 77 river sites monitored over the period 1989–2005. Most notably, rivers where point source discharges have been, or are being, controlled are typically characterised by improved water quality. Conversely, rivers in pastoral areas subject to land-use intensification are characterised by worsening quality, most likely associated with non-point source discharges (Scarsbrook 2006: v).

Hughey *et al.* (2007) compared perceptions gathered at national and context–specific levels and found there was a good correspondence with what biophysical scientists were also reporting. Generally, water quality is good and there is a large quantity of water available on a national level, but for lowland streams status is much more variable and there are major negative impacts, both in quantity and quality.

The state of these resources is clearly mixed and overall might be considered as adequate or good.

Perceptions of state, pressures and management trends

In 2000 and 2002, respondents were asked about condition, quantity and management of fresh water. In 2004 and subsequent surveys, the fresh water category was replaced by two separate categories, 'rivers and lakes' (Figures 4.9 a–c) and 'groundwater' (Figures 4.9 d–f), because of the different environmental impacts and management issues relating to them. Whereas Hughey *et al.* (2004, 2006) combined these categories for comparison with the earlier data, that practice has been discontinued in this report and only the 2004–2008 data are reported in detail. An exception occurs in terms of pressure, where the term 'fresh water' remains in use.

Although most people have opinions on the quality, quantity and management of rivers and lakes, there is a much higher proportion of 'don't know' responses for questions on groundwater, possibly because groundwater is not 'seen'.

Rivers and lakes in New Zealand are increasingly subject to pressures from land use, and nearly half the lakes in a recent study had declined in quality. Below: the confluence of the Dobson River and Hopkins River, with Lake Ohau beyond.

ROSS CULLEN

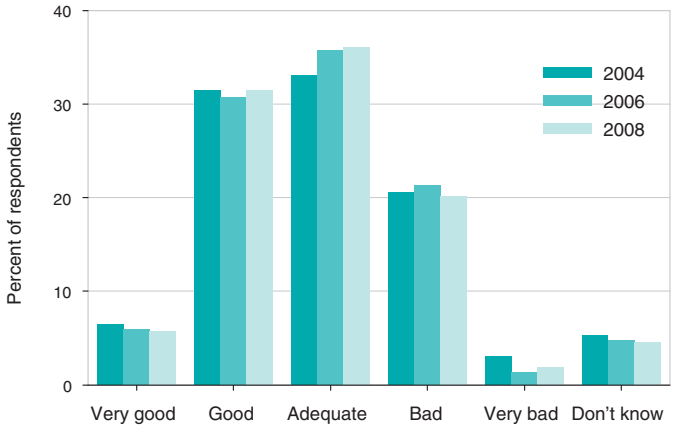


Figure 4.9a. Perceived quality or condition of rivers and lakes.

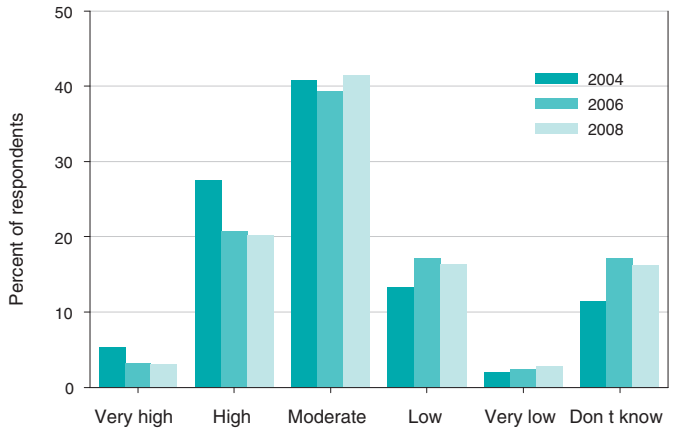


Figure 4.9b. Perceived amount of rivers and lakes ($p<0.01$).

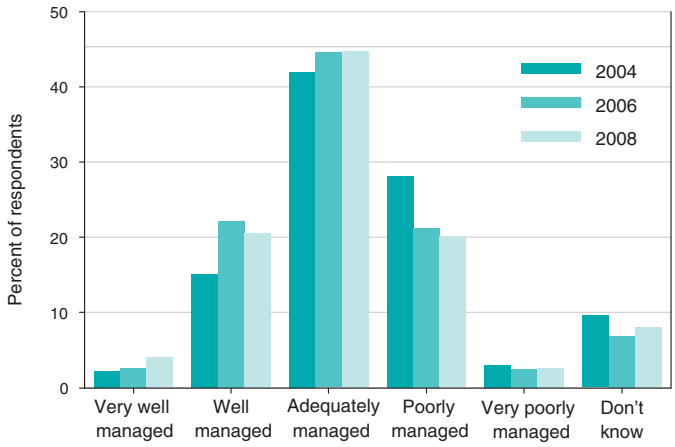


Figure 4.9c. Perceptions about management of rivers and lakes ($p<0.01$).

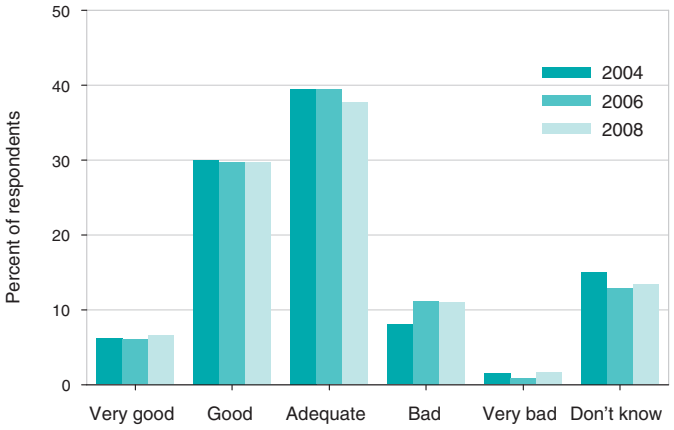


Figure 4.9d. Perceived quality of groundwater.

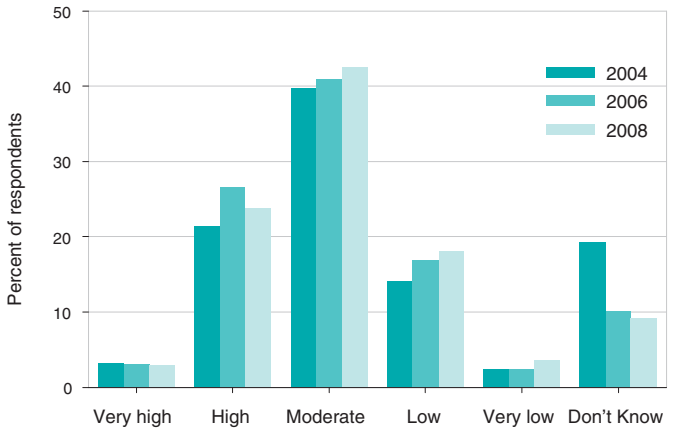


Figure 4.9e. Perceived amount of groundwater ($p<0.001$).

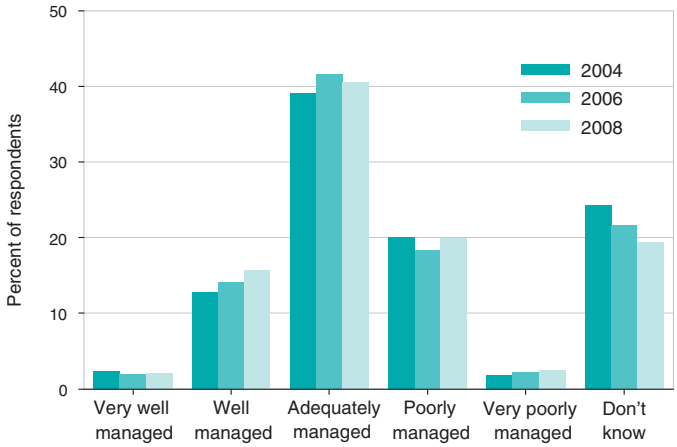


Figure 4.9f. Perceptions about management of groundwater.

The quality of our water is generally good by international standards, especially outside of agricultural and urban areas. However, survey recipients identified farming as a major cause of damage to fresh water, and the impact of farming has significantly increased in importance over the course of the five surveys. Above: Lowland river on the West Coast, Southland. Below: Cattle in a stream near Christchurch.

EOS ECOLOGY

The quality of rivers and lakes, and of groundwater (Figures 4.9a and 4.9e) is judged to be 'adequate' or 'good', and the amount of water available in both (Figures 4.9b and 4.9f) is mostly considered to be either 'moderate' or 'high'.

The main causes of damage to fresh waters (Figure 3.13h), and the range of variations from 2000–2008, are considered to be 'farming' (25–46%), 'sewage and stormwater' (41–44%), and 'industrial activities' (36–31%). Farming, in particular, has increased hugely in importance over the course of the survey period.

Around 20% of respondents for groundwater and less than 10% for rivers and lakes expressed 'don't know' responses to perceptions of management of each resource (Figures 4.9c and 4.9f respectively).

Commentary

Water quality and quantity issues remain of high public interest. For example, data on frequency of chapter MfE website downloads from the *Environment 2007* report show that 26% of downloads were of the fresh water chapter, with the next closest being biodiversity at 12% (MfE 2008: 3). More recently the New Zealand Business Council for Sustainable Development (2008) has reported proposals to improve water management in New Zealand to address over allocation and water quality deterioration issues. Concerns about water quality might be a response to ongoing media interest in water quality issues, such as the prominent 'dirty dairying' campaign implemented by Fish and Game New Zealand, but also to the reinforcing biophysical monitoring findings (Hamill 2006, Scarsbrook 2006, MfE 2007).

4.10 NATIONAL PARKS

Scientific information on state and trends

New Zealand continues to increase the amount of 'protected' land, under a variety of conservation legislation. Currently the country has more than nine million hectares—around a third of New Zealand–protected in national parks and other reserve types. While these areas embody a remarkable variety of landscapes and vegetation types, an incomplete range of environments and ecosystems is represented within the country's protected area network including the country's 14 national parks (Statistics New Zealand 2002). Moreover, a disproportionate quantity of national parks and other reserves are located in the South Island, mostly in difficult-to-access mountainous areas.

National parks in New Zealand are dominated by mountain lands and forests. While the state of the mountain lands is very high quality, the state of forests is likely to be mixed because of the impacts of weeds and pests (see section 4.4). The overall state of national parks can therefore be considered as good.

Perceptions of state, pressures and management trends

Respondents reported the area of national parks in New Zealand to be adequate to good, but with no detectable trends in response over time (Figure 4.10a). Key pressures (Figure 3.13i) on national parks are 'pests and weeds' (57–59% of respondents) and 'tourism' (42–51% of respondents). Respondents report that national parks are adequately to well managed (Figure 4.10b), with an improving trend detectable over the five surveys ($p<0.001$).

Commentary

National parks are sometimes considered the 'jewels in the crown' of conservation. They are important to conservation in New Zealand, and have been for many years. This importance and the level of management input may be reflected in survey responses which evaluate national parks and their management very positively.

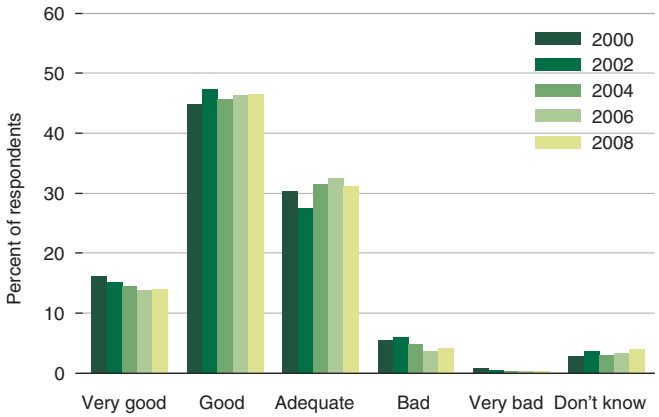


Figure 4.10a. Perceived area of national parks.

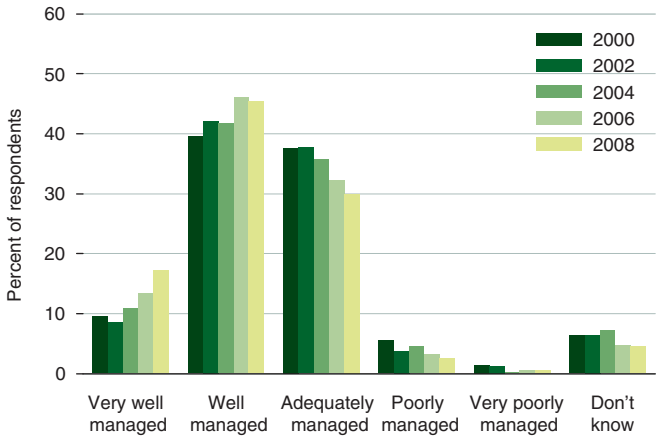


Figure 4.10b. Perceptions about management of national parks. ($p<0.001$).

SHELLEY MCMURTRIE

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Survey respondents had very positive perceptions of both the area of national parks in New Zealand, and how they were managed. Left: Mt Aspiring, in Mt Aspiring National Park.

4.11 WETLANDS

Scientific information on state and trends

Only an estimated 10% of the pre-human extent of wetlands now remain in New Zealand (Charteris *et al.* 2008, MfE 2007). Overall, the percentage remaining is lower in the North Island (4.9%) than in the South Island (16.3%), a fact attributed by Charteris *et al.* (2008) to the detrimental effects of human development in the lowland areas of the North Island. A Sustainable Management Fund project on the co-ordinated monitoring of New Zealand wetlands, including classification and assessment of wetland quality, has been developed (Clarkson *et al.* 2003) but there are insufficient data to determine the overall state of wetlands. The Department of Conservation, as part of ongoing Waters of National Importance work (which in turn is a component of the Sustainable Development Programme of Action), has developed a wetland typology and has identified key pressures on wetlands (Charteris *et al.* 2008). No national level picture is yet available for this work. Nevertheless, there is a range of documentation that enables tentative conclusions to be drawn about wetland state. The Parliamentary Commissioner for the Environment (2002: 5) concluded that:

> *"Although several thousand wetlands remain (including 70 deemed to be of international importance) most are very small, and their natural character and habitat quality have been lost or degraded by drainage, pollution, animal grazing and introduced plants".*

Similar conclusions were drawn by the Office of the Controller and Auditor General (2001: 54) who stated that:

> *"There are no comparisons over time of scientific information on water and biological quality or surveys of the wetland areas. Nevertheless, after questioning key professionals and others involved in the protection and management of wetlands, we concluded that there is strong subjective evidence that suggests a failure to achieve the desired outcome of the Convention".*

Based on the above, the overall status of New Zealand's wetlands can be considered to be poor.

Although very few of New Zealand's wetlands remain, and those remaining are very small, survey respondents considered the area of wetlands to be 'moderate' and their condition adequate to good. Below: high country wetland, St James Walkway, Lewis Pass.

Perceptions of state, pressures and management trends

Respondents generally consider the state or condition of wetlands to be adequate to good, with no detectable change over the five surveys (Figure 4.11a). The area of wetlands is considered to be moderate, with almost equal numbers (15–20%) considering it high to very high or low to very low, but in excess of 20% expressing a 'don't know' view (Figure 4.11b). The perceived main causes of damage to wetlands (Figure 3.13j) are 'pests and weeds' (34–44% of respondents), 'farming' (29–35% of respondents) and 'urban development' (28–31% of respondents). Wetlands are considered to be adequately to well managed, with an increasing proportion of respondents expressing very positive views about wetland management (Figure 4.11c).

Commentary

There is a lack of knowledge about trends in the pressures, state and responses to wetland issues in New Zealand, mirrored to some extent by the high frequency of 'don't know' responses to most wetland related questions. Having said this, it is somewhat surprising that around 60–70% of respondents consider the condition or quality, as well as the area, of wetlands to be adequate to good.

SHELLEY MCMURTRIE

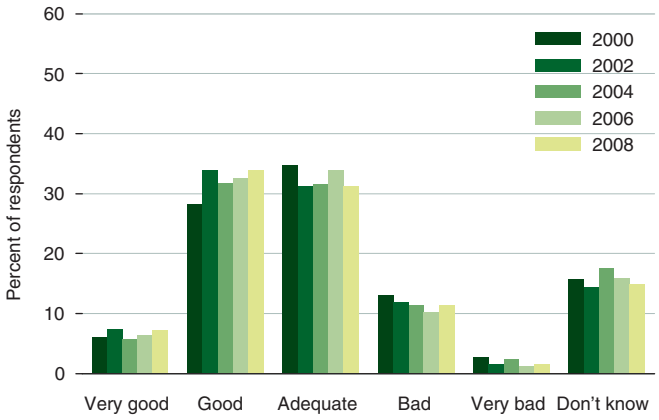

Figure 4.11a. Perceived condition of wetlands.

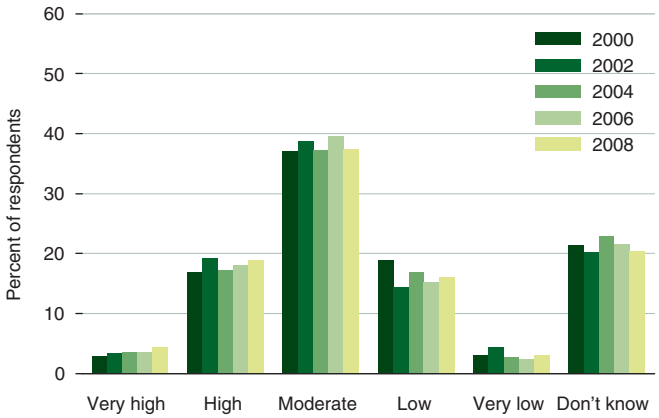

Figure 4.11b. Perceived area of wetlands.

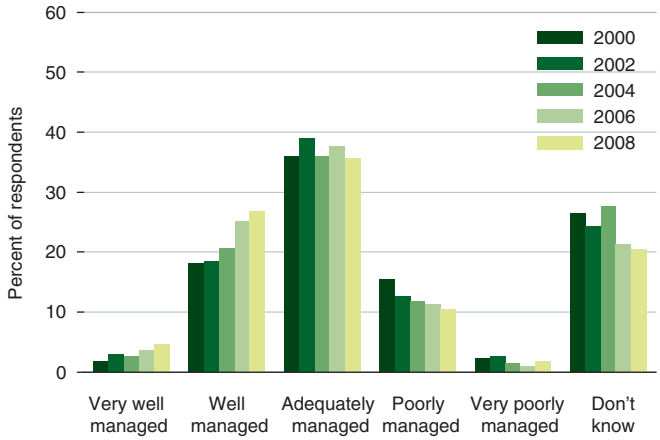

Figure 4.11c. Perceptions about management of wetlands ($p<0.001$).

4.12. NEW ZEALAND'S NATURAL ENVIRONMENT COMPARED TO OTHER DEVELOPED COUNTRIES

Scientific information on state and trends

It is not always easy to determine relative performance on an international basis. In earlier survey reports (e.g., Hughey *et al.* 2006) we used comparative data from the Environmental Sustainability Index (ESI), which provides a measure of overall progress towards environmental sustainability for 142 countries. ESI scores are based upon a set of 20 core "indicators," each of which combines two to eight variables from a total of 68 underlying variables. The ESI permits cross-national comparisons of environmental progress in a systematic and quantitative fashion (Esty *et al.* 2005). Overall, New Zealand ranked 14th of 142 nations evaluated in the ESI—it ranked highly for water quantity, water quality, and for air quality and badly for biodiversity status. Given the above it appeared appropriate to conclude that the state of the New Zealand environment is broadly comparable to nations in the upper quartile of the ESI.

More recently, an alternative ranking, the Environmental Performance Index, was released on a trial basis in 2006, and then subsequently confirmed in 2008 (Esty *et al.* 2008). It has been built around two objectives: 1) reducing environmental stresses on human health; and, 2) protecting ecosystem vitality. In 2006 New Zealand ranked 1st of 133 nations evaluated using this index but in 2008 New Zealand's ranking had declined to 7th of 149 nations considered. In both evaluations New Zealand is considered to be performing very strongly in terms of water resources, strongly in terms of sustainable energy, and biodiversity and habitat, and moderately in terms of productive natural resources. In contrast, New Zealand is considered to be performing poorly in terms of marine protected areas (see Table 4.1 for a summary of some of these scores for New Zealand compared to other developed nations).

Overall then, evaluated against both indices, New Zealand can be considered to be performing very well compared to other developed nations.

Perceptions of state, pressures and management trends

The vast majority of respondents considered the condition of New Zealand's natural environment to be good or very good when compared to other developed countries, a pattern which has been consistent over all surveys (Figure 4.12a). In terms of management, respondents consider New Zealand to be performing well to adequately, with a trend to higher ratings over time (Figure 4.12b).

Commentary

Survey responses reinforce the view that New Zealanders believe they live in a cleaner and greener environment than that found in other developed countries. This view concurs with the conclusions from the ESI and the EPI, which rank New Zealand highly for environmental sustainability and performance.

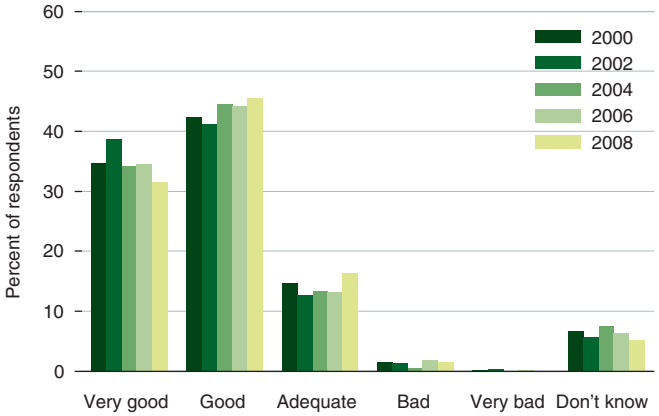

Figure 4.12a. Perceived condition of New Zealand's natural environment compared to other developed countries.

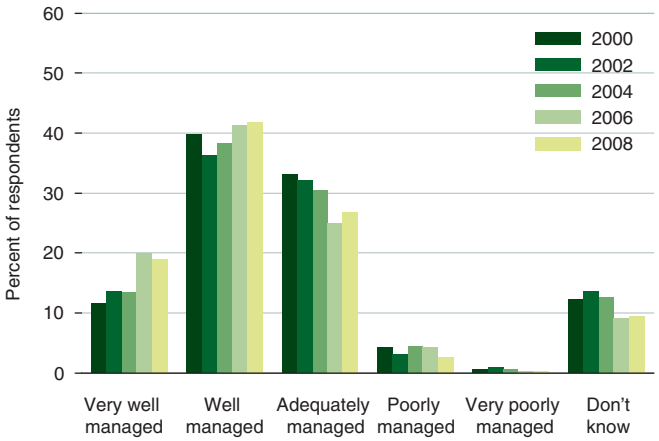

Figure 4.12b. Perceptions about current management of New Zealand's natural environment compared to other developed countries ($p<0.001$).

05

SHELLEY MCMURTRIE

Cattle farming in Mid Canterbury

STATE OF THE ENVIRONMENT

The overall trends evident from the detailed results presented in sections three and four are presented in this section.

5.1 OVERALL STATE OF THE ENVIRONMENT

Respondents believed the standard of living in New Zealand was good. Their assessment was that New Zealand was a 'clean and green' land although their responses were a little less positive than in previous surveys.

Respondents indicated the state of the New Zealand natural environment was good to adequate. New Zealanders believed that they have good knowledge of the environment. While the quality of the knowledge they had is unknown, their concern about the environment is evident. For example, there are eight separate environment-related activities that are engaged in by more than 50% of respondents during the past year (Figure 3.18). Participation in some of these activities (reducing or limiting electricity use, commuting by buses or trains, and recycling household waste) is substantially higher than when the survey began in 2000.

5.2 PRESSURES ON THE ENVIRONMENT

The New Zealand economy has grown during the period of the five surveys (2000–2008), with cumulative real GDP growth of 26.5%. During the same period the New Zealand population has grown by 10.3%. Growth in the economy and population growth can both increase environmental pressures. Each of the five surveys asked respondents about the pressures on the New Zealand environment. Their responses indicated a belief that growth in production and consumption, as well as intensification of some activities, farming and urban development in particular, are increasing pressures on the environment.

- Respondents in 2008 judged fresh-water-related issues to be the most important environmental issues facing New Zealand (Figure 3.20).
- Some sources of environmental problems are perceived to affect several environments. For example, respondents stated that sewage and storm water cause damage to beaches and coastal waters, fresh waters, marine fisheries and marine reserves (Table 3.4). Similarly, pests and weeds are frequently blamed for damage to native land and freshwater plants and animals, native forests and bush, national parks and wetlands.
- Farming maintained its prominent position as a perceived source of pressure on the environment, particularly on fresh waters. Over time it has been perceived as increasingly problematic for almost all resources monitored (Table 3.5).
- New Zealand European respondents were more likely than others to judge that farming exerts pressure on fresh waters. Maori respondents were more likely to identify household and solid wastes as exerting pressure on fresh waters.
- Forestry and urban development were judged to exert considerable pressure on native forests and bush.
- Commercial fishing was judged to be the main source of pressures on marine fisheries and marine reserves.
- Perhaps of most interest is that tourism was listed as second only to pests and weeds as a major cause of damage to national parks (Table 3.3).

5.3 STATE OF THE ENVIRONMENT

Respondents rated the state of the New Zealand environment highly compared to the environment in other developed countries (Figure 3.5). The five surveys asked respondents to assess the state of nine components of the environment.

- In the 2000 and 2002 surveys New Zealanders rated the state of marine fisheries as worse than other parts of the environment. However, the 2004, 2006 and 2008 surveys, which disaggregated fresh water into two separate categories, indicated that rivers and lakes are rated worse than marine fisheries (Figure 3.5).
- Three distinct clusters reflected the perceived availability of natural resources in New Zealand. (i) Area of national parks, parks and reserves in towns and cities, diversity of native and freshwater plants and animals, and amount of native bush and forest were tightly grouped at moderate to high availability. (ii) Area of marine reserves, area of wetlands, amount of groundwater, amount of fresh water in rivers and lakes, and quantity of marine fish were rated as having moderate availability. (iii) Oil and gas reserves were perceived to be moderate to low (Figure 3.7).
- The downward trend in perceptions of the amount of oil and gas reserves from 2000 to 2006 was reversed in 2008 with a substantial increase. Perceived availability of this resource remains less than moderate.
- Perceptions about availability of all other resources remain relatively static, or there is only marginally sufficient data (e.g., for rivers and lakes) to detect trends (Figure 3.8).

5.4 MANAGEMENT OF THE ENVIRONMENT

New Zealanders generally judged that the environment was adequately managed, but that environmental management is improving. However, this statement conceals a wide range of views about management of specific parts of the environment.

- For rivers and lakes, and for groundwater, more than 20% of respondents thought that management was poor or very poor.
- Management of New Zealand's natural environment compared to other developed countries and management of national parks, were both rated significantly more highly than other parts of the environment (Figure 3.11).
- Across the five surveys, air quality, marine fisheries and soils have consistently been rated amongst the worst-managed environmental sectors (Figure 3.12), joined more recently by rivers and lakes and by groundwater.
- Management of coastal waters and beaches, and of native bush and forests, has improved in every survey.

The overall continuing improvement in perceptions of management is not always matched by perceptions of state. A lag between management improvements and state is one possibility and this issue will be monitored carefully in future surveys.

Survey respondents judged the state of fresh water to be New Zealand's most important environmental issue, and expressed most concern about the effect of farming on rivers and lakes. Below: the Waimakariri River before it enters the Canterbury Plains, viewed from Mt Bruce, Craigieburn Forest Park.

SHELLEY MCMURTRIE

06

SHUTTERSTOCK

Castle Hill/Kura Tawhiti

SPECIAL TOPICS

In this section three topic areas of contemporary interest are examined. First, research is presented into fresh water, its management, and socio-demographic factors relating to perceptions of fresh water and its management. The second part deals with New Zealanders' participation in resource-based recreation activities, rates of visitation to national parks and socio-demographic factors relating to those items. Finally, people's interest in and perceptions of a range of conservation issues are explored. Appendix 3 reports data for each topic.

6.1 FRESH WATER

6.1.1 Introduction

Demand for fresh water in New Zealand continues to increase, especially from agriculture, but also for energy generation, other industries and for domestic water supply. This growth in demand and its effects on quantity and quality of fresh water has increased attention on the amounts of water available and the ability of rivers and streams to meet instream flow needs for fishing, wildlife, boating and other activities. In several regions dairy farming is associated with declining water quality in lowland streams. The public's view of these and related issues were investigated in this survey and in the 2004 survey.

6.1.2 Methods

Two questions, in 20 parts, addressed survey participants' perceptions of freshwater issues in New Zealand. Respondents were asked about the quality of water in New Zealand and in their region, and they were asked about management of fresh water by their regional council and about Ministry for the Environment policy making. Eight statements on a variety of freshwater issues were put to respondents with which they were asked to agree or disagree. Responses were crosstabulated with key socio-demographic factors. Both within year and between survey (2004–08) evaluations are presented.

6.1.3 Results

Water quality—2008

The quality of water in New Zealand's rivers and streams, aquifers, and lakes (Figure 6.1) was mainly seen as acceptable to good although there was a significant difference in spread of responses for each resource. The main differences were:

- Aquifer water quality was considered better than either lakes, or rivers and streams
- There was a very high proportion of 'don't knows' regarding aquifers.

Ratings for regional perceptions of water quality (Figure 6.2) followed a similar pattern to those at the national level with aquifers receiving the most positive rating. While aquifers also had the highest 'don't know' response (20.7%), there were was also a relatively high 'don't know' response for lakes

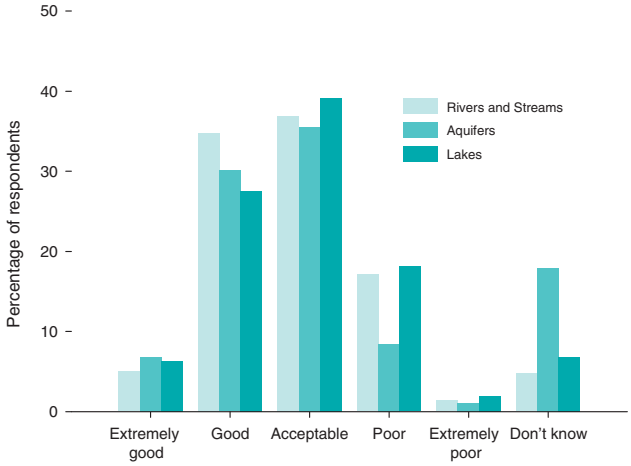

Figure 6.1. The quality of water in New Zealand's rivers and streams, aquifers, and lakes: 2008 ($p<0.001$ excluding 'don't know' responses).

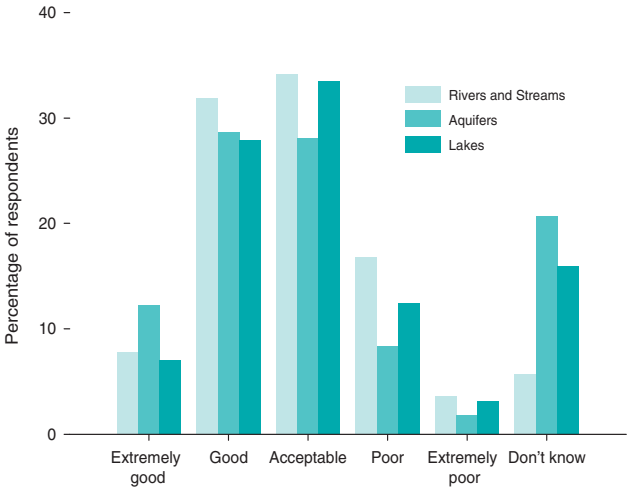

Figure 6.2. The quality of water in my region's rivers and streams, aquifers, and lakes: 2008 ($p<0.001$ excluding 'don't know' responses).

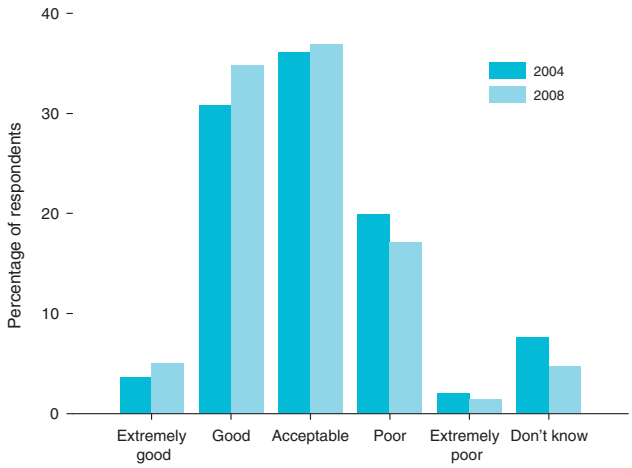

Figure 6.3. The quality of water in New Zealand's rivers and streams: 2004–2008 (NS excluding 'don't know' responses).

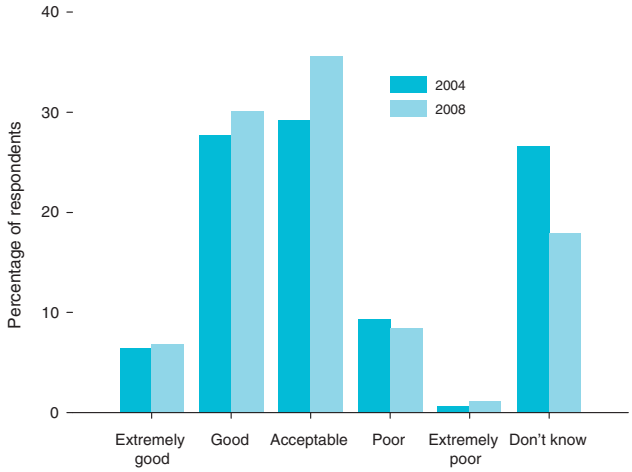

Figure 6.4. The quality of water in New Zealand's aquifers: 2004–2008 (NS excluding 'don't know' responses).

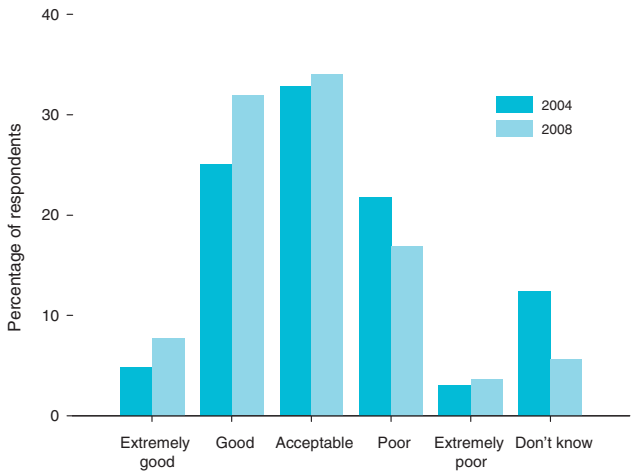

Figure 6.5. The quality of water in New Zealand's lakes: 2004–2008 ($p<0.001$ excluding 'don't know' responses).

(15.9%). Those who had an opinion considered the quality of water in their region as acceptable to good, with no significant difference between responses for rivers and streams compared with lakes. However, aquifer water quality was considered significantly better than surface water quality.

Trends 2004–2008: New Zealand

Figure 6.3 shows a comparison of water quality in New Zealand's rivers and streams between the 2004 and 2008 surveys. For those people who expressed an opinion there was a general view that quality is acceptable–good, with no significant difference between surveys.

A similar evaluation has been undertaken for groundwater (Figure 6.4) and of those who have expressed an opinion there is no significant difference between surveys, with most respondents considering quality to be good–acceptable. 'Don't know' responses to this question remain high but reduced between 2004 and 2008.

A different pattern emerged for New Zealand's lakes when responses from 2004 and 2008 are compared (Figure 6.5). Where people expressed an opinion the general view was that quality is acceptable–good, with a significant improvement recorded between surveys.

Survey respondents were generally happy with the quality of fresh water, but concerned about the state of lowland streams. Below: Bathing in a stream within the Coromandel Forest Park.

SHELLEY MCMURTRIE

Trends 2004–2008: Regional

People were asked about water quality in their region in both the 2004 and 2008 case studies. Figures 6.6–6.8, respectively, show these comparisons for rivers and streams, groundwater, and lakes. Key findings were that 'don't knows' reduced significantly between 2004 and 2008, and that overall there was an perception of improved quality of rivers and streams, and of lakes.

Water management

Respondents were asked to rate the performance of their regional council's management of fresh water and the Ministry for the Environment's (MfE) policy making performance.

Regional council performance was generally rated as 'acceptable–good' for all three resources, although there was a relatively high frequency of 'don't know' responses for aquifers and lakes (Figure 6.9).

Perhaps not surprisingly, and mirroring a similar finding from 2004, there was a very high 'don't know' response about MfE policy making (Figure 6.10). However, those prepared to express an opinion rated policy performance as 'acceptable–good'.

Socio-demographics

The roles of a wide range of socio-demographic variables were investigated for national and regional water quality and management-related questions. Only one socio-demographic, ethnicity, was consistently significant across the four areas investigated (Figures 6.11 and 6.12). New Zealand European respondents have more pessimistic views than do Maori, followed by people of other ethnicities. A few other differences that warrant attention are:

- Central region respondents gave more pessimistic ratings of water quality in New Zealand and their region's lakes than either Northern or Southern respondents ($p<0.001$);
- Education differences existed ($p<0.05$) for all four lake-related questions, i.e., in terms of national and regional perceptions of water quality, and regional council management and MfE policy-making. Unfortunately the patterns in these responses are not easily summarised or explained.

Notably, there were no significant differences between those employed in resource based versus other industries, nor in terms of income, and virtually no difference between urban and rural respondents.

6.1.4 Quality and management of rivers, lowland streams and groundwater

The survey asked respondents whether they agreed or disagreed with eight statements regarding fresh water, using the five point scale 'strongly agree', 'agree', 'neither agree or disagree', 'disagree', 'strongly disagree' and also the option of

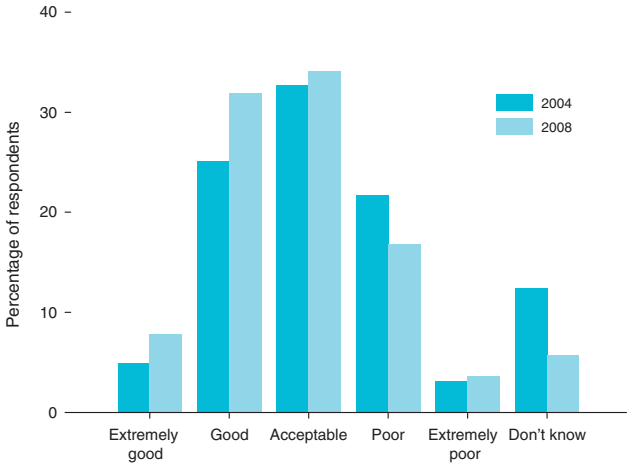

Figure 6.6. The quality of water in my region's rivers and streams: 2004–2008 ($p<0.01$ excluding 'don't know' responses).

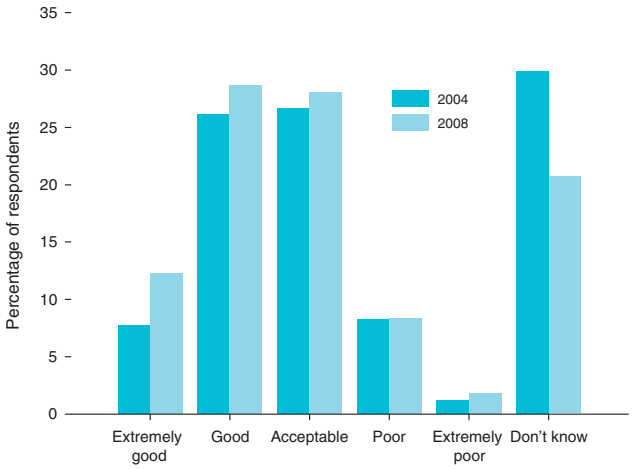

Figure 6.7. The quality of water in my region's aquifers: 2004–2008 (NS excluding 'don't know' responses).

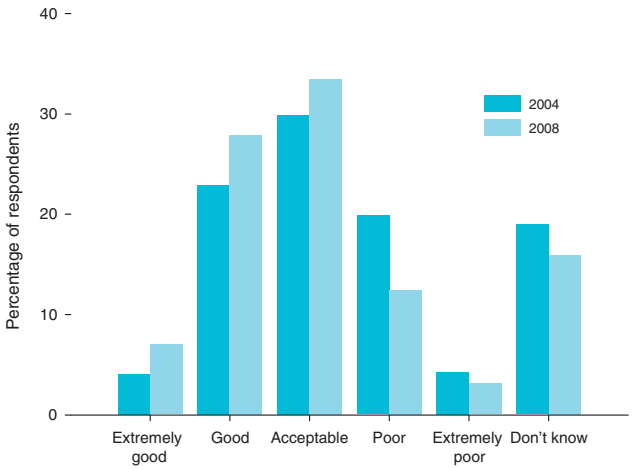

Figure 6.8. The quality of water in my region's lakes: 2004–2008 ($p<0.001$ excluding 'don't know' responses).

'don't know'—seven of the eight questions corresponded with questions asked in 2004.

Two broad observations about these data and their presentation need to be made: first, there are many differences between views expressed in 2004 and 2008, and; second, there is often a significant reduction in the 'don't know' responses between the two surveys. These differences have led to two forms of analysis. Figures 6.13 (a-h) show the total responses for each statement along with any significant differences between years, for those who have expressed a view. The 'don't knows' are excluded from the Chi square analysis, and are considered separately.

Responses to all of these statements reflect a concern for protecting the environment, but having said that there are differences between the directions of responses. The statements effectively dealt with three areas: large rivers, small lowland streams, and aquifers.

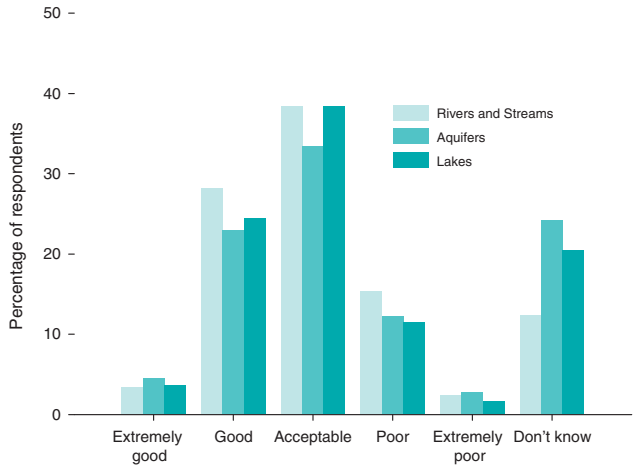

Figure 6.9. Performance rating of regional council river and stream, aquifer and lake management: 2008 (p= 0.35 excluding 'don't know' responses).

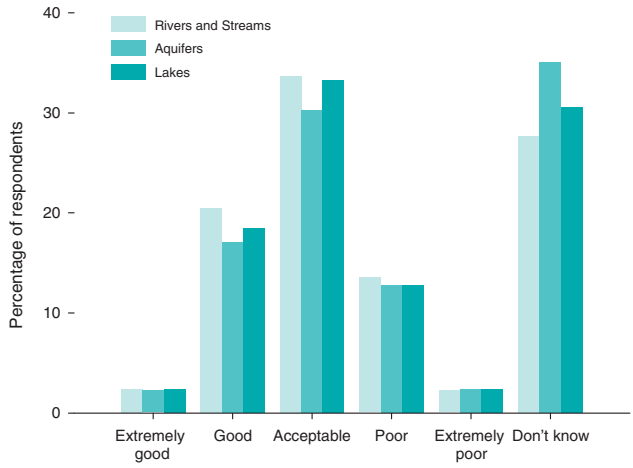

Figure 6.10. Performance rating of MfE's policy making regarding rivers and streams, aquifers and lakes:2008 (p= 1.00 excluding 'don't know' responses).

- Respondents continue to be very negative toward development of large rivers (Figures 6.13a, b) if it had a negative impact on freshwater fisheries (there was no significant change between survey years);
- Overall, respondents expressed concerns about the state of lowland streams (Figures 6.13c–g). In four of these five statements (c–f) there was evidence of significantly improved perceptions of states and management, albeit from often very negative 2004 positions. There was no significant difference in views regarding damage attributable to dairy farming between surveys.
- There was no significant difference between 2004 and 2008, in terms of groundwater use, with respondents remaining somewhat divided.
- There was a notable increase in willingness to express an opinion, with 'don't know' responses decreasing by about six percentage points since 2004 (Table 6.1).

Socio-demographics

The national and regional water quality and management of water questions were also subjected to multiple analyses across a wide range of socio-demographic variables. Again, only ethnicity was consistently significant across the areas investigated (Figure 6.14). Generally, New Zealand European respondents expressed more 'conservation–oriented' concerns than either Maori or other ethnicity respondents.

6.1.5 Discussion

The state of fresh water in New Zealand is generally perceived to be adequate to good. However, respondents to this survey perceived that demands for fresh water were placing pressure on lakes, rivers and streams and aquifers.

The degree of concern varied between regions, but not to the same extent as shown in the 2004 survey. Whereas in 2004 Northern region respondents were the least likely to agree that streams in their region were well managed, in good condition or have high quality water, the only significant regional differences here were detected with regard to lakes. However, at a more specific level (i.e., in relation to the eight statements in 2008) there were higher levels of concern raised about streams and rivers and the need to protect their instream values.

Those of 'other' ethnicity tended to give more positive responses on water quality than did Maori or New Zealand European respondents.

Finally, it is notable that proportions of 'don't know' responses to all repeat questions in this survey were reduced (and reductions were statistically significant) from the 2004 survey. This finding may well reflect a sustained media presentation of fresh-water-related issues and a growing awareness of these in the minds of the public.

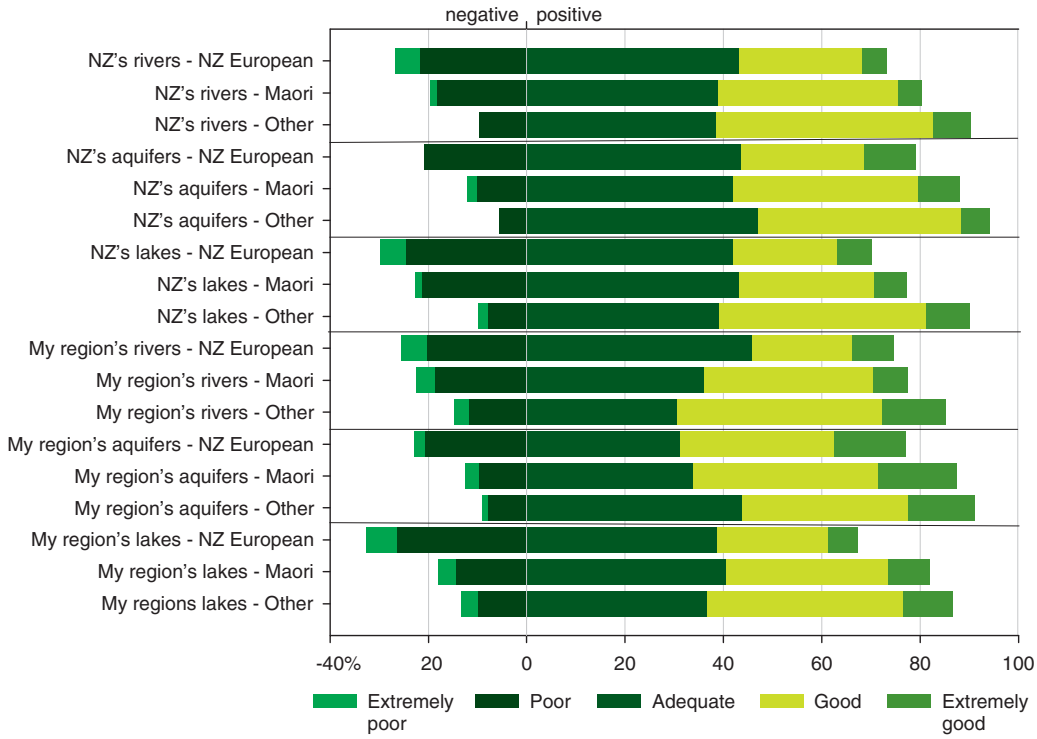

Figure 6.11. Analysis of ethnic variability in perceptions of water quality in New Zealand. (Note that the statistical analyses were undertaken by combining 'extremely good' and 'good', and 'poor' and 'extremely poor', and that 'don't know' responses have been removed.) All significant at $p<0.001$.

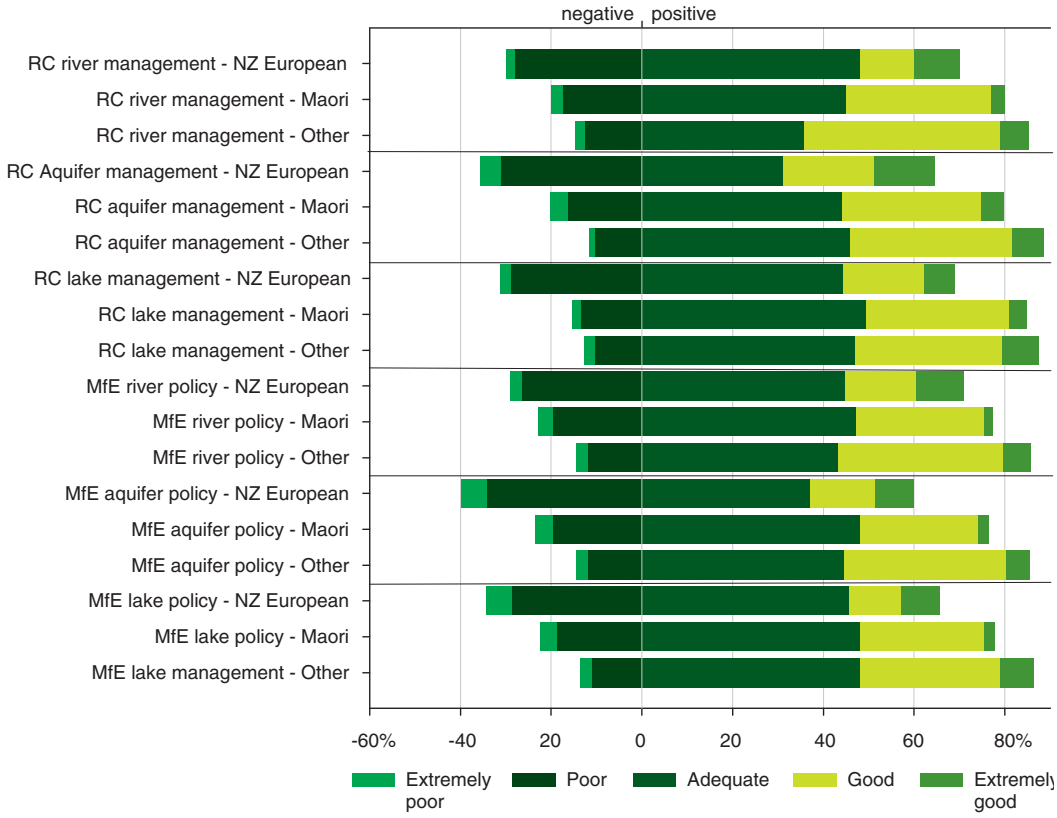

Figure 6.12. Analysis of ethnic variability in perceptions of management of fresh waters in New Zealand. (Note that the statistical analyses were undertaken by combining 'extremely good' and 'good', and 'poor' and 'extremely poor', and that 'don't know' responses have been removed.) All significant at $p<0.001$.

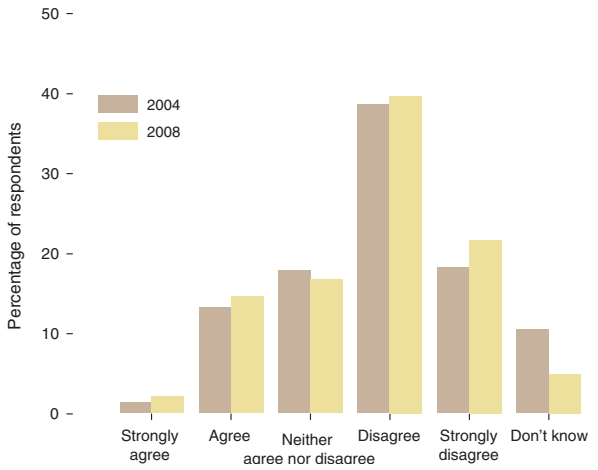

Figure 6.13a. More water should be taken from large rivers for irrigation, even if it has a negative impact on freshwater fisheries: 2004–2008 (p=0.51).

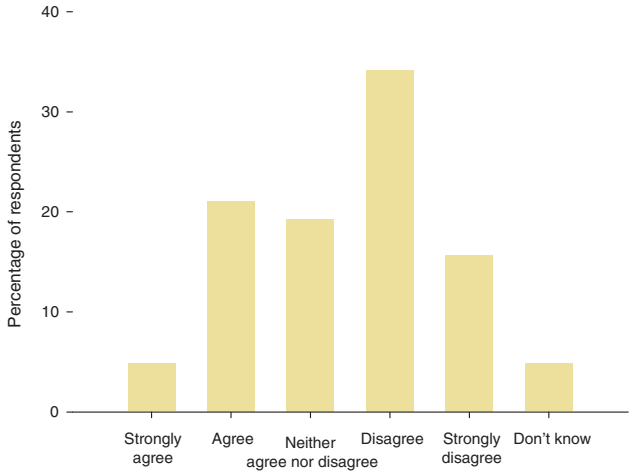

Figure 6.13b. More water should be taken from large rivers for hydro electric power generation, even if it has a negative impact on freshwater fisheries—2008.

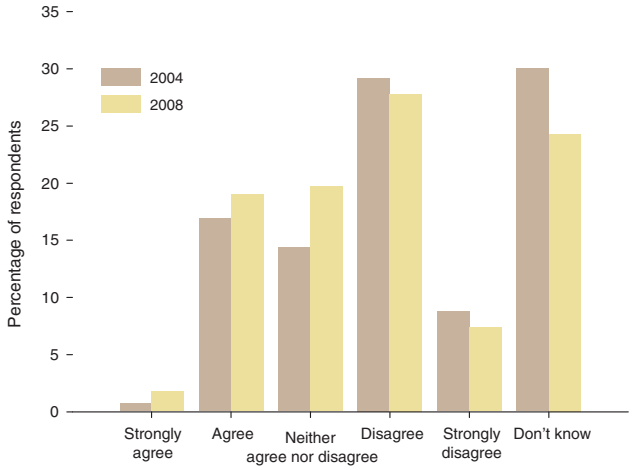

Figure 6.13c. Small lowland streams in my region have high water quality: 2004–2008 (p<0.05).

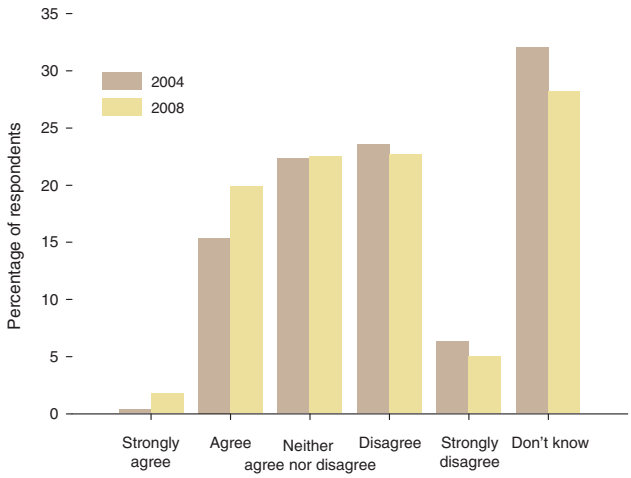

Figure 6.13d. Small lowland streams in my region are well managed: 2004–2008 (p<0.05).

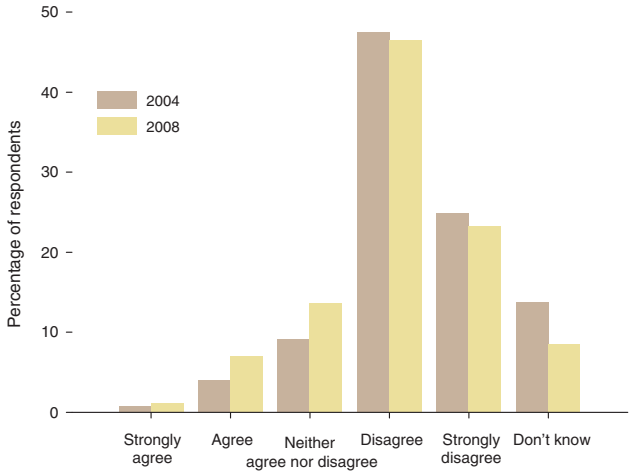

Figure 6.13e. More water should be taken from small lowland streams for irrigation, even if it has a negative impact on freshwater fisheries: 2004–2008 (p=0.01).

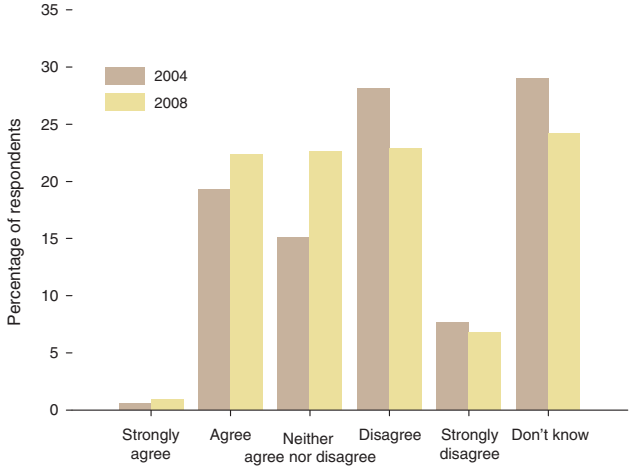

Figure 6.13f. Small lowland streams in my region are in good condition: 2004–2008 (p<0.01).

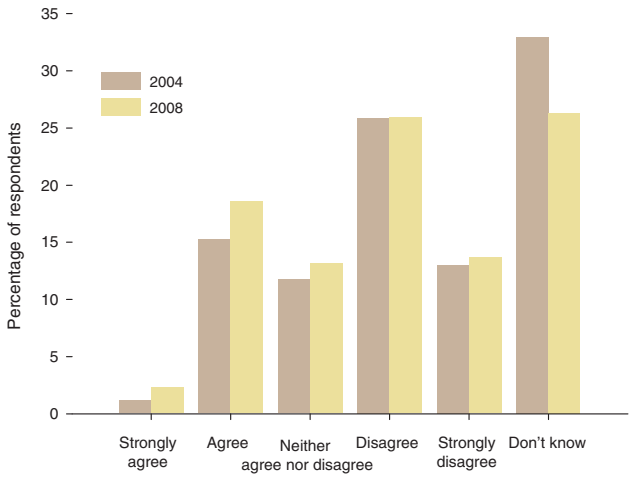

Figure 6.13g. Water quality in small lowland streams in my region has not been damaged by dairy farming: 2004–2008 (p=0.40).

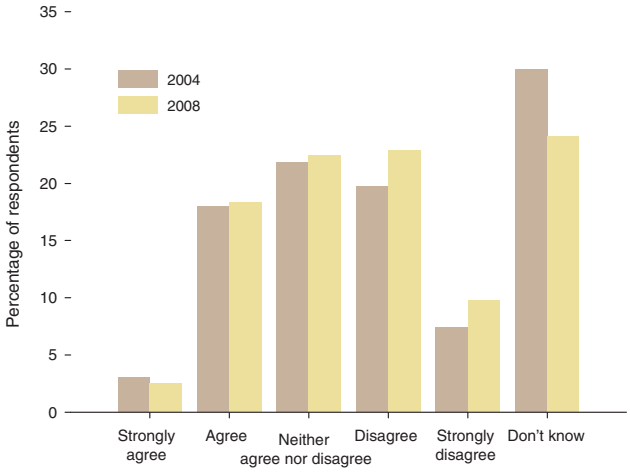

Figure 6.13h. More water should be taken from aquifers (underground) in my region: 2004–2008 (p=0.61).

Statement key:

1. *More water should be taken from large rivers for irrigation, even if it has a negative impact on freshwater fisheries*
2. *More water should be taken from large rivers for hydro electric power generation, even if it has a negative impact on freshwater fisheries*
3. *Small lowland streams in my region have high water quality*
4. *Small lowland streams in my region are well managed*
5. *More water should be taken from small lowland streams for irrigation, even if it has a negative impact on freshwater fisheries*
6. *Small lowland streams in my region are in good condition*
7. *Water quality in small lowland streams in my region has not been damaged by dairy farming*
8. *More water should be taken from aquifers (underground) in my region*

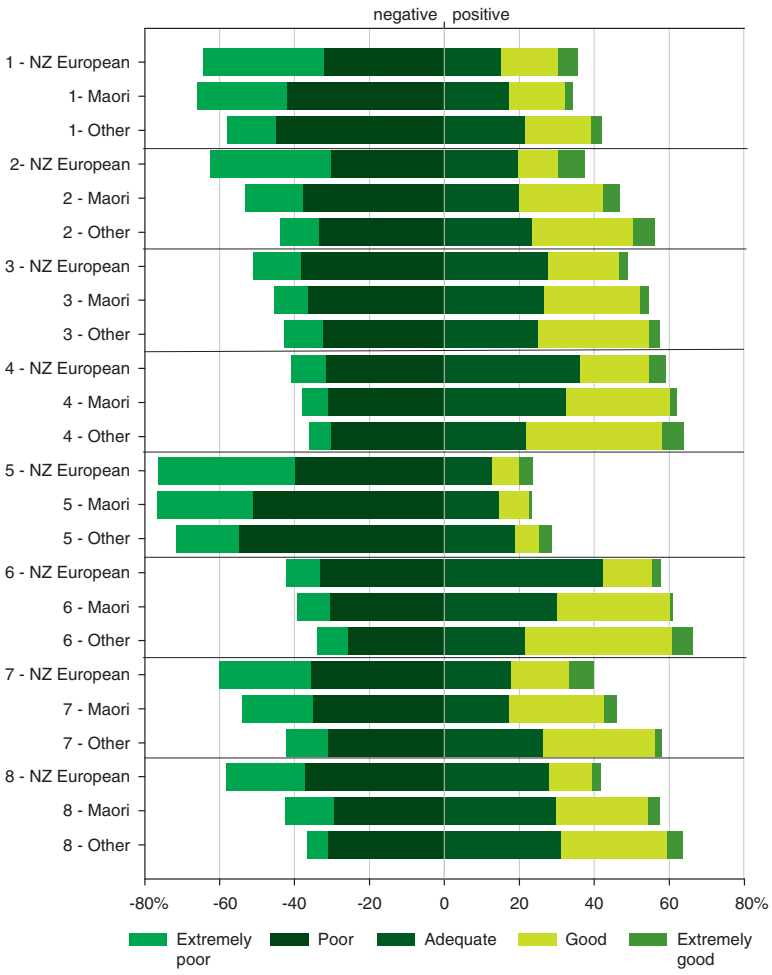

Figure 6.14. Analysis of ethnic variability in responses to eight statements regarding fresh water issues in New Zealand. (Note that the statistical analyses were undertaken by combining 'extremely good' and 'good', and 'poor' and 'extremely poor', and that 'don't know' responses have been removed.) All significant at p<0.001.

Table 6.1. Summary of changes in 'don't know' responses between the 2004 and 2008 surveys.

	Statement	Percent 'don't know' 2004	Percent 'don't know' 2008	Significance
1.	More water should be taken from large rivers for irrigation, even if it has a negative impact on freshwater fisheries.	10.5	5	***
2.	More water should be taken from large rivers for hydro electric power generation, even if it has a negative impact on freshwater fisheries.	Not asked		NA
3.	Small lowland streams in my region have high water quality.	30	24.3	*
4.	Small lowland streams in my region are well managed.	32	28.2	NS
5.	More water should be taken from small lowland streams for irrigation, even if it has a negative impact on freshwater fisheries.	13.8	8.4	**
6.	Small lowland streams in my region are in good condition.	29	24.2	*
7.	Water quality in small lowland streams in my region has not been damaged by dairy farming.	33	26.3	**
8.	More water should be taken from aquifers (underground) in my region.	30	24.1	*

SHELLEY MCMURTRIE

Sea fishing was the fifth-most-popular resource-based recreation identified by survey participants. Above: Fishing at the mouth of the Clarence River, East Coast.

6.2 RESOURCE-BASED RECREATION ACTIVITIES AND VISITS TO NATIONAL PARKS

6.2.1 Introduction

There is growing interest in New Zealanders' rates of participation in outdoor recreational activities, and visits to national parks. Two questions were designed in order to research these two topics, and to provide data comparable with other, often dispersed, information.

6.2.2 Resource-based recreation activities

Participation in 19 resource-based recreation activities was assessed. For each activity the respondent was able to tick a box indicating how many different days they had participated in the activity in 2007. Categorical responses were used to ease respondent burden. Categories used were 0 days, 1–5 days, 6–10 days, 11–15 days, 16–20 days, and 21 or more days. The response scale was chosen to simplify recall and response, but it does not permit direct estimation of mean days spent on each activity. Consequently, means have been estimated using logit models of proportions of either (i) all respondents, or (ii) active users who participated at each categorical threshold. The resulting participation frequency survival function was integrated over the positive quadrant to provide an estimate of mean days of activity (Table 6.2).

Figure 6.15 summarises resource-based recreation participation, ordered left to right according to the proportion of respondents who stated they had participated in each activity in 2007 (Blue line, right hand scale). Walking in a natural environment (85%) was undertaken by many more people than any of the other activities. The next most common activity was swimming in the sea, lakes or rivers (54%). Hunting for large game (6%), waterfowl (5%) and game birds (2%) were the least commonly undertaken activities.

The green bars, which use the left hand scale in Figure 6.15, report the mean number of days each activity was stated to be undertaken by participants. Again, walking in a natural environment was a standout, with participants walking on an average of 20 different days per year. Some of the least common activities had the highest levels of activity, with small game, large game, and game bird hunting (all 12 days per year) being prominent.

Factors affecting participation

Gender, income, education age and ethnicity are known to affect recreation participation (SPARC, undated a). Table 6.3 reports selected socio-demographic effects on participation. Participation rates are listed only for items with differences significant at the 95% confidence level. Age was not tested. Ethnicity did not have a significant effect on participation in any of these activities. There were no significant socio-demographic effects on participation in skiing.

Table 6.2. Resource-based recreation participation.

	Participated in 2007 (Standard error)	Mean days, all	Mean days, participants
Walking in a natural environment	84.6% (1.3%)	15.90	20.27
Swimming in sea, lake or river	53.9% (1.8%)	6.09	10.48
Boating on estuary or sea	34.6% (1.7%)	3.24	8.16
Camping	34.0% (1.7%)	3.56	9.41
Sea fishing	33.8% (1.7%)	3.13	8.04
Tramping	30.7% (1.7%)	2.74	7.62
Collecting shellfish	23.9% (1.6%)	1.70	5.37
Off-road driving	21.7% (1.5%)	1.99	7.68
Boating on a lake	20.9% (1.5%)	1.47	5.30
Boating on a river	18.9% (1.4%)	1.22	4.54
Surfing or body boarding	18.4% (1.4%)	2.09	10.40
Freshwater fishing	16.9% (1.4%)	1.46	7.27
Off-road mountain biking	14.6% (1.3%)	1.59	9.68
Mountain or rock climbing	12.6% (1.2%)	0.91	5.53
Skiing	11.3% (1.2%)	0.77	5.00
Hunting for small game	10.4% (1.1%)	1.36	12.01
Hunting for large game	5.7% (0.8%)	0.79	12.31
Hunting waterfowl	4.8% (0.8%)	0.47	8.56
Hunting game birds	2.5% (0.6%)	0.34	12.38

Comparison with other data

There is little recent information available with which to compare reported activity levels.

Fish and Game New Zealand license sales

Freshwater fishing for acclimatised species and bird hunting both require permits from Fish and Game New Zealand. National adult license sales for the 2006/7 season and our estimates of national participation are reported in Table 6.4. Fish and Game New Zealand define an adult as 18 years or over, the same as our survey population.

Even using the lower bounds of our estimates there is a marked divergence between reported participation and license sales. This may arise for a number of reasons.

- The data for freshwater fishing are not directly comparable. A fishing license is required only to fish for acclimatised species—catching whitebait, eels, koura and other species can be carried out without a license.
- Significant numbers of people (over 75% if this is the sole explanation) are participating in these activities without the legally required licenses.
- Sample bias is an unlikely explanation because of the high response rate to the survey. Multiplying the estimates by the overall survey response rate (40%) indicates, for example, that even if none of the non-respondents participated in bird hunting then estimated participation would still be over 74,000 people, far in excess of license sales.
- Social desirability bias may also play a role where the respondent attempts to conform to the interests of the researcher. This may be more of a problem for SPARC's interview-based data collection of information only about sport and physical activity (see below) than in our self-administered omnibus survey.
- Recall bias may have played an important role if people had participated in the activity previously but not in 2007, yet provided a positive indication of participation in 2007 on the basis of faulty recall. McLean and Tobias (2004) state "A high level of overestimation of physical activity appears inherent in self-report methods … Over-reporting of physical activity in New Zealand tends to be greater among less active individuals, people of non-European ethnicity, and older people."
- Different periods apply to our survey data and to license sales. Our data cover two freshwater fishing seasons (but only one bird season). If different people purchase licences from one season to another, annual license sales will underestimate participation in any calendar year.

All of these potential explanations may have played a role in the discrepancies observed here, but it is not possible to draw more solid conclusions.

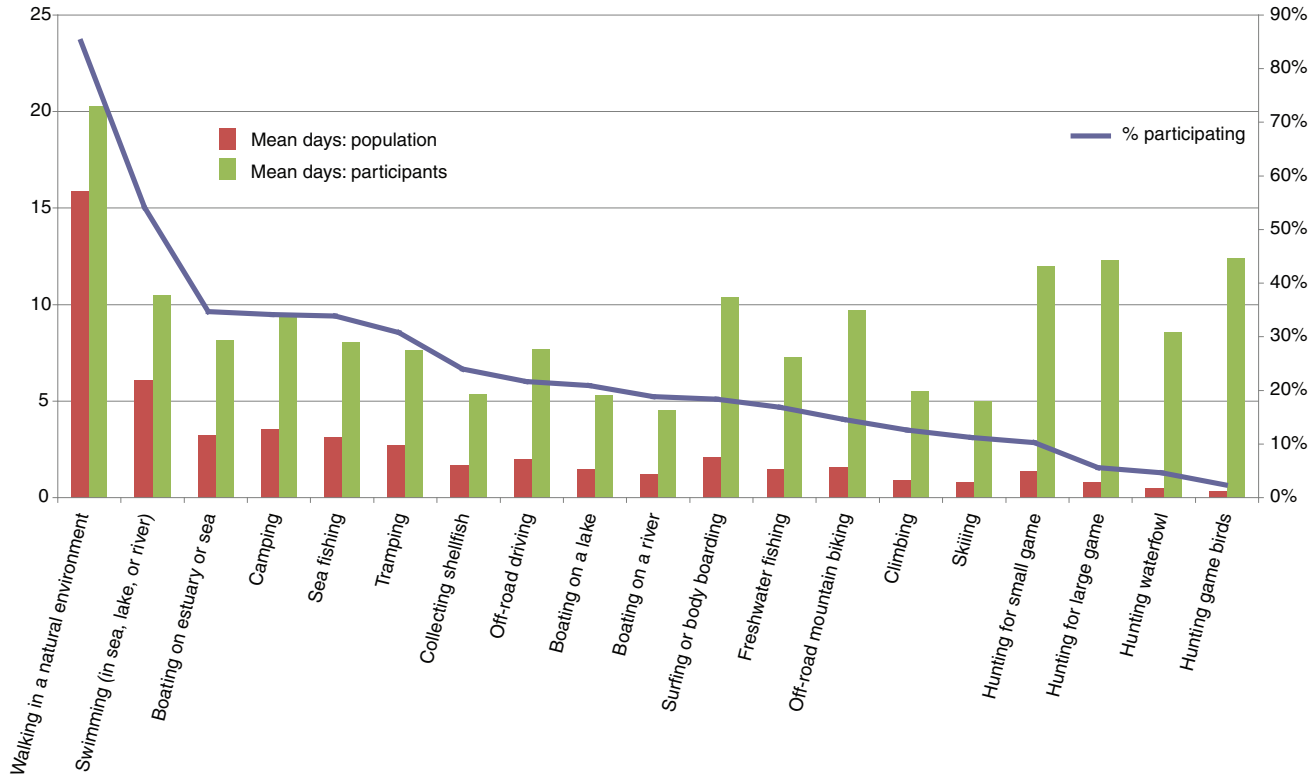

Figure 6.15. Resource-based recreation activity intensity.

Table 6.3. Socio-demographic effects on resource-based recreation activity participation.

	Group	Mountain biking	Tramping	Swimming	Surfing
Gender	Female	10.5%	26.4%		13.7%
	Male	20.4%	36.2%		23.7%
Education	No qualification	7.0%	17.7%	32.9%	8.2%
	Qualification	14.8%	30.3%	57.4%	20.4%
Income	Degree	23.2%	45.1%	67.7%	23.2%
	<$40,000 pa	8.7%	25.9%	46.8%	11.7%
	$40,000+ pa	24.3%	39.2%	66.7%	28.1%
Residence	Country		41.0%		
	Small town		35.4%		
	Medium town		20.5%		
	Large town		29.5%		

Table 6.4. Comparison with Fish and Game NZ license sales.

	This survey (95% confidence)	F&GNZ adult license sales 2006/7
Freshwater fishing	502,300 (422,600 ~ 582,000)	96,371
Waterfowl and game bird hunting	185,900 (134,400 ~ 237,300)	32,358

Below: Boating on the sea or an estuary was the third-most-popular category respondents identified. Sea-kayaking in Abel Tasman National Park.

DIANA PARR / DoC

SPARC recreation participation surveys

SPARC (formerly the Hillary Commission) has collected recreation participation information since 1997. SPARC data have been obtained using personal interviews in the respondent's home (McLean and Tobias, 2004; SPARC, 2008).

There are significant differences between our estimates and those of SPARC (Table 6.5), with our estimates being much larger. The four data sources all rank the activities in the same order. Participation rates for activities marked with an asterisk are not directly comparable. Whereas the Hillary/SPARC surveys asked about participation in these activities in any location, our survey asked about participation only in natural environments.

Explanations (except for failure to obtain a license) explored for freshwater fishing and for bird hunting potentially apply here too. Recall periods are slightly different; SPARC sought information on participation in the previous 12 months, whereas we sought information on participation in calendar year 2007, which ended two to three months prior to the survey. Consequently, there is more scope for recall error in our survey.

6.2.3 National Park visits

In each previous survey in this series respondents have been asked to identify whether they had visited a national park in the previous year. However, there is some evidence that many areas that are not national parks are commonly believed to be so (Booth & Peebles, 1995: see Figure 6.16). Further, previous questions did not identify which national parks were visited or how many visits were made to each.

The question used to assess national park visits in previous surveys was repeated in its usual context in the 2008 survey. As previously, national parks were undefined, so answers to this question were dependent upon respondent judgements as to which areas are national parks. The question assessed national park use in the previous 12 months.

Later in the 2008 survey a map indicated the location and names of all 14 New Zealand national parks. Accompanying the map was a question "During 2007, did you visit a National Park?" Respondents were also asked to indicate how many times they had visited each national park in 2007. These questions were accompanied by a directive to exclude visits that involved transiting a park solely to get to another destination.

Responses to the two questions assessing whether the respondent had made a visit to a national park were substantially different. Of 707 people who provided valid answers to both questions, 134 (19.0%) changed their response when the question was presented alongside the map which identified national parks. In the unprompted question 58.1% of respondents indicated they had visited a national park, whereas this fell to 43.7% in the presence of the map. This difference has very high statistical significance, supporting the hypothesis that many individuals believe the national park network is more extensive than it actually is.

Table 6.5. Comparison with Hillary/SPARC participation estimates.

Activity	This survey	Hillary 1997	SPARC 1997, '98, 2000	SPARC 2008
Walking *	84.6%	70%	64%	64.1%
Swimming *	53.9%	36%	36%	34.8%
Fishing	39.5%	25%	25%	19.3%
Tramping	30.7%	11%	12%	9.4%
Surfing/body boarding	18.4%	7%	7%	—
Skiing	11.3%	7%	6%	6.3%
Mountain biking *	14.6%	7%	6%	—

Source: SPARC (undated, b), SPARC (2008).

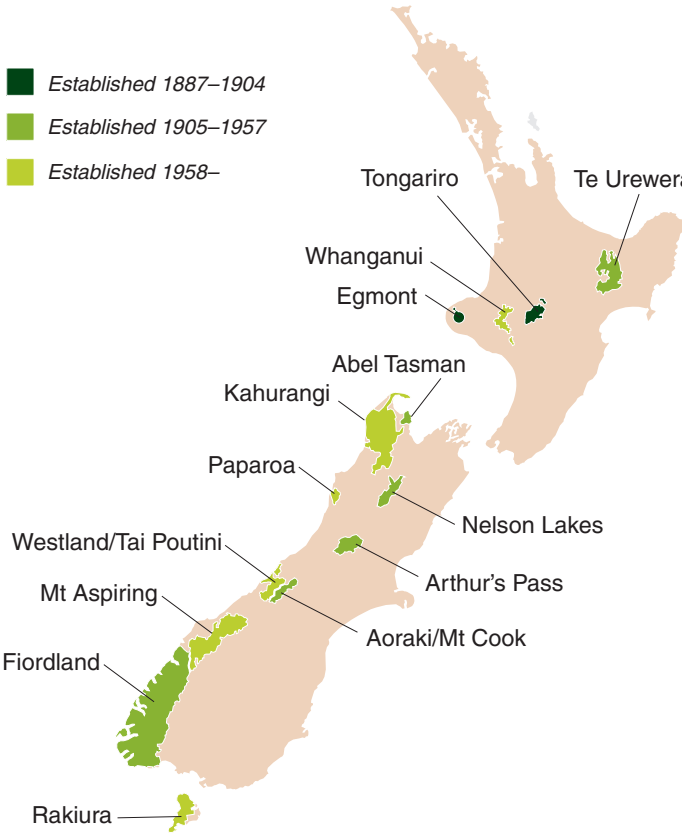

Figure 6.16. New Zealand's national parks.

Consistency between the two types of question accompanying the map was much better. Only three respondents said they had visited a national park and then failed to identify the number of visits to any individual national park. Eight people stated they had not visited a national park, but then indicated that they had made visits to individual parks.

Based upon identification of individual parks visited, 43.2% (SD = 1.8%) of respondents had visited a national park in 2007 (Figure 6.17). This figure is similar to, but somewhat higher than results of a telephone survey undertaken for the Department of Conservation in June 2008, which indicated that 36% (SD = 1.8%) of the population over the age of 15 years had visited a national park in the previous 12 months (S. Rundle, DoC, pers. comm.). The difference is significant at the 1% level (Z = 2.86), but may be attributable to methodological differences.

Most people had visited only one national park (22.5% of the population), dropping to 12.0% who had visited two parks, and 5.6% who had visited three parks. Only 3.2% of respondents had visited more than three national parks. On average, park visitors went to 1.87 national parks in 2007, although the large standard deviation (1.34 visits) makes this figure unreliable. The average number of visits to national parks by the survey population was 1.60. Although the number of visits has high variance (SD = 6.61), it provides an indicator of national park visits by the 2.97 million adult New Zealanders in the survey population in the order of 4.8 million visits per annum.

For the 647 people who provided valid responses the most visited national park was Tongariro, with 250 visits. Only five visits to Rakiura National Park were identified. Because of the small number of total visits to each national park and the high variance in the number of visits by individuals no further information on individual park visits is reported.

Tongariro National Park was visited by more individuals than any other, receiving visits in 2007 from 16.8% of survey respondents. This is significantly higher than the next most commonly visited park, Arthur's Pass, which was visited by 8.6% of respondents.

Who visits National Parks?

Socio-demographic attributes had significant impacts on national park visitation in 2007. Fifty five percent of respondents with personal annual income in excess of $40,000 claimed to have visited a national park in 2007, whereas only 39% of respondents with lower incomes made the same claim. Consistent with the income relationship, respondents with higher levels of education were more likely to have visited a national park, ranging from 26% for those who left school without a qualification, 45% for those who left school with a qualification but who did not have a university degree, to 57% of those with a university degree. Regional variation in national park visitation followed the pattern of park distribution, with only 31% of people from the Northern region visiting a national park in 2007, compared with 45% from the Central region and 55% from the South Island. Respondents who lived in cities or towns of over 10,000 people were less likely than rural or small town dwellers to visit national parks, with 41% and 51% visitation rates respectively. Ethnic differences were not significant.

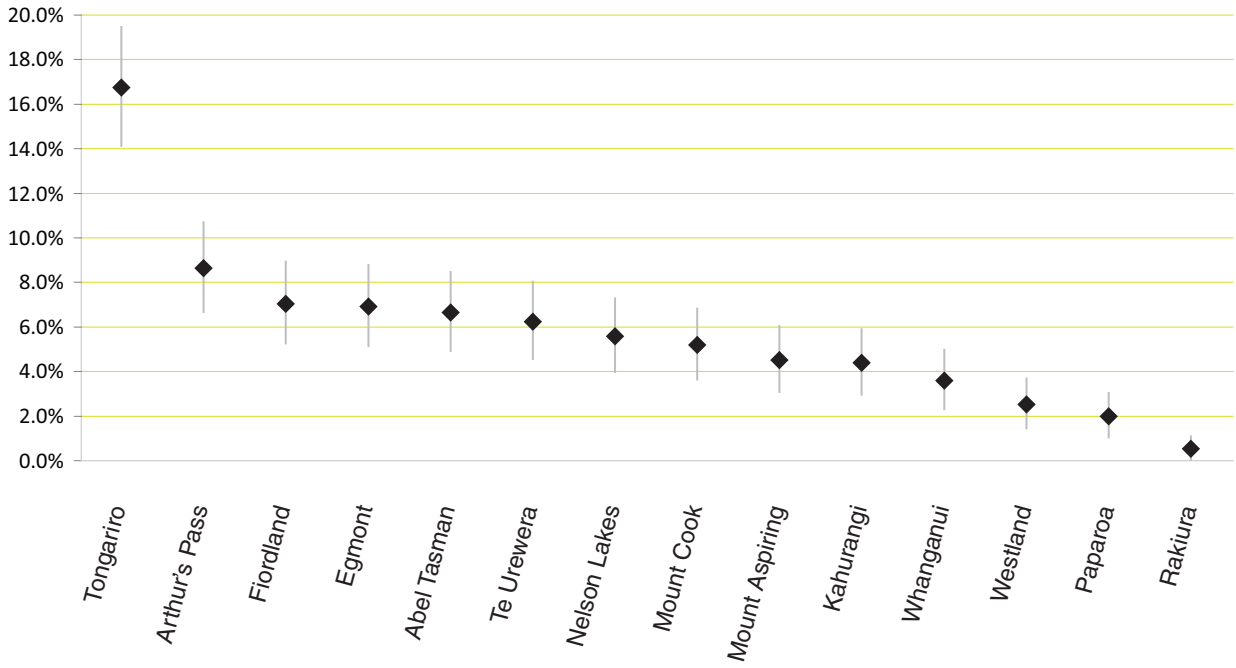

Figure 6.17. Percentage of respondents visiting each national park. (Bars indicate 95% confidence intervals.)

6.3 CONSERVATION

6.3.1 Introduction

The Department of Conservation (and likely many others) are interested in people's perceptions of a range of conservation related issues and approaches. The Department approached us to include a set of questions related to conservation, covering four main areas. First, they were interested in the extent to which people could be categorised according to their attitudes to the environment—this question was linked to previous work undertaken in Australia by Winter, Lockwood and Morrison (2003), Winter and Lockwood (2004) and Winter (2005), and tested in a telephone survey by Johnson *et al.* (2007). Second, there was interest in what people understood by the word 'conservation' and its importance to individuals and to New Zealand as a whole. Third, the Department wanted to know whether or not there was support for increased expenditure on conservation. Finally, they wanted to know the extent to which people were aware of the range of functions undertaken by the Department and people's views on how well they were performing in these roles.

Hughey *et al.* (2008) have reported separately on a detailed evaluation of these research questions. What follows is a summarised version of that report with some additional consideration of socio-demographic variables.

6.3.2. Methods

The questions incorporated in the conservation case study had previously been researched using a telephone survey (see Johnson *et al.* 2007)—the wording of a number of these questions was changed between the surveys to ensure suitability for a self-completed postal survey. Detailed descriptions of this and the other conservation questions are given in section 2.1.

Cluster analysis was used for the Natural Area Value Scores question. We used the method described in Winter *et al.* (2003), and explained in detail in Winter and Lockwood (2004). In summary, we:

- Used questions developed by Winter *et al.* (2003) to segment survey respondents into five value based groups
- Conducted tests using these segments against socio-demographic characteristics and the core conservation case study questions.

It is difficult to draw quantitative comparisons between this survey and that of Johnson *et al.* (2007). Theirs was a phone survey requiring different cognitive skills than a postal survey. While a degree of qualitative 'pattern matching' is possible great care needs to be taken if attempting quantitative comparisons. For example, whereas Johnson *et al.* (2007) used post-survey weighting to gain a representative sample, we did not.

6.3.3. Results

Natural Area Values

The five groups are shown in Table 6.6, with further detail of group composition and value attributes outlined in Hughey *et al.* (2008). A comparison of these groupings and related

Protecting national parks and native plants and animals ranked as the two most important conservation activities for survey respondents. Nearly 80% considered conservation to be 'extremely' or 'very' important to them. Below: Takahe with radio transmitter, Point Burn Valley, Fiordland National Park.

ROSS KERR / DoC

findings with those of both Winter *et al.* (2003) and Winter (2005) found a high level of agreement between the two sets of findings (Hughey *et al.*, 2008). Note that the names of our groups, while sometimes different, are not inconsistent with their results. These groupings indicate that nearly half (Green non-use and Pro-intrinsic combined) the respondents are very pro conservation, with around another quarter neutral, and the remainder (Moderate pro-use and Pro-use) more likely to support resource use.

These value groups have been used as a basis for evaluating people's responses to other key conservation questions, as shown below.

Meanings of conservation

Nine specified potential meanings of conservation, as well as 'other' and 'don't know', were provided to respondents. For each of these the respondent could tick a box to signify whether they thought the item was a "meaning" of conservation. Five meanings recorded around 80% response rates with 'Preserving culture and heritage' receiving only a 50% response—see Figure 6.18. This result is very different to that recorded by Johnson *et al.* (2007: 22) where 'preservation and protection' recorded 59% and all other items were less than 25%. They used an open-ended unprompted approach to elicit their responses, whereas for methodological and trial reasons we used a closed choice list.

Importance of conservation activities for New Zealand

Eleven specified conservation activities were provided to respondents. For each of these the respondent could tick a box, on a 5-point scale anchored by 'extremely important' to 'not at all important', to signify the relative importance of the activity for New Zealand. Nine of 11 activities were of relatively high importance for around 90% to almost 100% of respondents. The two exceptions were allowing commercial activities (which nevertheless achieved 59% support) and protecting customary rights (44%)—see Figure 6.19.

Table 6.6. The Natural Area Value groups.

Value group names	Characteristics	n (555)	%
Green non-use	*Pro conservation*	*244*	*43.96*
Pro-intrinsic		*30*	*5.41*
Moderate	*Neutral*	*160*	*28.83*
Moderate pro-use	*Pro resource use*	*70*	*12.61*
Pro-use		*51*	*9.19*

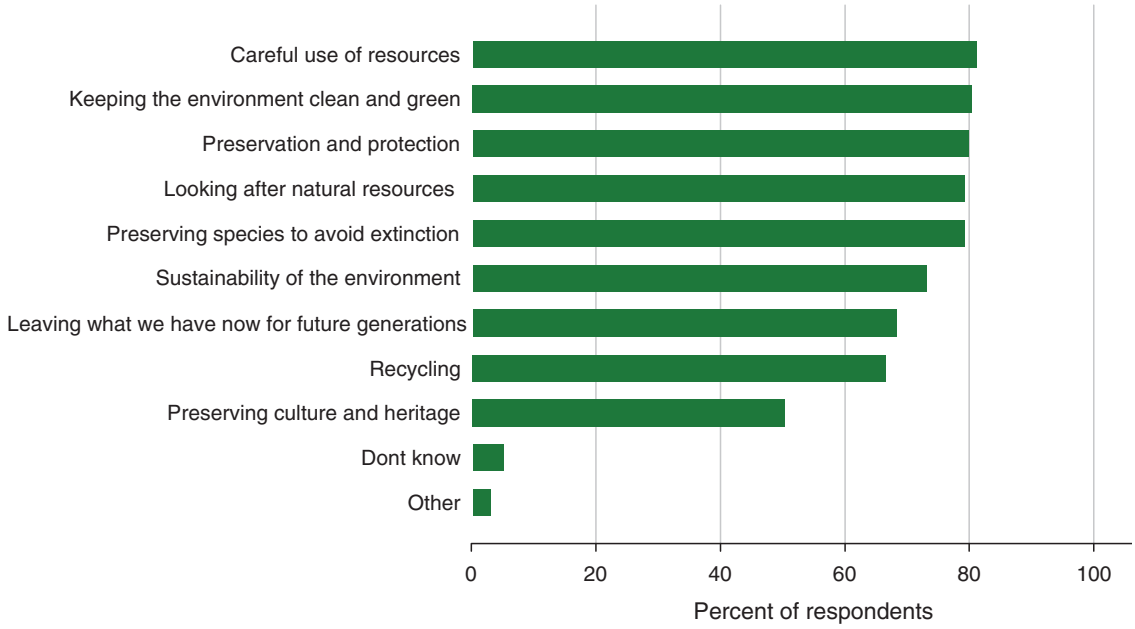

Figure 6.18. Meaning of conservation to respondents (N=752).

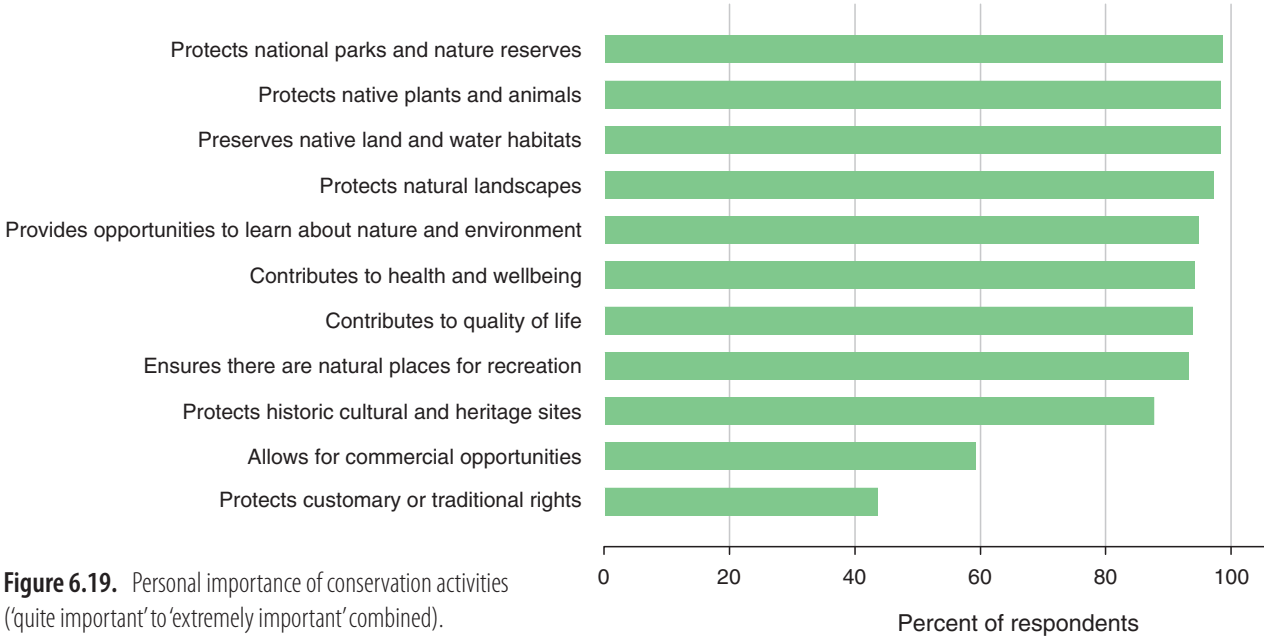

Figure 6.19. Personal importance of conservation activities ('quite important' to 'extremely important' combined).

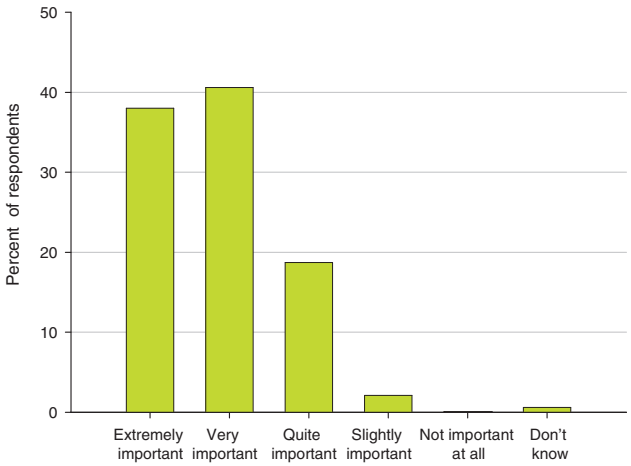

Figure 6.20. Overall importance of conservation to individuals (N=727).

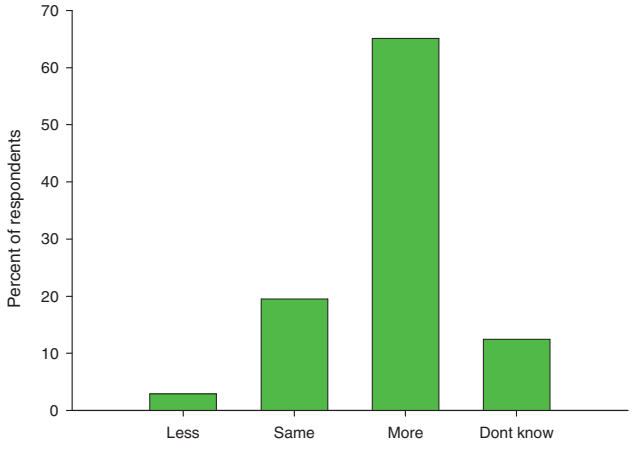

Figure 6.21. Support for a change in government expenditure on conservation (N=713).

Overall Importance of conservation

Around 79% of respondents considered conservation to be 'extremely important' or 'very important' to them (Figure 6.20). We changed slightly the terminology used by Johnson *et al.* (2007: 41) to ensure the question was better suited to a postal survey approach. The combination of 'very important' and 'above average' in their results yielded an 80% response to this question, consistent with our findings. The very low number of negative responses precluded any socio-demographic analysis.

We compared the NAVS-based value groups (see section 6.3.3) with the stated importance of conservation. The 'pro-use' group was much more likely (85.7% c.f. 14.7%) to rate conservation as 'extremely important' compared to 'important', than either 'green pro-use' (19.7% c.f. 80.3%) or 'moderate pro-use' (39.1% c.f. 60.9%)($p<0.001$).

Expenditure on Conservation

As shown in Figure 6.21, 65% of respondents support more expenditure on conservation. It is worth noting that Johnson *et al.* (2007) found 78% of respondents would support increased expenditure.

Some socio-demographic differences were detected. Maori and Asian respondents were significantly less likely to support more expenditure than were NZ Europeans or people of other ethnicities ($p<0.01$). Those with a higher education (bachelors degree or higher) were more likely to support an increase in expenditure than those with a lower education ($p=0.03$). Finally, 'resource users' were far less likely to support an increase in expenditure than any other occupational grouping ($p<0.001$).

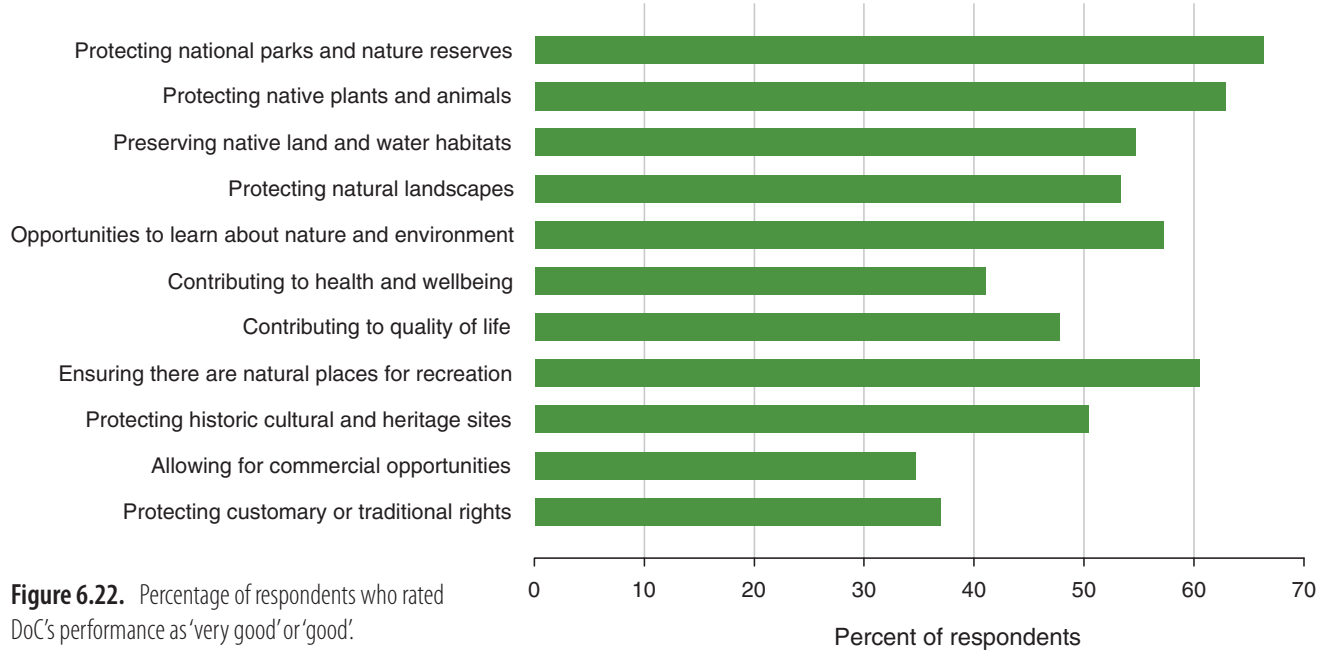

Figure 6.22. Percentage of respondents who rated DoC's performance as 'very good' or 'good'.

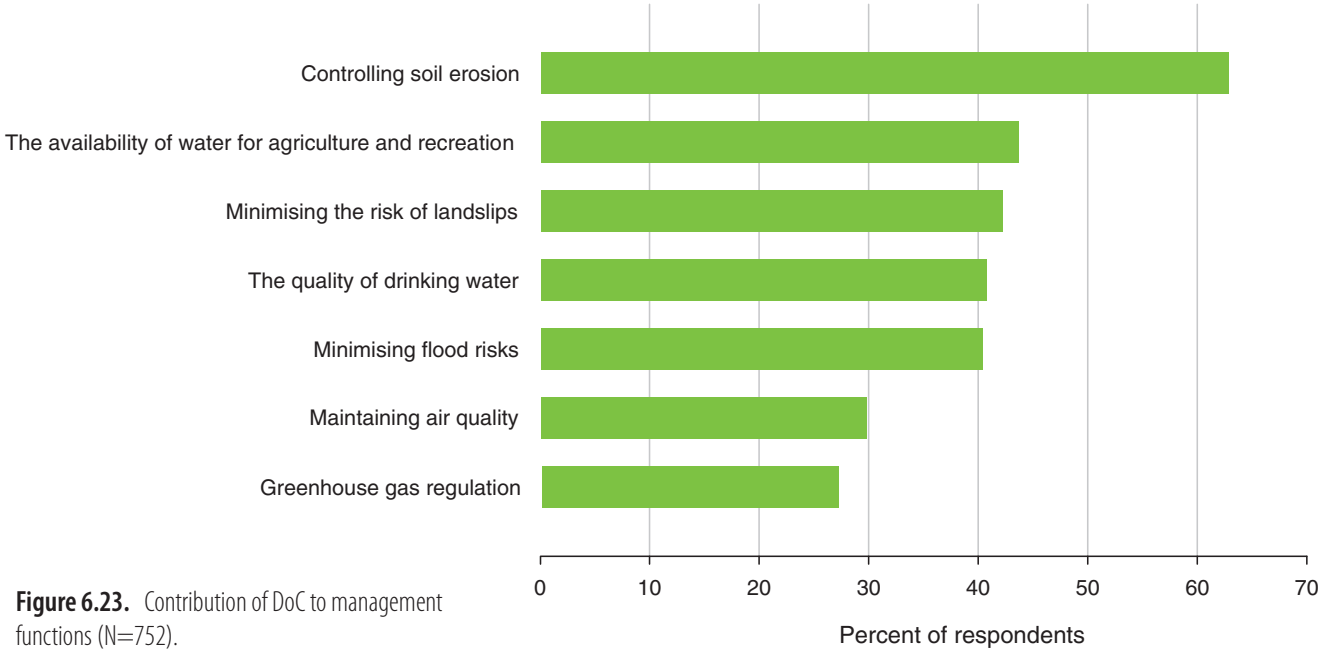

Figure 6.23. Contribution of DoC to management functions (N=752).

Department of Conservation's performance

Eleven specified conservation functions were provided to respondents. For each of these the respondent could tick a box, on a 5-point scale anchored by 'very good' to 'very poor', to signify the relative performance rating for the Department in each function. While most of the combined 'very good' and 'good' responses exceeded 50% (see Figure 6.22), they are routinely around 20 percentage points below the ratings recorded in Johnson *et al.* (2007: 77).

'Poor' and 'very poor' rankings were also combined—no set of responses in these categories exceeded 7.5%, indicating low overall levels of dissatisfaction.

Management functions

Seven specified management functions (roughly equivalent to the notion of ecosystem services) were provided to respondents. For each of these the respondent could tick a box to signify whether they thought the function was something that DoC contributed to (Figure 6.23). 'Controlling soil erosion' was the most selected choice, and 'greenhouse gas regulation' the least. These results are substantially lower than for Johnson *et al.* (2007) who, for example, recorded 59% for 'availability of water for agriculture and recreation', whereas we recorded 44% for the same function.

DON MERTON / DoC

Most survey respondents supported inceased expenditure on conservation. Above: Pycroft's petrel chicks being transported to artificial burrows, Cuvier Island, March 2003.

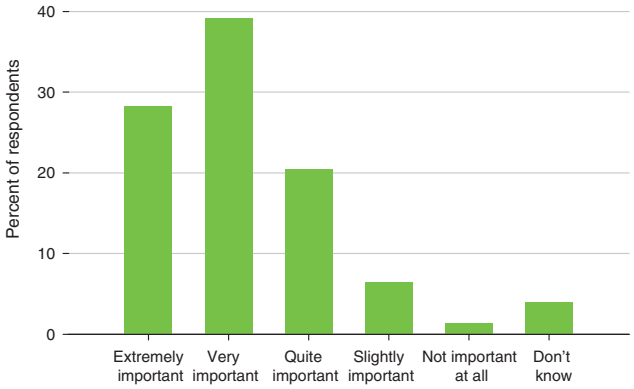

Figure 6.24. Importance of DoC's work to individuals (N=706).

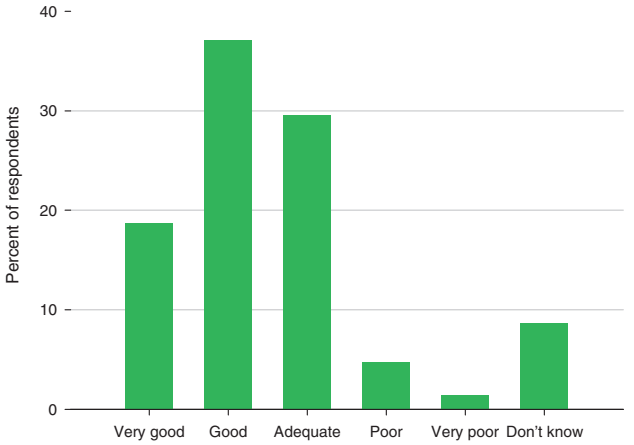

Figure 6.25. Overall performance rating of DoC (N=707).

Importance of work undertaken by DoC

People were asked to rate using a 5-point Likert scale, anchored by 'extremely important' and 'not at all important', the overall importance to them as individuals of work done by DoC (Figure 6.24). Sixty six percent of respondents chose 'extremely important' or 'very important', compared to the 76% (combined 'very important' and 'above average') reported by Johnson *et al.* (2007: 80).

We compared the NAVS-based value groups with stated importance of DoC's work, based on those who thought it was 'extremely important' to them, versus those who thought it was important ('very important', 'quite important' and 'slightly important' combined). The 'green pro-use' (15.3% c.f. 84.7%), the 'moderate' (36.2% c.f. 63.8%) and the 'moderate pro-use' (27.7% c.f. 72.3%) were all much more likely to rate the work as 'important' rather than 'extremely important' ($p<0.001$).

DoC's performance

People were asked to rate, using a 5-point Likert scale anchored by 'very good' and 'very poor', the overall performance of work done by DoC (Figure 6.25). Over 50% of respondents rated DoC's performance as 'very good' or 'good', with only 6.1% considering it to be 'poor' or 'very poor'.

6.3.4. Discussion and Conclusions

This case study explored four main aspects of conservation and its management in New Zealand, namely:

- Natural Area Value scores and use of these to identify specific groups of survey respondents
- Meanings and importance of conservation
- Funding for conservation management
- Contribution, importance and performance of DoC.

Each of these aspects is explored, in brief, below, and, where relevant, comparisons drawn with the findings of Johnson *et al.* (2007).

Natural Area Values

Analysis of the Natural Area Value scores led to the identification of five value group clusters, similar in makeup to those reported by Winter (2005), and explained in detail in Winter and Lockwood (2004). The biggest difference between these studies has resulted from the sampling method used by Winter (2005)—she combined data sets representing the general public and specifically targeted environmentalists

and farmers. As a result of her approach there is a relatively even distribution of numbers between all five groups. Two of the cluster groups had very low numbers of responses in our survey, which limited our ability to undertake more analyses. Nevertheless, our findings are similar to those of Johnson *et al.* (2007).

Irrespective of the differences it is clear the value group clusters identified in this study can be used to explain some differences in behaviour and perceptions. Much more analysis is required in this area.

Meanings and importance of conservation

Conservation is very important to most people for a wide variety of reasons, including for commercial opportunities. In the order of 80% of respondents think conservation is about careful resource use, being clean and green, preserving and protecting the environment, and looking after natural resources. Almost two thirds think it is also about sustainability, future generations and recycling, and 50% include culture and heritage. Only customary rights received a less than 50% rating of importance for respondents.

Funding for conservation management

From the responses to this question it is clear the vast majority of respondents are very supportive of some additional resourcing for conservation expenditure. However, this is an area that requires further research.

Contribution, importance and performance of DoC

Respondents were only reasonably aware of the range of management functions that DoC contributes to. This seems surprising. For example, given that DoC manages most of New Zealand's remaining native forests it should have been obvious that DoC's forest conservation activities, e.g., possum contol, contributes to greenhouse gas regulation. But, even given this response there is very high overall support for the importance of the work done by DoC, with over half the respondents considering the department's performance to be 'good' or 'very good'.

S. HAYES / DoC

More than half the respondents felt DoC was doing a good job or better, and perceived its work to be 'very' or 'extremely' important, although some had an incomplete idea of the range of DoC's activities. Above: Piopiotahi–Milford Sound Marine Reserve, Fiordland Marine Area.

SHUTTERSTOCK

Queenstown, Otago

07

DISCUSSION AND CONCLUSIONS

The biennial survey of people's perceptions of the state of the New Zealand environment is the only research the authors are aware of that systematically studies perceptions of the state of the environment using public surveys, while applying the Pressure–State–Response (PSR) model[1]. In this section the main findings and implications from the 2008 PSR survey are identified and key trends over all five surveys examined.

7.1 THE 2008 SURVEY

7.1.1 Pressure–State–Response

The survey sought to determine how New Zealanders perceived pressures, states and responses to various aspects of the New Zealand environment. The survey results reinforce results based on biophysical measures that show New Zealand is in the top quartile of countries in terms of sustainability (see Esty *et al.* 2008). This position is consistent with the overarching findings that on average New Zealanders considered the state of their natural environment to be adequate or good, New Zealand to be 'clean and green', and that they had a good knowledge of the environment. It is noteworthy that while WWF *et al.* (2008: 14) ranked New Zealand 6th of 148 countries in terms of the size of its per capita Ecological Footprint[2], New Zealand has a biocapacity ecocredit more than 80% larger than its national footprint (WWF *et al.* 2008: 37). The pressure on the New Zealand environment is much lower than in many other countries, but it is likely to be increasing steadily with population and economic growth.

While the environment overall, and the urban environment in particular, were thought of very highly, there was an overall negative trend for air quality. Nevertheless, for air and the other resources, people's perceptions were of good or very good state despite the fact that for some items, such as 'biodiversity', the state is in fact very poor (see for example Hughey *et al.* 2006b). Reasons for dissonance between science and perceptions are not always clear—this is one area where more research might be useful.

New Zealanders judged that the environment was adequately managed, and generally improvingly so. From the environmental issues management questions (Figures 3.9 and 3.10) respondents continued to give the poorest ratings to management of farm effluent and runoff, and industrial impact on the environment. Questions about management of resources reveal that respondents rate lowest management of rivers and

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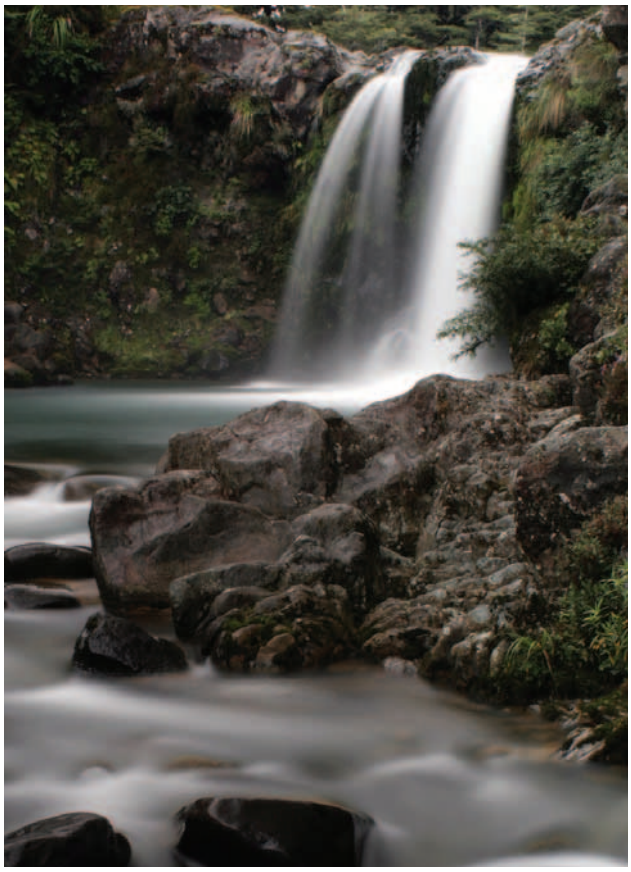
Survey respondents had positive perceptions of the environment overall, especially the urban environment. Above: punting on the Avon, Christchurch.

SHELLEY MCMURTRIE

The condition of native flora and fauna in New Zealand was rated as 'adequate' or 'good' by most respondents, although several major reports suggest it is in fact very poor. This has implications for public acceptance of conservation programmes. Pictured is the jewelled gecko (Naultinus gemmeus), which is close to extinction in many parts of the country often from illegal collection.

1 A project undertaken, initially biennially but now triennially, in the Environment Waikato region assesses environmental awareness, attitudes and actions but does not apply the PSR model (Environment Waikato & Gravitas Research and Strategy Ltd 2006). The Waikato project has completed three biennial surveys and undertook its first triennial survey in late 2006.

2 Defined by WWF *et al.* (2008: 14) as measuring humanity's demand on the biosphere in terms of the area of biologically productive land and sea required to provide the resources we use and to absorb our waste.



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Freshwater quality was identified (by 32.3% of respondents) as the single most important enviromental issue for New Zealand.

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Survey respondents were strongly supportive of actions that protected instream values, irrespective of their socio-demography. Above: Woolshed Creek at Mt Somers.

lakes, air quality, coastal water and beaches, groundwater and marine fisheries. The same five resources received the highest ratings for the change in management over all surveys. Thus, while there are still some low management ratings most are nevertheless improving over time. If this is the case then there should be an improving trend in perceived state of all these resources but such an improvement has not yet been observed.

Over 75% of year 2008 respondents recycled household waste, bought products marketed as environmentally friendly, or had reduced or limited their use of electricity. Few respondents, however, were involved in the restoration or replanting of the natural environment, had participated in an environmental organisation, or taken part in hearings or consent processes related to the environment.

The single most important environmental issue for New Zealand in 2008 was again fresh water quality and related issues (32.3% of respondents).

As with the previous surveys, high numbers of respondents stated they lacked knowledge about some resources (soils, wetlands, marine reserves, oil and gas reserves, groundwater), and their unwillingness to give uninformed responses should add credibility to the results presented. Having said this, it was clear from the water resources case study that in some areas respondents are increasingly willing to express an opinion.

7.1.2 Fresh water

A case study was undertaken focusing on fresh water, repeating a number of questions asked in 2004. Overall findings were similar between the two surveys. The general state of fresh water is good but there are issues at regional and local levels with streams and sometimes with lakes. Ethnicity was an important determinant of freshwater perceptions, with New Zealand European and Maori respondents almost always more concerned than people of other ethnicities—the consistent pattern is startling (see for example Figures 6.11, 6.12 and 6.14).

We tested to see if there were other differences, including urban-rural, but remarkably few existed. One conclusion, supported by responses to the statements represented in Figures 13a–13h and irrespective of socio-demographic considerations, is that respondents are strongly supportive of actions that protect instream values.

7.1.3 Resource based recreation and national park visits

Judgements on the state of the natural environment are likely to be more reliable if people are familiar with the environment. Sport and recreational activity are two of the main ways that people interact with the natural environment and become aware of it's quality and how it is changing. Survey respondents claimed high participation rates in resource-based recreation. About 85% of respondents claimed to walk in natural environments, averaging 20 different days engaged in this

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Walking was the most popular activity identified by respondents (85%), who averaged 20 different days of walking a year. Above: visitors to a kauri grove in Waiau, Coromandel.

activity each year. This level and frequency of participation bodes well for detection of environmental changes in places where people walk. Over half of respondents claimed to swim in rivers, lakes or the sea, making them reasonably familiar with water quality.

While these results illustrate the high proclivity of New Zealanders to engage in outdoor recreation in natural environments, caution is urged because the participation rates estimated here are significantly higher than those reported in other sources.

The potential for perceptions to deviate from reality was illustrated in the two different approaches to estimation of national park visit rates. Much higher visit rates are reported when people were left to judge for themselves what constituted a national park and this suggests that the national park network is perceived to be more extensive than it is in reality. The more conservative estimate, that 43% had visited a national park in 2007, underlines the affinity that New Zealanders have for natural environments.

7.1.4 Conservation

The conservation case study had four major themes.

1. Identification of Natural Areas Value was undertaken and this enabled a clustering of respondents into five groups—these value groups are directly comparable to similar research from Australia (see Winter *et al.* 2003), and comparable to more recent New Zealand research (Johnson *et al.* 2007). The value group clusters were used to further analyse responses to other conservation questions.
2. Conservation was very important to individuals, however respondents recognised a wide range of meanings for the term 'conservation'.
3. Given the above it should not be surprising that respondents were very supportive of additional government expenditure for conservation.
4. Finally, there is a surprisingly low level of awareness of how DoC's activities contribute to a range of ecosystem services. But even given this limitation, there was very high overall support for the importance of the work done by DoC, with over half the respondents considering the Department's performance to be 'good' or 'very good'.

The patterns of responses and overall conclusions are similar to those that were drawn from a 2007 phone-based survey (Johnson *et al.* 2007).

S. HAYES / DoC

Survey respondents had a generous interpretation of what constituted a national park, but even by the most conservative estimate 43% had visited one in 2007. Above: alpine cushion bog, Key Summit, Fiordland National Park.

SHELLEY MCMURTRIE

JANE TANSELL / DoC

Respondents were largely unaware of the Department of Conservation's contribution to a range of ecosystem services. Above: DoC staffer Tansy Bliss holding "Kahu", a Haast tokoeka (Apteryx australis). Found only in South Westland, less than 300 Haast tokoeka exist, and they depend on DoC stoat control for survival.

GEOFF KERR

Survey participants valued conservation and supported additional government funding for it, though 'conservation' was understood to mean many different things. Above: warning about the illegal release of the coarse game fish rudd (Scardinius erythrophthalmus), Travis Wetland reserve in Christchurch.

DoC

Survey respondents were very supportive of the Department of Conservation, with over half considering its performance to be 'good' or 'very good'. Above: 'Tark of the Park', part of the Yogi Bear Summer Holiday Programme, Fiordland National Park.

Over half of survey respondents claimed to swim in rivers, lakes or the sea. Note, though, that outdoor recreation participation rates estimated in this survey are higher than those reported in other sources. Left: swimming at the Nile River on the West Coast.

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'Urban development' was considered a major cause of damage to New Zealand's environment. For the first time in this survey 'farming' was reported as being the primary cause of damage to fresh waters, although, as in previous surveys, respondents considered it had a major impact on all resources. Above: the Sky Tower, Auckland. Below: Nisbet's view of the effect of dairying on waterways.

7.2 INTER-SURVEY COMPARISONS

While inter-survey comparisons were generally consistent there are several notable exceptions to the generally high level of consistency of responses to the five surveys.

7.2.1 Pressure–State–Response differences

- 'Farming' continued to be judged as a major cause of impact to almost all resources, and for the first time was recorded as the biggest single cause of damage to fresh water. Similarly, 'urban development' was identified as a major cause of damage to many resources.
- The state of air was considered to be declining. The condition of native bush and forests, and coastal waters and beaches was perceived to be improving.
- It is notable that management was perceived to be improving for 12 of the 13 resources monitored. The exception is groundwater, where no trend was detected.

7.2.2 Behaviours

There have been few between-survey differences. The highest participation levels have always been reported for 'reducing or limiting use of electricity' (around 80%) and 'recycling household waste' (around 90%).

7.3 IMPLICATIONS FOR POLICY MAKERS

Some of the survey findings should prompt policy makers into action. Differences between perceptions and fact can be indicative of potential problems. First, the 'facts' may not be correct. Residents and resource users are a significant monitoring resource that can be aware of problems unknown to management agencies and policy makers, simply because they are the eyes over an entire nation. Second, if perceptions are incorrect the public may demand that scarce environmental management funds and expertise are used to manage less serious problems. Where this occurs, resources may be diverted from the major environmental issues to the detriment of overall environmental quality. Some examples of potential issues along these lines are:

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Although the condition of New Zealand forests is considered 'good', this may not reflect the impact of weeds and other pests. Above: wilding lupins in the South Island.

- Most respondents considered the condition of New Zealand's native plants and animals to be 'adequate' or 'good' although the National Biodiversity Strategy (DoC and MfE 2000), the Environment New Zealand 2007 report (MfE 2007) and the global Environmental Sustainability Index (Esty *et al.* 2005) indicate otherwise. This dissonance could ultimately hinder acceptance of additional programmes in this area.
- The perception that the condition of New Zealand's native bush and forests is 'good' to 'adequate' may not accurately reflect the impact of pests and weeds, on which there is little representative scientific data.
- The perceived impact of farming on the environment has always been negative, but was worse in this survey; a trend which would be interesting to track in relation to new policies and programmes designed to address this issue. Audited positive results arising from the 'Dairying and Clean Streams Accord' (see Hill 2004, for example) may change these perceptions when they are more widely known, although Deans and Hackwell (2008) present a pessimistic view of the outcomes from this type of initiative.

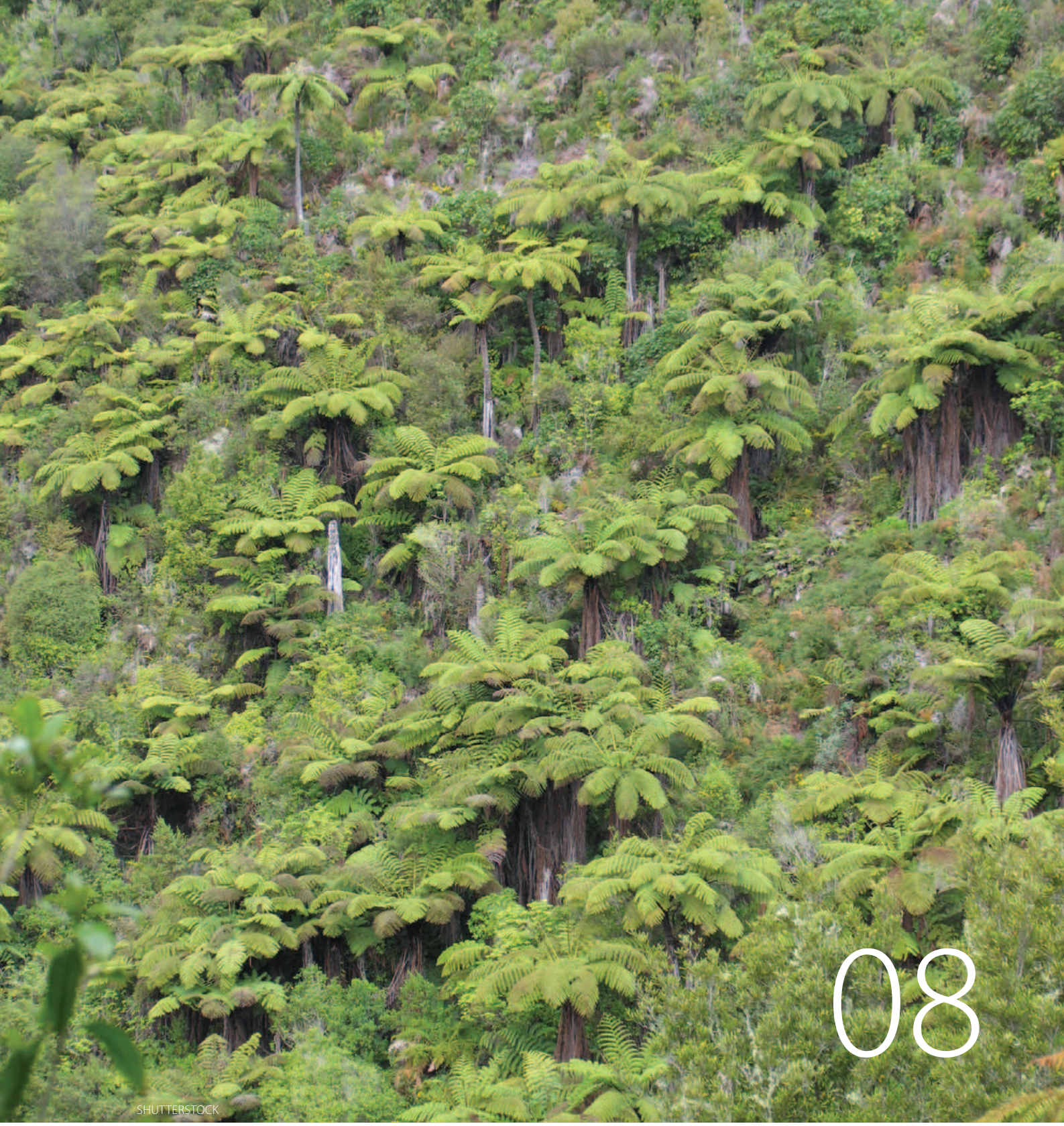
The case study results, particularly for fresh water, have implications for policy makers. Freshwater quality is clearly a major environmental issue in New Zealand, a finding that continues to be reinforced by results from this survey. Cullen *et al.* (2006) and Hughey *et al.* (2007) have related survey findings to both policy and biophysical science matters. In the latter they found that people's perceptions about fresh water are matched by scientific findings (also recently confirmed in the Waikato region—see Environment Waikato 2008). The 2008 case study confirmed findings from 2004. People are concerned about lowland waterways and lakes and, while there has been some lessening of concern it remains large. What is perhaps most significant is that more people are now prepared to express an opinion about water-related issues, and the number of 'don't know' responses to almost all water–related questions has declined significantly. Improved awareness and heightened concerns about fresh water, which transcend socio-demographic groups, should be leading to implementation of significant new policy.

We consider there are major challenges here. First, while there is much discussion and several proposals surrounding policy changes at the national level, such as the Proposed National Policy Statement for Freshwater Management, and in the regions, these have yet to be confirmed. There are lag times between discussions, proposals, and confirmation of policies and plans. Second, assuming these proposed policies are confirmed, there will be further lags in developing and implementing new proposals and giving effect to these at regional levels. Finally, assuming all these necessary changes occur, there will be variable lag times between policy, plan and consent implementation and detectable changes in the environment—these time lags are likely to be in the order of years, if not decades in some cases.

In such circumstances there is a need for realism and education—councils and researchers need to be realistic about raising public expectations. How these expectations and perceptions change over time will be monitored with interest in these surveys, and in other forums.

GEOFF KERR

The condition of fresh water is the number one environmental concern amongst New Zealanders. Above: An infestation of didymo in the Hurunui River, Canterbury.



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Rugged coast line, Catlins, Southland

APPENDICES

Perceptions of the State of New Zealand's Environment

2008 Survey

Published and distributed by:
Lincoln University

Coverpage image:
Cruise ship in Kaikoura (© 2006 S. McMurtrie)

For each question please indicate your answer by **ticking the appropriate box(es)** or **writing in the spaces provided.**

1 We would like **your opinion** on the following issues.

	Very good	Good	Adequate	Bad	Very bad	Don't know
Your knowledge of environmental issues is						
The overall standard of living in New Zealand is						
The overall state of the natural environment in New Zealand is						

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Don't know
New Zealand's environment is "clean and green"						

2 Please indicate what you think **the condition** of each of the following is.

The condition of New Zealand's …	Very good	Good	Adequate	Bad	Very bad	Don't know
Natural environment in towns and cities is						
Air is						
Native land and freshwater plants and animals is						
Native bush and forests is						
Soils is						
Coastal waters and beaches is						
Marine fisheries is						
Rivers and lakes is						
Groundwater is						
Wetlands is						
Natural environment compared to other developed countries is						

3 Now we would like your opinion on some of our **natural resources.**

New Zealand's …	Very high	High	Moderate	Low	Very low	Don't know
Diversity of native land and freshwater plants and animals is						
Amount of native bush and forests is						
Quantity of marine fisheries is						
Area of marine reserves is						
Amount of freshwater in rivers and lakes is						
Availability of groundwater for human use is						
Area of national parks is						
Area of wetlands is						
Availability of parks and reserves in towns and cities is						
Reserves of oil and gas are						

4 What do you think of the **management** of the following items?

Management of New Zealand's …	Very good	Good	Adequate	Bad	Very bad	Don't know
Pest and weed control is						
Solid waste disposal is						
Sewage disposal is						
Farm effluent and runoff is						
Hazardous chemicals use and disposal is						
Industrial impact on the environment is						

5 What do you think of the **management** of each of the following?

Currently New Zealand's …	Very well managed	Well managed	Adequately managed	Poorly managed	Extremely poorly managed	Don't know
Natural environment in towns and cities is						
Air quality is						
Native land and freshwater plants and animals are						
Native bush and forests are						
Soils are						
Coastal waters & beaches are						
Marine fisheries are						
Marine reserves are						
Rivers and lakes are						
Groundwater is						
National parks are						
Wetlands are						
Natural environment compared to other developed countries is						

7 Please tick one box in each row to indicate whether in the last 12 months you have done any of the following.

In the last 12 months you have…	Yes	Regularly	No	Don't know
Reduced, or limited your use of electricity				
Reduced, or limited your use of fresh water				
Visited a marine reserve				
Visited a national park				
Bought products that are marketed as environmentally friendly				
Recycled household waste				
Composted garden and/or household waste				
Been involved in a project to improve the natural environment				
Grown some of your own vegetables				
Obtained information about the environment from any source				
Taken part in hearings or consent processes about the environment				
Participated in an environmental organisation				
Commuted by buses or trains				
Been an active member of a club or group that restores and/or replants natural environments				
Made a financial donation to a non government environmental organisation (e.g., Forest & Bird)				

6 Pease tell us what you think are the **main causes of damage** to parts of the New Zealand environment by **ticking up to 3 causes** on **each row** across the page.

	Motor vehicles & transport	Household waste & emissions	Industrial activities	Pests & weeds	Farming	Forestry	Urban development	Mining	Sewage & stormwater	Tourism	Commercial fishing	Recreational fishing	Dumping of solid waste	Hazardous chemicals	Other (please specify)
Air															
Native land & fresh water plants & animals															
Native forests & bush															
Soils															
Beaches & coastal waters															
Marine fisheries															
Marine reserves															
Fresh waters															
National parks															
Wetlands															

Freshwater resource management

We would now like your opinion about some aspects of lakes, rivers and streams, and aquifers (groundwater).

Regional councils (e.g. Auckland Regional Council (ARC), Environment Waikato, Greater Wellington Regional Council, Environment Canterbury, Otago Regional Council) are responsible, amongst other things, for:

- Water quality and pollution management;
- Allocation and management of river and stream flows, and of lake levels;
- Extraction of shingle from river beds; and
- Flood control works.

The Ministry for the Environment, in central government, is responsible for the development of national level policies and standards for freshwater. The Ministry has, for the last four years, been running the government's Sustainable Water Programme of Action.

8 Please give us your **opinion** of the following.

The quality of water in New Zealand's…	**Extremely good**	**Good**	**Adequate**	**Poor**	**Extremely poor**	**Don't know**
Rivers and streams is						
Aquifers (groundwater) is						
Lakes is						

The quality of water in my region's…	**Extremely good**	**Good**	**Adequate**	**Poor**	**Extremely poor**	**Don't know**
Rivers and streams is						
Aquifers (groundwater) is						
Lakes is						

My Regional *(e.g., Greater Wellington, Auckland, Environment Canterbury)* ***Council's management of…***	**Extremely good**	**Good**	**Adequate**	**Poor**	**Extremely poor**	**Don't know**
Rivers and streams is						
Aquifers (groundwater) is						
Lakes is						

Ministry for the Environment's policy making for…	**Extremely good**	**Good**	**Adequate**	**Poor**	**Extremely poor**	**Don't know**
Rivers and streams is						
Aquifers (groundwater) is						
Lakes is						

9 Do you **agree** or **disagree** with the following statements?

	Strongly agree	**Agree**	**Neither agree nor disagree**	**Disagree**	**Strongly disagree**	**Don't know**
More water should be taken from **large rivers** for irrigation, even if it has a negative impact on freshwater fisheries.						
More water should be taken from **large rivers** for hydro electric power generation, even if it has a negative impact on freshwater fisheries.						
Small lowland streams in my region have high quality water.						
Small lowland streams in my region are well managed.						
More water should be taken from **small lowland streams** for irrigation, even if it has a negative impact on freshwater fisheries.						
Small lowland streams in my region are in good condition.						
Water quality in **small lowland streams** in my region has not been damaged by dairy farming.						
More water should be taken from **aquifers** (underground) in my region.						

Resource-Based Activities

10 Please tick one box in each row to indicate on how many different **days** you have participated in each of the following activities during 2007.

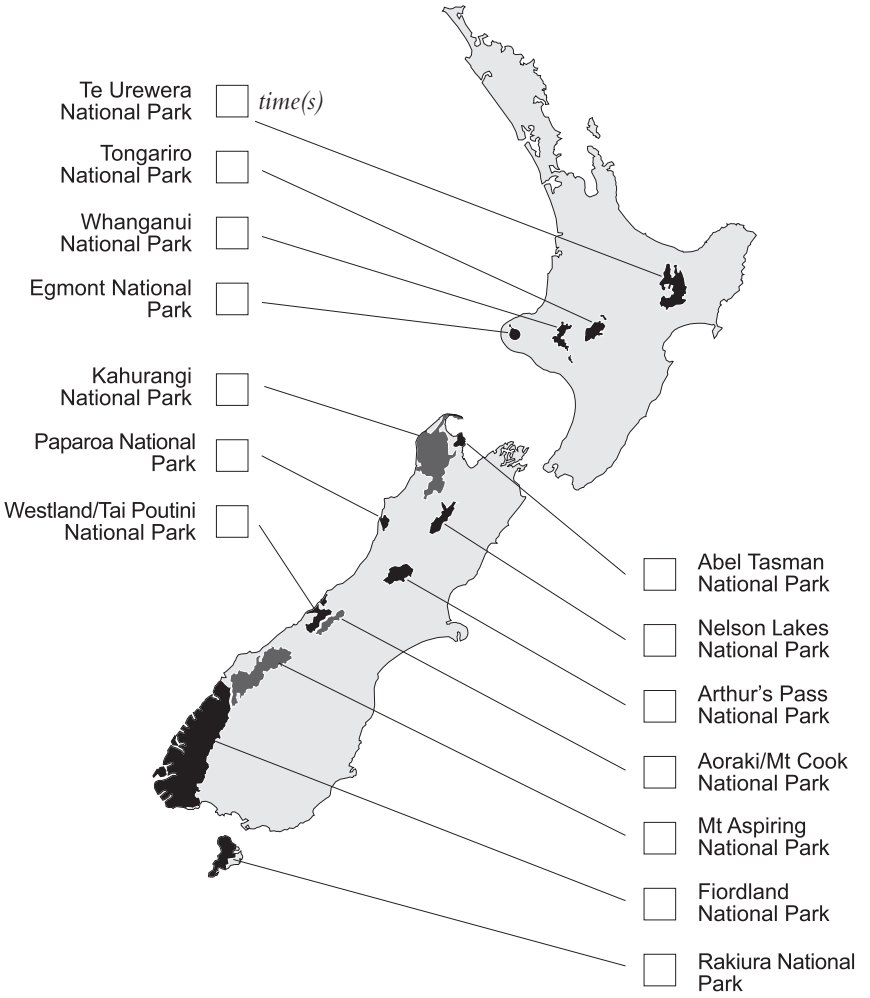
	0 days	1–5 days	6–10 days	11–15 days	16–20 days	21 or more days
Walking in a natural environment						
Tramping						
Climbing (e.g., mountain, rock)						
Camping						
Off-road mountain biking						
Off-road driving						
Boating on a river						
Boating on a lake						
Boating on estuary or the sea						
Freshwater fishing						
Sea fishing						
Collecting shellfish						
Skiing						
Swimming (in sea, lake or river)						
Surfing or body boarding						
Hunting for large game (deer, pigs, tahr, chamois, goats, wallabies)						
Hunting for small game (e.g., rabbits, hares, possums)						
Hunting waterfowl (e.g., ducks, geese, pukeko)						
Hunting gamebirds (e.g., pheasant, quail)						

National Park Visits

11 During 2007, did you visit a **National Park**?

☐ Yes ☐ No

If **yes**, fill in the boxes beside the map below to show **how many times** you visited each national park in 2007. (Visits to national parks do not include driving through or beside a park to get somewhere else.)



Conservation in New Zealand

The next questions are about conservation in New Zealand, and activities and effectiveness of the Department of Conservation.

12 The following statements reflect a range of different attitudes people have towards the environment. Please indicate how much you **agree** or **disagree** with the statements below.

	Very strongly agree	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Very strongly disagree	Don't know
Only humans have intrinsic value—that is, value for their own sake								
The value of an ecosystem only depends on what it does for humans								
Ugliness in nature indicates that an area has no value								
Places like swamps have no value and should be cleaned up								
The only value that a natural place has is what humans can make from it								
The value of nature exists only in the human mind. Without people nature has no value								
There are plenty of natural places that are not very nice to visit but I'm glad they exist								
Even if I don't go to natural areas, I can enjoy them by looking at books or seeing films								
We have to protect the environment for humans in the future, even if it means reducing our standard of living today								
I'm seeing natural areas the next generation of children may not see, and that concerns me								
I need to know that untouched, natural places exist								
Natural areas are valuable to keep for future generations of humans								
Natural areas must be protected because I might want to use them for recreation in the future								
Natural areas are important to me because I use them for recreation								
I don't like industries such as mining destroying parts of nature, but it is necessary for human survival								
It is better to test new drugs on animals than on humans								
Our children will be better off if we spend money on industry rather than on the natural environment								
All plants' and animals' lives are precious and worth preserving but human needs are more important than all other beings								
To say that natural areas have value just for themselves is a nice idea but we just cannot afford to think that way: the welfare of people has to come first								
Forests are valuable because they produce wood products, jobs and income for people								

13 The term 'conservation' covers many things and can mean different things to different people. When you think about the term '**conservation**' what does it mainly mean to **you**?

Conservation means: *(tick as many as apply)*

- ❑ Careful use of resources
- ❑ Keeping the environment clean and green
- ❑ Leaving what we have now for future generations
- ❑ Looking after natural resources
- ❑ Preservation and protection
- ❑ Preserving culture and heritage
- ❑ Preserving species to avoid extinction
- ❑ Recycling
- ❑ Sustainability of the environment
- ❑ Other (please specify)
- ❑ Don't know/not sure

14 The conservation activities listed below have different importance for different people. How **important** is it to you that New Zealand…?

How important is it to you that New Zealand…	Extremely important	Very important	Quite important	Slightly important	Not at all important	Don't know
Protects native plants and animals						
Preserves natural land and water habitats						
Protects natural landscapes						
Protects national parks and nature reserves						
Ensures there are natural places for outdoor recreation						
Allows some commercial opportunities in parks, reserves and other natural areas for New Zealand businesses such as tourism, mining, agriculture and fishing						
Protects the customary or traditional fishing and harvest rights of Maori (such as shellfish and mutton birds)						
Contributes to people's general health and wellbeing						
Protects historic cultural and heritage sites						
Provides people with opportunities to learn about nature and the environment						
Contributes to people's quality of life through conservation						

15 Overall, how important is **conservation** to you?

	Extremely important	Very important	Quite important	Slightly important	Not at all important	Don't know
Conservation in New Zealand is…						

16 In 2007, the New Zealand Government allocated **0.5 percent** of its expenditure to **conservation**. Do you think the Government should spend **less**, **more**, or the **same** percentage on conservation activities?

❑ Less ❑ Same percentage ❑ More ❑ Don't know

17 How well do you rate the **Department of Conservation's** (DoC's) performance of the following functions?

	Very good	Good	Adequate	Poor	Very poor	Didn't know DoC did this	Don't know
Protecting native plants and animals							
Preserving natural land and water habitats							
Protecting natural landscapes							
Protecting national parks and nature reserves							
Ensuring there are natural places for outdoor recreation							
Allowing some commercial opportunities in parks, reserves and other natural areas for New Zealand businesses such as tourism, mining, agriculture and fishing							
Protecting the customary or traditional fishing and harvest rights of Maori (such as shellfish and mutton birds)							
Contributing to people's general health and wellbeing							
Protecting historic cultural and heritage sites							
Providing people with opportunities to learn about nature and the environment							
Contributing to people's quality of life							

18 Tick the boxes beside those management functions that the **Department of Conservation** contributes to.

The Department of Conservation contributes to: *(tick as many as apply)*

- ❑ Controlling soil erosion
- ❑ The availability of water for agriculture and recreation
- ❑ Minimising flood risks
- ❑ Minimising the risk of landslips
- ❑ Maintaining air quality
- ❑ Greenhouse gas regulation
- ❑ The quality of drinking water

19 Overall, how important to you personally is the work done by the **Department of Conservation**?

	Extremely important	Very important	Quite important	Slightly important	Not at all important	Don't know
Overall, the work done by the Department of Conservation is…						

20 Overall, how **good** is the **job done** by the Department of Conservation?

	Very good	Good	Adequate	Poor	Very poor	Don't know
Overall, the performance the Department of Conservation is…						

21 Most important environmental issues

a What do you think is the most important environmental issue facing **New Zealand** today?

b Why did you choose this issue?

c What do you think is the most important environmental issue facing the **world** today?

d Why did you choose this issue?

22 Personal questions

Now we would like to ask a few questions about you. They allow us to check we have a representative sample of people. Remember, your responses are anonymous.

a Are you: ❑ Male ❑ Female

b Including yourself, how many people live in your household? _____

c What year were you born in? _____

d What country were you born in? _____

e Are you:

❑ Māori ❑ Pacific Islander ❑ Other
❑ New Zealand European ❑ Asian

f Which **region** do you live in?

North Island

❑ Northland ❑ Auckland ❑ Waikato
❑ Bay of Plenty ❑ Gisborne/Poverty Bay ❑ Taranaki
❑ Hawkes Bay ❑ Manawatu-Wanganui ❑ Wellington

South Island

❑ Nelson ❑ Marlborough ❑ Canterbury
❑ West Coast ❑ Otago ❑ Southland

g Do you live in:

❑ The countryside or a town of less than 1,000 people
❑ A town of 1,000 to 10,000 people
❑ A town of 10,001 to 30,000 people
❑ A large town or city of more than 30,000 people

h What is the **highest** level of formal education (or the equivalent outside of New Zealand) you have completed?

❑ Primary school (standard 6)
❑ High school, without qualifications
❑ High school, with qualifications
❑ Trade/technical qualification or similar
❑ Undergraduate diploma/certificate
❑ Bachelor's degree
❑ Postgraduate

i Please tick **one** of the following that **best describes** your current situation.

❑ Paid employment, working 30 or **more** hours per week
❑ Paid employment, working 30 or **less** hours per week
❑ Unemployed
❑ Student
❑ Retired
❑ Home duties
❑ Unpaid voluntary work
❑ Other

j What **industry** do you work in, or if you are not working, what industry did you last work in?

❑ Resource based
❑ Manufacturing and transport
❑ Accommodation, retail and leisure services
❑ Government services and defence
❑ Health services
❑ Communication and financial services
❑ Education
❑ Never been in paid employment

k What is your **occupation**?

❑ Clerical or sales employee
❑ Technical or skilled worker
❑ Business manager or executive
❑ Semi-skilled worker
❑ Farm owner or manager
❑ Professional or senior government official
❑ Labourer, manual, agricultural or domestic worker
❑ Teacher, nurse, police or other trained service worker
❑ Other
❑ Business owner or self-employed

l What is your **personal annual income** from all sources before tax?

❑ Loss
❑ $0 to $10,000
❑ $10,001 to $20,000
❑ $20,001 to $30,000
❑ $30,001 to $40,000
❑ $40,001 to $50,000
❑ $50,001 to $70,000
❑ $70,001 to $100,000
❑ $100,001 or more

9.2 APPENDIX 2: SOCIO-DEMOGRAPHICS AND COMPARABLE DATA

The tables that follow present demographic results from the 2008 survey. Comparable data collected from earlier surveys this is also shown. In addition, readily available, census results from Statistics New Zealand are included.

Table 1. Gender (%).

Year …	2000	2002	2004	2006	2008	2006 Census
Male	44.1	46.8	45.8	46.1	45.1	48.8
Female	55.9	53.2	54.2	53.9	54.9	51.2
N	**883**	**822**	**818**	**856**	**730**	**4,027,947**

Table 2. Age of respondents (%).

Year …	2000	2002	2004	2006	2008	2006 Census
18 to 19	1.4	1.1	1	1.3	1.3	4.9
20 to 29	15	9.5	9	8.7	7.4	21.9
30 to 39	18.2	15.9	15.6	15	12.9	24.6
40 to 49	19.7	22.8	22.5	22.8	18.0	25.9
50 to 59	18.1	20.8	22.2	19.6	22.7	20.7
60 to 69	12.8	16.1	16.1	17.5	20.6	14.0
70 and over	14.8	13.8	13.6	15.2	17.0	14.8
N	**846**	**807**	**796**	**848**	**688**	**2,346,756**

Table 3. Country of birth (%).

Country/region …	2002	2004	2006	2008
New Zealand	80.0	77.8	77.1	78.3
Australia	1.7	1.7	1.8	2.9
Pacific Islands	2.6	0.7	2.5	3.0
Britain/Ireland	8.7	11.3	9.4	7.4
Rest of Europe	1.8	1.8	2.6	2.3
USA and Canada	0.4	1.4	0.9	0.4
Asia	2.9	3.6	3.4	3.3
Other	1.7	1.5	2.5	2.1
N	**817**	**812**	**849**	**728**

Table 4. Ethnicity (%).

Category …	2002	2004	2006	2008	2006 Census
Maori	5.8	8.1	5.3	9.0	12.6
Pacific Islander	2.7	1.4	2.3	2.2	6.4
NZ European	81.9	79	77.4	74.9	71.6
Asian	NC	NC	3.3	5.0	8.0
Other	9.6	11.5	11.7	8.9	9.4
N	**810**	**810**	**854**	**722**	**4,501,551**

Table 5. Respondent's regional council (%).

Council …	2006	2008	2006 Census
Northland	4.3	4.8	3.8
Auckland	27.1	27.3	29.5
Waikato	8.4	8.7	9.7
Bay of Plenty	5.6	8.6	6.2
Gisborne/Poverty Bay	0.7	0.4	1.3
Taranaki	3.6	3.0	2.9
Hawkes Bay	4.2	2.7	2.9
Manawatu-Wanganui	6.1	4.5	6.3
Wellington	11.1	10.9	11.4
Nelson	2.1	3.0	1.1
Marlborough	1.5	0.8	1.1
Canterbury	16.5	15.7	12.9
West Coast	0.7	0.5	0.9
Otago	5.6	5.9	5.1
Southland	2.6	3.0	2.7
N	**859**	**732**	**4,140,300**

Table 6. Urban or rural respondents (%).

Area	2006	2008	2006 Census
Urban	81.4	83.8	85.8
Rural	18.6	16.2	14.2
N	**854**	**721**	**3,735,519**

Table 7. Education status (%).

Year	2000	2002	2004	2006	2008	2006 Census
Primary	4.2	4.3	3.8	3.3	3.0	33.9
High school without qualifications	18.4	19.8	17.8	18.7	18.7	
High school with qualifications	21.9	24.4	25.1	21.9	23.9	25.7
Trade or technical qualification	22.0	19.5	18.5	19.4	16.1	25.4
Undergraduate diploma	11.9	14.1	12.8	12.2	15.8	
Bachelors degree	13.7	12.0	14.3	14.9	14.7	5.7
Postgraduate	7.9	5.9	7.7	9.6	7.8	2.8
N	**876**	**815**	**813**	**852**	**728**	**2,786,220**

Note: For consistency over time the same measures of education were used in the 2008 survey as used in previous surveys. New census measures of education were used in the 2006 census with comparable results shown.

Table 8. Employment status (%).

Status	2006	2008
Paid more 30hrs	47.4	47.9
Paid less 30hrs	13.4	11.4
Unemployed	0.5	1.5
Retired	20.8	3.5
Unpaid Voluntary Work	2.3	22.9
Student	4.6	5.6
Homes Duties	5.1	1.0
Other	6.0	6.2
N	**857**	**712**

*Aged 15 and over.

Table 9. Employment sector (%).

Industry	2002	2004	2006	2008	2001 Census
Resource based	13.3	15.4	17.2	12.3	8.9
Manufacturing and transport	22.4	20.5	20.8	22.3	24.4
Accommodation, retail and leisure	17.0	18.3	16.1	14.0	23.7
Government services and defense	7.9	7.8	6.9	8.6	3.6
Health services	14.5	14.2	13.6	15.1	11.1
Education	12.5	11.4	12.5	10.1	7.7
Communication and financial services	9.9	10.7	11.2	14.2	20.4
Never been in paid employment	2.5	1.7	1.7	3.5	NA
N	**751**	**755**	**825**	**636**	**1,636,407**

Note: Statistics NZ is unable to provide corresponding data from the 2006 census.

Table 10. Income (before tax, %).

Income bracket	2000	2002	2004	2006	2008	2006 Census
Loss	0	2.0	2.4	1.4	0.9	0.5
$0 - $10,000	17.1	14.4	11.5	9.4	8.5	18.8
$10,001 - $20,000	20.1	18.9	19.5	17.5	13.7	19.5
$20,001 - $30,000	15.4	13.9	16.5	15.0	13.0	13.8
$30,001 - $40,000	13.6	13.3	13.4	14.5	12.6	12.8
$40,001 - $50,000	10.6	11.1	7.4	9.7	10.5	8.3
$50,001 - $70,000	7.5	9.4	10.5	13.3	16.1	8.9
$70,001 - $100,000	4.3	4.1	4.1	6.7	5.9	4.0
$100,000 +	3.2	3.7	5.0	5.1	5.9	3.3
Not stated	8.1	9.2	9.6	7.4	12.9	10.2
N	**894**	**836**	**820**	**880**	**752**	**3,160,371**

9.3 APPENDIX 3: PSR AND SPECIAL TOPIC DATA

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									
2000	878	6.5	29.4	52.1	8.9	1.4	1.8	2.69	0.78
2002	810	7.5	28.6	54.4	7.0	1.1	1.2	2.65	0.77
2004	812	6.4	25.7	57.4	8.1	0.9	1.5	2.71	0.74
2006	864	7.3	31.9	52.8	5.1	0.6	2.3	2.59	0.73
2008	739	8.8	28.8	53.7	6.5	0.5	1.6	2.66	0.87
the overall standard of living in New Zealand									
2000	863	11.1	45.5	36.0	5.6	0.9	0.8	2.39	0.80
2002	766	14.1	50.8	28.6	4.8	0.9	0.8	2.27	0.80
2004	781	18.3	54.2	23.3	3.1	0.0	1.2	2.11	0.73
2006	864	16.8	50.9	28.2	3	0.1	0.9	2.18	0.74
2008	730	13.7	51.2	30.0	4.2	0.4	0.4	2.28	0.80
the overall state of the natural environment in New Zealand									
2006	861	11	47.3	32.4	6.6	0.3	2.3	2.37	0.78
2008	731	9.6	45.7	35.1	7.4	0.3	1.8	2.70	0.94

Table 2. New Zealand's 'clean and green' image (%).

	N	Strongly agree (1)	Agree (2)	Neither agree or disagree (3)	Disagree (4)	Strongly disagree (5)	Don't know	Mean (1-5)	Std. Dev.
New Zealand's environment is regarded as "clean and green"									
2000		Question not asked in 2000							
2002	816	9.2	57.0	17.6	13.7	2.0	0.5	2.42	0.91
2004	799	5.8	45.3	29.2	17.0	2.0	0.8	2.64	0.90
2006	863	4.3	49.1	26	18.8	1.4	0.5	2.64	0.88
2008	731	5.6	43.2	28.7	20.5	1.4	0.5	2.70	0.94

Table 3. Perceived state of New Zealand's environment (%).

Respondents' perceived quality of...	N	Verygood(1)	Good (2)	Adequate (3)	Bad (4)	Very bad (5)	Don't know	Mean (1-5)	Std.Dev.
natural environment in towns and cities									
2000	875	3.7	34.5	47.4	12.1	0.7	1.6	2.71	0.75
2002	815	5.9	36.9	44.7	9.6	1.1	1.8	2.62	0.79
2004	806	5.6	42.4	41.3	8.4	0.7	1.5	2.56	0.76
2006	868	4.6	38.0	43.9	10.7	0.9	1.8	2.65	0.77
2008	732	4.4	37.3	45.2	10.1	0.8	2.2	2.65	0.76
air									
2000	866	20.0	47.0	23.6	7.2	1.3	1.0	2.22	0.89
2002	795	15.8	43.5	29.6	8.8	1.5	0.8	2.36	0.91
2004	803	14.3	45.1	28.8	10.0	1.2	0.6	2.38	0.90
2006	859	12.0	47.5	30.0	8.7	1.0	0.7	2.41	0.90
2008	734	14.6	45.8	28.9	9.5	0.5	0.7	2.35	0.87
native land and freshwater plants and animals									
2000	870	12.6	42.8	29.9	10.1	1.8	2.8	2.44	0.91
2002	808	14.6	40.8	30.2	9.2	1.7	3.5	2.41	0.92
2004	810	11.2	42.6	29.9	11.1	0.9	4.3	2.45	0.88
2006	859	12.0	47.5	30.0	8.7	1.0	0.7	2.39	0.85
2008	734	11.3	40.7	34.1	9.1	0.8	4.0	2.45	0.85
native bush and forests									
2000	870	20.5	39.8	26.0	10.6	1.6	1.6	2.32	0.97
2002	808	23.1	42.9	23.1	7.7	1.0	2.1	2.19	0.92
2004	807	21.9	40.8	24.5	8.6	1.1	3.1	2.24	0.94
2006	864	21.5	44.8	25.0	6.3	0.6	1.9	2.18	0.87
2008	740	21.9	47.2	20.4	7.4	0.3	2.8	2.15	0.86
soils									
2000	862	10.1	40.1	33.4	7.1	1.2	8.1	2.45	0.84
2002	797	10.4	40.8	32.0	7.0	0.9	8.9	2.42	0.83
2004	800	7.6	41.3	32.9	6.5	.9	10.9	2.46	0.79
2006	859	7.6	40.4	36.0	7.2	1.2	7.7	2.50	0.80
2008	732	7.2	41.4	34.3	8.1	1.1	7.9	2.50	0.81
coastal waters and beaches									
2000	873	12.4	37.2	35.2	11.3	1.5	2.4	2.51	0.91
2002	817	12.6	37.5	34.8	10.5	2.0	2.7	2.50	0.92
2004	810	13.1	41.6	32.0	9.0	1.7	2.6	2.43	0.90
2006	859	7.6	40.4	36.0	7.2	1.2	7.7	2.50	0.80
2008	741	15.0	46.4	26.9	8.2	0.9	2.6	2.32	0.87
marine fisheries									
2000	875	6.2	30.2	32.9	15.4	2.7	12.6	2.75	0.93
2002	801	6.2	33.5	36.0	10.2	2.5	11.6	2.65	0.88
2004	808	5.9	29.8	31.8	14.4	1.4	16.7	2.70	0.89
2006	859	6.5	30.3	34.2	16.1	1.6	11.3	2.73	0.90
2008	732	5.9	31.7	34.6	13.8	1.2	12.8	2.69	0.87
fresh water									
2000	875	11.7	35.3	35.1	12.2	1.9	3.8	2.56	0.93
2002	803	12.1	34.2	36.5	11.1	2.4	3.7	2.56	0.94
2004				Question not asked in 2004					
2006				Question not asked in 2006					
2008				Question not asked in 2008					

Perceived state of New Zealand's environment *continued.*

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.
rivers and lakes									
2000				Question not asked in 2000					
2002				Question not asked in 2002					
2004	810	6.5	31.5	33.1	20.6	3.0	5.3	2.81	0.96
2006	866	6.0	30.7	35.8	21.4	1.4	4.7	2.80	0.91
2008	737	5.7	31.5	36.1	20.2	1.9	4.6	2.80	0.91
groundwater									
2000				Question not asked in 2000					
2002				Question not asked in 2002					
2004	801	6.1	30.0	39.5	8.0	1.5	15.0	2.63	0.82
2006	861	6.0	29.7	39.4	11.1	0.8	12.9	2.67	0.82
2008	738	6.6	29.7	37.7	11.0	1.6	13.4	2.67	0.86
wetlands									
2000	872	6.0	28.1	34.6	13.0	2.6	15.7	2.74	0.91
2002	836	7.3	33.9	31.2	11.8	1.5	14.4	2.61	0.89
2004	805	5.6	31.7	31.4	11.4	2.4	17.5	2.68	0.90
2006	865	6.4	32.5	33.9	10.2	1.3	15.8	2.61	0.85
2008	730	7.1	33.8	31.2	11.4	1.6	14.8	2.61	0.89
New Zealand's natural environment compared to other developed countries									
2000	879	34.6	42.3	14.7	1.6	0.2	6.6	1.83	0.77
2002	821	38.7	41.2	12.7	1.3	0.4	5.7	1.76	0.76
2004	806	34.3	44.5	13.3	0.5	0.0	7.4	1.78	0.70
2006	863	34.5	44.1	13.1	1.7	0.1	6.4	1.81	0.75
2008	736	31.5	45.4	16.4	1.5	0.0	5.2	1.87	0.74

Table 4. 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 freshwater plants and animals									
2000	841	7.6	36.0	40.5	8.0	0.7	7.1	2.55	0.79
2002	807	7.7	37.9	38.0	5.6	1.1	9.7	2.50	0.79
2004	794	7.4	37.7	39.5	5.2	.6	9.6	2.49	0.76
2006	841	8.4	38.0	38.6	4.0	0.4	10.5	2.44	0.74
2008	713	6.9	33.8	42.2	5.2	0.6	11.4	2.54	0.75
amount of native bush and forests									
2000	855	9.4	39.3	34.9	12.6	2.0	1.9	2.58	0.90
2002	812	10.7	39.2	34.5	10.3	2.1	3.2	2.52	0.90
2004	797	11.7	36.3	34.8	12.0	2.0	3.3	2.55	0.93
2006	853	11.1	40.4	35.3	9.6	0.7	2.8	2.47	0.85
2008	722	9.0	38.2	38.0	9.7	2.1	3.0	2.56	0.87
quantity of marine fisheries									
2000	846	3.8	25.2	38.3	16.2	1.5	15.0	2.84	0.84
2002	808	3.7	22.0	42.9	12.0	2.4	17.0	2.85	0.92
2004	793	3.7	17.7	42.7	16.4	1.8	17.8	2.94	0.82
2006	849	2.9	20.6	44.9	12.2	1.2	18.1	2.85	0.76
2008	718	2.8	23.4	39.1	14.8	2.0	18.0	2.87	0.83
area of marine reserves									
2000	849	2.5	13.8	37.9	24.5	4.9	16.4	3.19	0.88
2002	808	3.7	16.7	36.1	21.8	4.6	17.1	3.08	0.93
2004	790	3.0	17.5	38.5	18.5	3.2	19.4	3.02	0.87
2006	850	4.2	19.8	39.4	17.3	2.1	17.2	2.92	0.87
2008	722	3.9	20.8	35.0	19.9	4.3	16.1	3.00	0.94

Perceived availability of natural resources *continued.*

Respondents' perceptions of ...	N	Very high (1)	High (2)	Moderate (3)	Low (4)	Very low (5)	Don't know	Mean (1-5)	Std. Dev.
amount of freshwater									
2000	851	11.2	41.2	32.4	8.5	1.8	4.9	2.46	0.88
2002	813	8.6	40.0	35.4	8.1	2.0	5.9	2.52	0.86
2004	Question not asked in 2004								
2006	Question not asked in 2006								
2008	Question not asked in 2008								
rivers and lakes									
2000	Question not asked in 2000								
2002	Question not asked in 2002								
2004	787	5.2	27.4	40.7	13.3	1.9	11.4	2.77	0.85
2006	850	3.2	20.7	39.3	17.2	2.5	17.2	2.94	0.85
2008	722	3.0	20.2	41.4	16.3	2.8	16.2	2.95	0.86
groundwater									
2000	Question not asked in 2000								
2002	Question not asked in 2002								
2004	794	3.1	21.4	39.7	14.1	2.4	19.3	2.89	0.84
2006	849	3.1	26.5	41.0	16.8	2.5	10.1	2.88	0.85
2008	720	2.9	23.8	42.5	18.1	3.6	9.2	2.95	0.84
area of National Parks									
2000	858	16.1	44.8	30.3	5.4	0.8	2.7	2.28	0.83
2002	812	15.1	47.4	27.5	5.9	0.5	3.6	2.27	0.81
2004	795	14.5	45.7	31.6	4.9	0.3	3.1	2.29	0.79
2006	855	13.8	46.4	32.5	3.6	0.4	3.3	2.28	0.76
2008	722	13.9	46.5	31.2	4.2	0.4	3.9	2.28	0.78
area of wetlands									
2000	855	2.8	16.8	37.0	18.9	3.0	21.4	3.03	0.87
2002	807	3.3	19.2	38.7	14.3	4.3	20.2	2.96	0.90
2004	794	3.5	17.1	37.2	16.8	2.6	22.8	2.97	0.87
2006	850	3.5	18.0	39.4	15.2	2.4	21.5	2.93	0.85
2008	723	4.3	18.9	37.3	16.0	3.0	20.3	2.93	0.90
availability of parks and reserves in towns and cities									
2000	856	12.0	36.2	37.4	10.5	2.0	1.9	2.53	0.91
2002	812	12.8	39.0	34.7	9.7	1.7	2.0	2.47	0.90
2004	801	12.6	40.0	35.5	8.2	2.2	1.5	2.47	0.90
2006	856	10.2	41.8	37.6	6.9	1.8	1.8	2.47	0.84
2008	725	12.4	41.5	35.0	8.0	0.4	2.6	2.41	0.83
reserves of oil and gas									
2000	851	1.2	10.0	32.8	24.7	3.9	27.5	3.28	0.83
2002	812	1.4	7.3	29.9	28.7	3.8	28.9	3.37	0.81
2004	796	1.5	3.8	23.6	34.4	10.9	25.8	3.67	0.86
2006	855	1.1	3.0	21.9	36.3	12.9	24.9	3.76	0.83
2008	722	1.8	7.5	24.4	30.7	8.0	27.6	3.49	0.91

Table 5. Perceived quality of management activities (%).

Respondents' 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.
pest and weed control									
2000	852	2.9	18.8	34.5	30.2	7.0	6.6	3.21	0.95
2002	812	4.2	17.6	40.6	26.4	6.0	5.2	3.13	0.94
2004	783	5.7	22.3	33.6	26.8	7.0	4.5	3.07	1.02
2006	859	5.0	18.4	39.6	26.9	5.5	4.7	3.10	0.95
2008	728	4.4	24.0	40.7	23.9	2.2	4.8	2.95	0.88
solid waste disposal									
2000	854	1.6	12.8	38.8	32.8	7.4	6.7	3.34	0.87
2002	807	2.4	14.3	42.5	27.0	5.8	8.1	3.21	0.87
2004	779	3.5	17.3	41.7	24.0	5.9	7.6	3.12	0.92
2006	857	2.6	15.2	45.0	24.3	4.2	8.8	3.14	0.84
2008	728	2.7	18.7	44.1	24.5	2.2	7.8	3.05	0.83
sewage disposal									
2000	853	2.0	14.0	39.7	31.4	8.6	4.3	3.32	0.90
2002	806	3.0	13.6	46.5	24.6	6.8	5.5	3.20	0.88
2004	782	3.6	19.3	38.0	26.9	5.6	6.6	3.12	0.94
2006	858	3.0	17.5	47.7	21.8	3.6	6.4	3.06	0.84
2008	728	3.3	22.1	47.0	18.5	3.3	5.8	2.96	0.84
farm effluent and runoff									
2000	849	0.7	9.2	29.8	32.7	9.2	18.4	3.50	0.87
2002	811	1.0	6.9	25.4	34.8	14.9	17.0	3.67	0.91
2004	783	1.3	8.8	24.3	37.9	13.8	13.9	3.63	0.92
2006	855	0.8	7.1	28.8	38.5	9.2	15.6	3.57	0.83
2008	729	1.4	7.1	26.3	38.3	13.3	13.6	3.64	0.90
hazardous chemicals use and disposal									
2000	854	1.6	8.1	28.1	29.2	13.5	19.6	3.56	0.95
2002	806	1.9	9.4	30.8	28.9	8.4	20.6	3.41	0.91
2004	785	2.3	14.1	30.7	24.7	5.7	22.4	3.22	0.93
2006	857	0.8	10.9	36.1	25.3	5.5	21.5	3.30	0.83
2008	728	2.1	13.2	32.8	26.0	4.8	21.2	3.23	0.89
industrial impact on the environment									
2000				Question not asked in 2000					
2002	811	0.6	7.4	31.9	37.9	10.2	12.0	3.56	0.83
2004	781	1.3	9.0	36.1	31.9	8.2	13.6	3.43	0.86
2006	858	0.9	7.1	39.9	31.5	7.3	13.3	3.43	0.80
2008	729	1.1	8.9	38.7	32.6	7.0	11.7	3.40	0.82

Table 6. 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.
natural environment in towns and cities									
2000	852	2.8	26.4	53.8	12.7	1.2	3.2	2.82	0.73
2002	814	2.7	22.1	56.1	14.0	1.1	3.9	2.88	0.72
2004	784	1.9	24.7	54.7	13.0	0.6	5.0	2.85	0.69
2006	856	3.3	29.1	52.5	12.0	0.6	2.6	2.77	0.73
2008	723	4.1	27.0	54.9	9.8	1.0	3.2	2.76	0.73
air quality									
2000	851	2.8	20.1	45.7	22.9	2.9	5.5	3.03	0.84
2002	805	1.6	15.2	45.7	26.6	4.6	6.3	3.19	0.82
2004	779	0.6	18.9	46.1	25.4	2.4	6.5	3.11	0.77
2006	851	3.6	20.9	49.5	19.0	2.2	4.7	2.95	0.82
2008	719	5.1	26.6	46.9	16.3	1.1	4.0	2.81	0.82
native land and freshwater plants and animals									
2000	849	3.3	22.5	46.8	17.1	1.6	8.7	2.90	0.80
2002	805	2.2	24.6	47.3	14.8	1.4	9.7	2.87	0.76
2004	775	1.8	24.9	48.8	12.5	.9	11.1	2.84	0.72
2006	852	5.2	28.3	47.3	11.4	1.1	6.8	2.73	0.79
2008	726	5.0	30.9	45.0	10.9	1.1	7.2	2.70	0.79
native bush and forests									
2000	850	5.5	29.3	39.6	17.5	3.1	4.9	2.82	0.91
2002	807	4.7	34.2	42.1	11.0	1.6	6.3	2.69	0.81
2004	781	6.1	31.5	42.0	11.5	1.2	7.7	2.68	0.82
2006	856	8.2	37.0	40.4	9.8	0.7	3.9	2.56	0.82
2008	727	10.0	39.5	37.7	7.8	0.7	4.3	2.47	0.82
soils									
2000	847	1.5	18.2	44.6	14.5	2.6	18.5	2.98	0.78
2002	800	1.4	15.9	43.9	15.0	1.9	22.0	3.00	0.75
2004	773	1.4	15.9	44.5	13.8	1.8	22.5	2.98	0.74
2006	848	2.1	18.8	47.3	13.4	1.2	17.2	2.91	0.74
2008	722	3.2	21.1	47.4	10.8	1.4	16.2	2.84	0.76
coastal waters and beaches									
2000	846	2.5	17.6	44.1	24.8	4.1	6.9	3.11	0.85
2002	808	1.9	19.3	43.7	24.6	3.2	7.3	3.09	0.83
2004	782	2.4	19.2	42.3	24.0	2.2	9.8	3.05	0.83
2006	853	3.4	27.1	47.7	17.0	1.5	3.3	2.86	0.80
2008	725	5.1	31.0	44.7	12.8	1.5	4.8	2.73	0.82
marine fisheries									
2000	848	2.2	13.2	33.3	24.5	4.4	22.4	3.20	0.89
2002	809	1.2	14.8	37.6	20.4	3.7	22.2	3.14	0.83
2004	780	1.9	13.1	36.0	22.4	2.7	23.8	3.14	0.83
2006	852	2.7	18.7	36.6	20.3	3.1	18.7	3.03	0.87
2008	724	3.6	21.5	36.9	15.7	2.6	19.6	2.90	0.88
marine reserves									
2000	853	2.6	20.3	40.3	10.9	2.2	23.7	2.87	0.80
2002	802	2.6	21.7	41.4	11.1	2.0	21.2	2.85	0.79
2004	769	2.3	21.6	39.5	11.6	0.7	24.3	2.82	0.75
2006	850	4.9	26.0	41.8	8.8	0.6	17.9	2.68	0.77
2008	724	6.9	28.9	34.9	9.4	1.7	18.2	2.63	0.87

Perceptions of current management of the environment *continued.*

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.
fresh water									
2000	846	3.3	20.1	45.3	17.6	3.2	10.5	2.97	0.84
2002	807	2.4	20.4	45.5	18.1	3.2	10.4	2.99	0.82
2004				Question not asked in 2004					
2006				Question not asked in 2006					
2008				Question not asked in 2008					
rivers and lakes									
2004	779	2.2	15.1	42.0	28.1	3.0	9.6	3.16	0.83
2006	855	2.6	22.2	44.6	21.3	2.5	6.9	2.99	0.83
2008	723	4.0	20.5	44.8	20.1	2.6	8.0	2.97	0.85
groundwater									
2004	774	2.3	12.7	39.0	20.0	1.8	24.2	3.08	0.80
2006	852	2.0	14.1	41.7	18.3	2.2	21.7	3.06	0.79
2008	722	2.1	15.7	40.4	19.9	2.5	19.4	3.06	0.82
National Parks									
2000	848	9.6	39.5	37.6	5.5	1.4	6.4	2.46	0.81
2002	810	8.5	42.1	37.8	3.8	1.2	6.5	2.43	0.77
2004	779	10.8	41.7	35.7	4.5	0.1	7.2	2.37	0.76
2006	853	13.4	46.1	32.2	3.2	0.5	4.7	2.20	0.78
2008	728	17.2	45.3	29.9	2.5	0.5	4.5	2.57	1.09
wetlands									
2000	842	1.9	18.2	35.9	15.4	2.3	26.4	2.97	0.83
2002	807	3.0	18.5	38.9	12.6	2.6	24.4	2.91	0.84
2004	772	2.6	20.6	35.9	11.8	1.4	27.7	2.85	0.80
2006	854	3.7	25.2	37.6	11.2	0.9	21.3	2.75	0.80
2008	722	4.7	26.7	35.7	10.5	1.8	20.5	2.72	0.85
New Zealand's natural environment compared to other developed countries									
2000	852	11.6	39.9	33.1	4.3	0.7	12.3	2.35	0.80
2002	815	13.6	36.3	32.1	3.2	1.0	13.7	2.32	0.82
2004	776	13.5	38.3	30.5	4.4	0.6	12.6	2.32	0.82
2006	846	20.0	41.4	24.9	4.4	0.2	9.1	2.16	0.83
2008	722	19.0	41.8	26.7	2.6	0.4	9.4	2.16	0.80

Table 7. Respondents' participation in environmental activities (%).

In the last 12 months the respondent had…..	Year	N	No	Yes	Regularly	Don't know
reduced or limited their use of electricity	2002	803	22.2	60.3	15.1	2.5
	2004	798	15.9	63.3	19.7	1.1
	2006	856	19.9	57.0	21.5	1.6
	2008	722	17.43	61.13	21.0	0.4
reduced or limited their use of freshwater[1]	2006	849	43.8	35.8	18.4	2.0
	2008	722	35.00	39.17	24.4	1.4
visited a marine reserve	2002	801	59.8	36.0	2.9	1.4
	2004	790	69.9	27.5	1.9	0.8
	2006	851	70.9	26.7	1.6	0.8
	2008	726	74.69	22.83	1.8	0.7
visited a national park	2002	801	36.8	55.6	6.7	0.9
	2004	797	32.6	61.9	4.9	0.6
	2006	853	41.0	53.6	5.3	0.1
	2008	719	41.79	51.72	6.2	0.3
bought products that are marketed as environmentally friendly	2002	805	11.7	64.8	15.	8.3
	2004	799	12.1	66.6	16.4	4.9
	2006	850	15.1	63.3	15.6	6.0
	2008	722	15.10	64.68	14.8	5.4
recycled household waste	2002	800	11.8	63.3	24.5	0.5
	2004	802	8.1	62.8	28.7	0.4
	2006	848	9.3	62.6	27.8	0.2
	2008	725	8.89	65.42	25.3	0.4
composted garden and/or household waste	2002	804	28.5	50.2	20.6	0.6
	2004	802	27.4	50.4	21.9	0.2
	2006	853	27.4	48.9	23.1	0.6
	2008	720	30.64	48.33	20.8	0.3
been involved in a project to improve the natural environment	2002	797	74.7	20.3	3.6	1.4
	2004	784	75.5	19.4	3.4	1.7
	2006	844	76.9	17.8	4.4	0.9
	2008	718	76.88	19.08	3.1	1.0
grown some of their own vegetables	2002	812	33.0	54.9	11.6	0.5
	2004	806	29.5	54.7	15.5	0.2
	2006	856	31.5	52.9	15.4	0.1
	2008	718	30.39	54.56	14.9	0.1
obtained information about the environment from any source	2002	805	44.2	46.0	7.7	2.1
	2004	791	48.4	43.9	6.3	1.4
	2006	845	43.9	46.5	8.0	1.5
	2008	724	41.56	48.29	9.3	0.8
taken part in hearings or consent processes about the environment	2002	810	81.1	15.1	2.6	1.2
	2004	795	84.8	12.5	1.8	1.0
	2006	853	85.6	12.2	1.4	0.8
	2008	729	87.05	10.88	1.7	0.4
participated in an environmental organisation	2002	802	84.0	12.3	2.2	1.4
	2004	793	87.3	10.1	1.3	1.4
	2006	852	86.5	10.4	2.3	0.7
	2008	726	86.38	11.28	1.8	0.6
	2008	727	77.03	19.67	2.3	1.0

1 Not asked in 2002 or 2004.

Respondents' participation in environmental activities *continued.*

In the last 12 months the respondent had…..	Year	N	No	Yes	Regularly	Don't know
commuted by buses or trains	2002	806	59.4	34.9	4.8	0.9
	2004	796	62.7	32.0	4.8	0.5
	2006	851	64.5	29.5	5.6	0.4
	2008	727	62.12	31.40	6.2	0.3
been an active member of a club or group that restores and/or replants natural environments	2002	807	86.0	11.9	1.1	1.0
	2004	792	87.8	10.4	1.0	0.9
	2006	847	89.7	8.3	1.7	0.4
	2008	725	87.03	10.21	2.3	0.4
made a financial donation to an NGO[2]	2006	852	76.2	20.0	2.7	1.2

2 Not asked in 2002 or 2004.

Table 8. Perceived quality of water (%).

Perceived quality of water in New Zealand's...	N	Extremely good (1)	Good (2)	Adequate (3)	Poor (4)	Extremely poor (5)	Don't know	Mean (1-5)	Std. Dev.
rivers and streams									
2004	799	3.6	30.8	36.0	19.9	2.0	7.6	3.09	1.19
2008	718	5.0	34.8	36.9	17.1	1.4	4.7	2.89	1.09
aquifers (groundwater)									
2004	793	6.4	27.7	29.3	9.3	.6	26.6	3.50	1.67
2008	714	6.9	30.1	35.6	8.4	1.1	17.9	3.21	1.51
lakes									
2004	794	3.3	25.8	32.5	24.4	4.9	9.1	3.29	1.25
2008	712	6.3	27.5	39.2	18.1	2.0	6.9	3.03	1.19

Perceived quality of water in my region's ...	N	Extremely good (1)	Good (2)	Adequate (3)	Poor (4)	Extremely poor (5)	Don't know	Mean (1-5)	Std. Dev.
rivers and streams									
2004	800	4.9	25.1	32.8	21.8	3.1	12.4	3.30	1.35
2008	718	7.8	31.9	34.1	16.9	3.6	5.7	2.94	1.20
aquifers (groundwater)									
2004	799	7.8	26.2	26.7	8.3	1.3	29.9	3.59	1.75
2008	715	12.3	28.7	28.1	8.4	1.8	20.7	3.21	1.66
lakes									
2004	790	4.1	22.9	29.9	19.9	4.3	19.0	3.54	1.48
2008	696	7.0	27.9	33.5	12.5	3.2	15.9	3.25	1.48

My regional council's management of ...	N	Extremely good (1)	Good (2)	Adequate (3)	Poor (4)	Extremely poor (5)	Don't know	Mean (1-5)	Std. Dev.
rivers and streams									
2008	704	3.4	28.1	38.4	15.3	2.4	12.4	3.22	1.32
aquifers (groundwater)									
2008	701	4.6	23.0	33.4	12.3	2.7	24.1	3.58	1.58
lakes									
2008	695	3.6	24.5	38.4	11.5	1.6	20.4	3.44	1.49

Percieved quality of water *continued.*

Ministry for the Environment's policy making for ...	N	Extremely good (1)	Good (2)	Adequate (3)	Poor (4)	Extremely poor (5)	Don't know	Mean (1-5)	Std. Dev.
rivers and streams									
2008	709	2.4	20.5	33.7	13.5	2.3	27.6	3.76	1.56
aquifers (groundwater)									
2008	709	2.3	17.1	30.3	12.8	2.4	35.1	4.01	1.62
lakes									
2008	703	2.4	18.5	33.3	12.8	2.4	30.6	3.86	1.60

Table 9. Water statements (%).

	N	Strongly agree (1)	Agree (2)	Neither agree or disagree (3)	Disagree (4)	Strongly disagree (5)	Don't know	Mean (1-5)	Std. Dev.
More water should be taken from large rivers for irrigation, even if it has a negative impact on freshwater fisheries.									
2004	789	1.4	13.3	17.9	38.7	18.3	10.5	3.91	1.20
2008	723	2.2	14.7	16.7	39.7	21.7	5.0	3.79	1.15
More water should be taken from large rivers for hydro electric power generation, even if it has a negative impact on freshwater fisheries.									
2008	720	4.9	21.1	19.3	34.2	15.7	4.9	3.37	1.15
Small lowland streams in my region have high quality water.									
2004	787	.8	16.9	14.4	29.2	8.8	30.0	4.18	1.46
2008	720	1.8	19.0	19.7	27.8	7.4	24.3	3.93	1.47
Small lowland streams in my region are well managed.									
2004	793	.4	15.4	22.3	23.6	6.3	32.0	4.16	1.48
2008	720	1.8	19.9	22.5	22.6	5.0	28.2	3.94	1.54
More water should be taken from Small lowland streams for irrigation, even if it has a negative impact on freshwater fisheries.									
2004	790	.8	4.1	9.1	47.5	24.8	13.8	4.33	1.01
2008	722	1.1	7.1	13.6	46.5	23.3	8.4	4.09	1.04
Small lowland streams in my region are in good condition.									
2004	792	.6	19.3	15.2	28.2	7.7	29.0	4.10	1.49
2008	719	1.0	22.4	22.7	22.9	6.8	24.2	3.85	1.50
Water quality in small lowland streams in my region has not been damaged by dairy farming.									
2004	792	1.1	15.3	11.7	25.9	13.0	33.0	4.33	1.47
2008	722	2.4	18.6	13.2	25.9	13.7	26.3	4.09	1.51
More water should be taken from aquifers (underground) in my region.									
2004	794	3.0	18.0	21.8	19.8	7.4	30.0	4.01	1.58
2008	718	2.5	18.4	22.4	22.8	9.7	24.1	3.91	1.50

Table 10. Recreation based activities (%).

	N	1-5 days	6-10 days	11-15 days	16-20 days	21 or more days
Walking in natural environment	636	28.9	10.7	9.6	6.9	43.9
Tramping	231	58.0	16.9	6.5	6.1	12.6
Climbing (e.g., mountain rock)	95	68.4	16.8	2.1	2.1	10.5
Camping	256	43.0	21.1	13.7	10.5	11.7
Off-road mountain biking	110	48.2	20.0	8.2	5.5	18.2
Off-road driving	163	63.2	12.9	3.7	6.7	13.5
Boating on a river	142	75.4	11.3	3.5	1.4	8.5
Boating on a lake	157	68.8	14.6	4.5	4.5	7.6
Boating on estuary or the sea	260	56.2	15.4	9.6	4.6	14.2
Freshwater fishing	127	59.8	15.0	9.4	3.1	12.6
Sea fishing	254	52.8	20.1	9.1	5.1	13.0
Collecting shellfish	180	69.4	14.4	5.0	1.1	10.0
Skiing	85	69.4	15.3	4.7	3.5	7.1
Swimming (in sea, lake or river)	405	46.2	18.5	9.9	4.9	20.5
Surfing or body boarding	138	50.0	17.4	5.8	6.5	20.3
Hunting for large game (deer, pigs, tahr, goats, wallabies)	43	39.5	18.6	11.6	4.7	25.6
Hunting for small game (e.g., rabbits, hares, possums)	78	44.9	16.7	7.7	6.4	24.4
Hunting waterfowl (e.g., ducks, geese, pukeko)	36	47.2	22.2	13.9	2.8	13.9
Hunting game birds (e.g., pheasant, quail)	19	42.1	21.1	5.3	5.3	26.3

Table 11. Visited National Park .

During 2007 did you visit a national park? (N=752)	Percent
Yes	42.3
No	37.7

Table 12. Number of times visited a National Park in 2007 (% of visitors).

National park	N	1	2	3	4	5 to 10	10 or more
Te Urewera	46	76.1	13.0	4.3	2.2	2.2	2.2
Tongariro	124	68.5	16.9	8.1	1.6	2.4	2.4
Whanganui	27	77.8	14.8	0.0	3.7	3.7	0.0
Egmont	49	61.2	14.3	6.1	2.0	12.2	4.1
Kahurangi	32	71.9	9.4	9.4	0.0	3.1	6.3
Paparoa	15	73.3	6.7	0.0	6.7	0.0	13.3
Westland/Tai Poutini	19	84.2	0.0	5.3	0.0	5.3	5.3
Abel Tasman	46	71.7	15.2	0.0	0.0	10.9	2.2
Nelson lakes	40	85.0	7.5	5.0	0.0	2.5	0.0
Arthur's Pass	63	81.0	12.7	0.0	3.2	1.6	1.6
Aorangi/Mt Cook	39	79.5	15.4	2.6	0.0	2.6	0.0
Mt Aspiring	34	85.3	5.9	2.9	0.0	5.9	0.0
Fiordland	53	73.6	9.4	7.5	5.7	1.9	1.9
Rakiura	4	0.0	0.0	0.0	0.0	75	25

Table 13. Conservation values (%).

	N	Very strongly agree (1)	Strongly agree (2)	Agree (3)	Neither agree nor disagree (4)	Disagree (5)	Strongly disagree (6)	Very strongly disagree (7)	Don't know	Mean (1-5)	Std. Dev.
Only humans have intrinsic value – that is, value for their own sake	710	3.1	3.2	15.5	11.7	31.1	14.4	15.9	5.1	4.80	1.55
The value of an ecosystem only depends on what it does for humans	713	1.5	2.2	8.6	8.4	34.6	21.2	19.9	3.5	5.23	1.38
Ugliness in nature indicates that an area has no value	719	1.1	1.9	3.9	8.3	43.8	19.6	19.3	1.9	5.33	1.22
Places like swamps have no value and should be cleaned up	723	1.7	2.1	6.4	8.4	37.5	20.5	21.9	1.7	5.31	1.35
The only value that a natural place has is what humans can make from it	724	1.5	2.1	6.9	5.2	33.8	21.3	28.3	0.8	5.47	1.38
The value of nature exists only in the human mind. Without people nature has no value	723	1.7	2.4	6.5	6.5	30.7	21.0	29.2	2.1	5.47	1.42
There are plenty of natural places that are not very nice to visit but I'm glad they exist	727	12.9	15.8	50.8	10.0	3.7	1.5	1.9	3.3	2.88	1.18
Even if I don't go to natural areas, I can enjoy them by looking at books or seeing films	728	13.3	20.1	54.5	6.0	2.6	1.4	0.4	1.6	2.70	1.01
We have to protect the environment for humans in the future, even if it means reducing our standard of living today	716	14.9	17.5	42.2	14.0	9.1	0.8	1.0	0.6	2.91	1.23
I'm seeing natural areas the next generation of children may not see, and that concerns me	725	21.8	22.9	44.0	6.6	4.0	0.1	0.1	0.4	2.49	1.05
I need to know that untouched, natural places exist	724	24.0	24.2	40.5	7.3	3.0	0.1	0.1	0.7	2.42	1.05
Natural areas are valuable to keep for future generations of humans	725	31.0	27.6	36.0	2.8	1.4	0.3	0.1	0.8	2.18	1.05
Natural areas must be protected because I might want to use them for recreation in the future	713	10.9	19.2	38.6	18.5	9.8	1.0	1.1	0.8	3.05	1.22
Natural areas are important to me because I use them for recreation	715	10.9	15.0	39.7	20.8	10.5	0.7	0.8	1.5	3.11	1.19
I don't like industries such as mining destroying parts of nature, but it is necessary for human survival	722	4.3	5.1	43.2	23.0	16.9	3.9	1.9	1.7	3.64	1.19
It is better to test new drugs on animals than on humans	715	6.6	6.0	35.4	21.8	13.6	4.8	7.8	4.1	3.79	1.51
Our children will be better off if we spend money on industry rather than on the natural environment	719	1.1	1.7	7.0	21.4	39.2	15.7	12.0	1.9	4.95	1.22
All plants' and animals' lives are precious and worth preserving but human needs are more important than all other beings	724	3.3	4.3	23.9	20.2	31.9	7.3	8.0	1.1	4.29	1.41
To say that natural areas have value just for themselves is a nice idea but we just cannot afford to think that way. the welfare of people has to come first	723	2.4	3.6	22.3	22.4	30.8	9.4	7.5	1.7	4.36	1.36
Forests are valuable because they produce wood products, jobs and income for people	722	7.6	9.6	49.2	15.2	12.7	2.8	1.9	1.0	3.32	1.24

Table 14. Meaning of conservation (%).

Item	Percent
Careful use of resources	81.1
Preserving species to avoid extinction	79.3
Keeping the environment clean and green	80.5
Recycling	66.6
Leaving what we have now for future generations	68.4
Sustainability of the environment	73.1
Looking after natural resources	79.3
Preservation and protection	3.1
Preserving culture and heritage	79.9
Other	5.2
Don't Know/not sure	50.4

Table 15. Importance of conservation activities (%).

	N	Extremely important (1)	Very important (2)	Quite important (3)	Slightly important (4)	Not important at all (5)	Don't know	Mean (1-5)	Std. Dev.
Protects native plants and animals	726	45.5	36.1	16.8	1.1	0.6	0.0	1.75	0.81
Preserves natural land and water habitats	724	44.9	39.0	14.5	1.1	0.4	0.1	1.73	0.78
Protects natural landscapes	721	40.4	38.6	18.2	2.1	0.7	0.1	1.84	0.84
Protects national parks and nature reserves	728	49.0	35.2	14.4	0.8	0.5	0.0	1.69	0.79
Ensures there are natural places for outdoor recreation	726	31.1	39.5	22.5	5.5	1.2	0.1	2.06	0.93
Allows some commercial opportunities in parks, reserves and other natural areas for New Zealand businesses such as tourism, mining, agriculture and fishing	717	9.5	17.0	32.8	24.8	13.7	2.2	3.17	1.16
Protects the customary or traditional fishing and harvest rights of Maori (such as shellfish and mutton birds)	711	9.0	12.7	22.1	25.0	28.1	3.1	3.52	1.29
Contributes to people's general health and wellbeing	719	30.5	39.4	24.3	3.9	1.3	0.7	2.06	0.91
Protects historic cultural and heritage sites	723	25.7	36.8	25.2	9.3	2.2	0.8	2.25	1.01
Provides people with opportunities to learn about nature and the environment	724	29.4	39.0	26.4	4.3	0.7	0.3	2.08	0.89
Contributes to people's quality of life through conservation	725	29.2	40.4	24.1	4.7	1.0	0.6	2.08	0.90

Table 16. Overall importance of conservation (%).

	N	Extremely important (1)	Very important (2)	Quite important (3)	Slightly important (4)	Not important at all (5)	Don't know	Mean (1-5)	Std. Dev.
Conservation in New Zealand is…	727	38.0	40.6	18.7	2.1	0.1	0.6	1.85	0.80

Table 17. Spending on conservation (%).

	N	Less (1)	Same (2)	More (3)	Don't know(4)
In 2007, the New Zealand Government allocated 0.5 percent of its expenditure to conservation. Do you think the Government should spend less, more, or the same percentage on conservation activities?	713	2.9	19.5	65.1	12.5

Table 18. Department of Conservation's performance (%).

	N	Extremely important (1)	Very important (2)	Quite important (3)	Slightly important (4)	Not important at all (5)	Don't know	Didn't know DoC did this	Mean (1-5)	Std. Dev.
Protecting native plants and animals	720	21.9	41.0	27.6	3.5	1.0	4.9	0.1	2.16	0.86
Preserving natural land and water habitats	715	15.2	39.4	31.5	6.3	1.3	6.0	0.3	2.35	0.88
Protecting natural landscapes	709	16.4	37.0	33.6	4.5	0.8	6.6	1.1	2.31	0.85
Protecting national parks and nature reserves	717	24.3	42.1	25.9	2.0	0.7	4.9	0.1	2.08	0.82
Ensuring there are natural places for outdoor recreation	712	18.5	42.0	28.8	2.8	0.7	6.0	1.1	2.19	0.81
Allowing some commercial opportunities in parks, reserves and other natural areas for New Zealand businesses such as tourism, mining, agriculture and fishing	706	8.2	26.5	40.7	5.7	1.7	12.5	4.8	2.59	0.84
Protecting the customary or traditional fishing and harvest rights of Maori (such as shellfish and mutton birds)	696	10.8	26.4	31.8	2.6	1.7	15.2	11.5	2.43	0.87
Contributing to people's general health and wellbeing	713	9.5	31.6	32.0	5.0	1.0	11.9	9.0	2.45	0.83
Protecting historic cultural and heritage sites	712	13.6	36.8	31.0	2.8	0.7	9.3	5.8	2.30	0.80
Providing people with opportunities to learn about nature and the environment	719	18.4	38.9	28.5	5.0	1.1	7.2	0.8	2.26	0.88
Contributing to people's quality of life	717	13.8	34.0	30.7	4.7	1.0	10.7	5.0	2.35	0.86

Table 19. Management functions of the Department of Conservation (%).

Item	Percent
Controlling soil erosion	62.9
Maintaining air quality	0.0
The availability of water for agriculture and recreation	43.8
Greenhouse gas regulation	27.3
Minimising flood risks	40.4
The quality of drinking water	40.8
Minimising the risk of landslips	42.3

Table 20. Overall importance of Department of Conservation (%).

	N	Extremely important (1)	Very important (2)	Quite important (3)	Slightly important (4)	Not important at all (5)	Don't know	Mean (1-5)	Std. Dev.
Overall the work done by the Department of Conservation is …	706	28.3	39.2	20.5	6.5	1.4	4.0	2.10	0.95

Table 21. How good is the job done by the Department of Conservation (%)?

	N	Very good (1)	Good (2)	Adequate (3)	Poor (4)	Very poor (5)	Don't know	Mean (1-5)	Std. Dev.
Overall the performance of the Department of Conservation is …	707	18.7	37.1	29.6	4.7	1.4	8.6	2.27	0.90

Table 22. Respondents' opinions of the most important environmental issues facing New Zealand and the World today (%).

	NZ issue	World issue
Air pollution/air quality	8.1	9.9
Water pollution	17.6	6.4
Water use	8.5	3.2
Water (unspecified)	6.6	4.8
Wildlife/natural environment	1.9	0.4
Introduced pests/weeds/diseases	1.5	
Overfishing/fish stocks	1.1	0.2
Disposal of refuse/waste	6.1	1.8
Sewage	0.2	0.2
Protecting environment/keeping NZ clean and green	2.1	
Environmental education	0.6	0.2
Global warming/climate change	8.5	19.9
Urban sprawl/urban development	4.4	0.8
Industrial pollution/waste		0.4
Population pressures	1.5	9.1
Natural bush and waterways	0.2	
Too much power to one party/agency/ethnic group		0.2
Ozone layer/GHG	8.1	15.1
War/conflict	0.4	
Sustainable management of resources	2.3	3.0
GE	0.2	0.2
Bio-security	0.4	
Insufficient environmental controls/resources		0.8
Transport	1.3	0.2
Agriculture	5.5	0.2
Pollution (unspecified)	11.4	16.5
Land/sea use	0.2	0.6
Tourism	0.2	0.2
Deforestation	1.1	5.8