

An aerial photograph of a coastal town in New Zealand, likely Milford Sound. The town is nestled at the base of a steep, forested hill. A large harbor area is filled with numerous small boats and yachts. A large ferry ship is visible in the water, moving towards the left. In the background, there are more hills and mountains under a blue sky with scattered white clouds.

Public Perceptions of New Zealand's Environment: 2006

Kenneth F. D. Hughey
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Ross Cullen

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SUMMARY

The fourth biennial survey of people's perceptions of the state of the New Zealand environment was undertaken in February - March 2006. 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 2006 also looked more specifically at land transport environmental, social and related issues, and people's perceptions of government and individual priorities. Two thousand people aged 18 and over were randomly selected from the New Zealand electoral roll. An effective response rate of 46% was achieved. Data have been analysed descriptively and the 2006 survey responses were compared with responses from the 2004, 2002 and 2000 surveys. Statistical analyses of the responses were completed to determine the roles of several 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, wetlands and marine fisheries continued to be perceived to be in the worst state, but were still rated highly;
- Management of eight out of 11 components of the environment studied has improved over the course of the four surveys. Rivers and lakes, marine fisheries, 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. Management of eight of the 11 major resources being monitored was perceived to be significantly improving;
- Pollution (air, water, and solid waste disposal) was rated as the most important environmental issue facing New Zealand. On a global basis, climate change/global warming was seen as the most important issue for around a third of respondents; and
- Regional variation was a key factor in responses, especially regarding perceptions of 'air' and aspects of fresh water quality and management.

The land transport case study explored policy options for internalising a range of social, environmental and other impacts. Three approaches to internalisation were explored, with responses indicating that policy measures that focus on particular areas are much more likely to be supported than are broad policy responses.

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



01

Dappled sunrise through the beech trees at Nina Hut (photo S. McMurtrie)

INTRODUCTION

1.1 BACKGROUND

The first State of the Environment Reporting (SER) exercise based on a survey of New Zealanders' perceptions of the environment was performed in 2000 and reported by Hughey et al. (2001). The survey questionnaire is constructed around a Pressure-State-Response model. Hughey et al. (2001) provides background and justification for the survey approach used. The OECD (1996) and Ministry for the Environment (1997) explain this 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 second and third surveys were undertaken and reported on in 2002 (Hughey et al. 2002a) and 2004 (Hughey et al. 2004). This publication reports the results of the fourth biennial survey, undertaken in 2006, and includes a comparison with the 2000, 2002 and 2004 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; and
- To 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).



Waka moored on the Opara River,
Banks Peninsula (photo G. Kerr).



02

Jet boating on the Dart River (photo Shutterstock)

SURVEY METHOD

A postal questionnaire based on the Pressure-State-Response (PSR) model and the survey administered in 2000 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 2006 QUESTIONNAIRE

Questionnaire items were presented in an A5-size booklet with questions on facing pages. 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 167 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 for respondents who did not feel they were sufficiently informed to provide an assessment. 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. In 2006 two new sets of questions were asked. The first relating to the sources and reliability of environmental information, and the second to the importance of environmental issues compared with other issues.

Participation in fifteen activities was measured to explore relationships between environmental behaviour and responses to the PSR framework. Eleven questions sought demographic information. The dynamics of relationships between demographic information and concern for the environment have been well documented (e.g., Jones and Dunlap, 1992) and these are being explored biennially. A question on ethnic origin was introduced in 2002 and analysis by ethnic origin revealed there were 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. Another demographic question new to the 2006 survey was added to determine whether respondents live 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).

Knowledge, standard of living and 'clean green'

The questionnaire began by asking for 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'. This change was retained for the 2006 survey.

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 previous 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 perceptions data for years 2000, 2002, 2004 are already available from previous surveys.

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 scale provided for measurement each of which was anchored by 'Very good' and 'Very bad'.

The second set of questions regarding the state of the environment measured perceptions of the amount or availability of 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. In previous surveys questions were asked about management compared to five years ago. However, as with the similar question from the state of the environment section, these questions have been removed for the 2006 survey.

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, with each 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 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 the 2004 and 2006 surveys, with the addition of two activities in 2006, i.e., 'Reduced, or

limited your use of freshwater', and 'Made a financial donation to a non government environmental organisation (e.g., Forest and Bird)'.

Sources and reliability of environmental information

In the 2006 survey two questions identified where respondents obtain their environmental information from and how reliable they consider a variety of sources of environmental information. The first question presented eight sources of environmental information and asked 'What are your main sources of environmental information? Respondents were invited to record, in order of importance, their top three sources of information.

The second question asked, 'How reliable are the following sources of environmental information?', followed by seven environmental information sources. Measurements were taken using a five-point scale anchored by 'Very reliable' to 'Very unreliable'.

Priorities and performance: environmental issues compared with social and economic issues

In the 2006 survey five sets of questions were asked regarding the importance of environmental issues in relation to other social and economic issues. In the first question set respondents were presented seven Government activities and were asked 'to rank the seven activities from highest to lowest priority.

The next set of questions concerned seven macro-level aspects of social welfare. Respondents were asked to rate personal importance of the seven aspects along a five-point scale anchored by 'Very important' to 'Very unimportant'.

Another question asked respondents to 'Rate New Zealand's performance' on the same seven aspects. Again a five-point scale was provided anchored by 'Very good' to 'Very bad'.

Measurements were taken on participant beliefs about whether achieving environmental sustainability would improve seven environmental, economic and social aspects. Respondents were asked 'Do you think that achieving environmental sustainability in New Zealand would ...' followed by the seven aspects anchored by 'Strongly agree' and 'Strongly disagree'.

A final set of questions measured the effectiveness of six institutions in maintaining environmental quality. Respondents were asked 'What overall effect does each of the following have on maintaining environmental quality?' The items were evaluated with a five-point scale anchored by 'Very effective' and 'Very ineffective'.

Transport questions

The 2006 survey included a number of questions concerning land transport which sought respondents' opinions about aspects of private and public land transport management. This section began by stating 'First we need to know something about your use of private and public transport', followed by questions about the number of vehicles at the respondent's address, and the engine sizes of those vehicles.

Use of transport other than private vehicles was measured. Bicycle use was measured by asking 'Do you ride a bicycle?', with 'Yes' and 'No' response options. Those who made bicycle trips were then asked how many trips they made per month.

The use of public transport (excluding passenger ferries) was measured in the next set of questions. The first question asked 'Is public transport to and from your place of work reasonably accessible?' with 'Yes' and 'No' response options. For respondents who had public transport accessible two questions were asked on how many trips they made per month. If public transport was available, but the respondent did not use it they were asked why not. A further question asked whether public land transport was used for activities other than work and, if yes, how many trips per month.

The next question measured respondents' support for vehicle owners paying for road use impacts. Information was presented on the costs of road use impacts followed by the statement 'The full costs of vehicle use, including social and environmental costs, should be paid for by vehicle owners. 'Agree', 'Disagree', and 'Don't know' were provided as response options.

A set of questions then sought to measure respondents' support for each of five payment methods for road use in the scenario that vehicle owners must pay the full costs of road use (including road building and maintenance, and all environmental and social costs). Responses were measured along a five-point scale anchored by 'Strongly support' to 'Strongly oppose'.

Support for four alternative methods of targeting specific impacts or combinations of impacts from road transport was addressed. A summary evaluation of the relative effectiveness against a set of criteria for each of the four options was presented. Respondents were asked what they thought of the four options, with responses being measured along a five-point scale anchored by 'Strongly supportive' to 'Strongly opposed'.

A final set of questions on transport sought respondents' opinions on the quality of three aspects of transport in New Zealand and in their home region. The responses were measured along a five-point scale anchored by 'Extremely good' to 'Extremely poor'. Perceived changes in traffic congestion in

New Zealand and each respondent's region were measured by stating 'Traffic congestion is becoming...' followed by a five-point scale anchored by 'Much less of a problem' to 'Much worse'.

Demographic information and representativeness

Information was sought regarding gender, number of household members over the age of 14, 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), and personal income. Where possible these were measured using categories closely corresponding to data categories reported in the 2001 New Zealand Census. Key demographic information for the 2006 survey is provided in Appendix 1. 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 being 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.

To determine representativeness of the sample we have compared it with current official statistics where they are available (Statistics NZ 2006). In some cases the most recent data available are from the 2001 Census.

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

- Females are over-represented in the sample;
- New Zealand Europeans and 'others' are over-represented;
- Those aged over 40 were more likely to respond;
- Those not in employment were over-represented; and
- Those with a tertiary qualification were over-represented.

The biases in the samples are consistent across surveys allowing detection of changes between surveys.

Other questions

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?' An open space was provided at the end of

the survey for respondents to add anything further that they wished to say.

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 and 2006 surveys. In addition, a small number of individuals completed the 2006 questionnaire and subsequently provided comments about the questionnaire and the questionnaire topics. Ministry for the Environment and Ministry of Transport staff also appraised the questionnaire. 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 2006 survey results with those from 2004, 2002 and 2000. Some relationships between parts of the PSR framework and demographic information were explored and are also presented in Section 3. Chi-square statistics (χ^2) were used to test for changes in responses. Data aggregation was necessary in some areas because there were too few valid responses in some cells 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 9 February 2006. In addition, a follow-up postcard was sent on 28 February 2006 and a second questionnaire posting to non-respondents was made on 26 March 2006.

2.5 RESPONSE

The survey received an effective response rate of 46%; $N = 880$. The 2000 survey response rate was 48%; $N = 894$, the 2002 survey response rate was 45%; $N = 836$ and the 2004 survey response rate was 43%; $N = 820$. All surveys had maximum margins of error of 3% at the 95% confidence level.

2.6 MAJOR CHANGES IN THE 2006 SURVEY

In summary the following changes and additions have been made from the 2004 survey:

- In the principal PSR sections all questions relating to conditions 5 years ago have been removed;
- Whereas the major case study in 2004 concerned freshwater, the 2006 case study addressed land transport;
- New questions about sources and reliability of environmental information, about priorities for government, and regarding institutional effectiveness in environmental management have been added;
- An additional question seeks respondents' views of the world's main environmental problems, enabling comparison with the same question concerning New Zealand;
- A question regarding whether respondents lived in urban or rural settings was added, with another question asking respondents to identify the regional council area they lived in; and
- Finally, the ethnicity classification was extended to explicitly identify respondents of Asian ethnic origin.



03

Small fishing boat at Kaikoura juxtaposed against a visiting cruise liner (photo S. McMurtrie)

PRESSURE-STATE RESPONSE ANALYSIS BY QUESTION

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

The 2006 Survey

This section reports findings grouped by question type, which provides the clearest depiction of the relative evaluations of different environments. Section 4 presents an overview of all results for each environment. Appendix 2 reports data for each of the items addressed in this chapter.

Most people considered their environmental knowledge to be 'adequate' (52.8%) or 'good' (31.9%, Figure 3.1). The vast majority considered the standard of living in New Zealand to be 'good' or 'very good' (79.1%, Figure 3.2). The state of the New Zealand environment is considered to be 'adequate' to 'good' (79.7%, 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 (53.4%), there was also a high number who neither agreed nor disagreed (26%), and 20.2% who disagreed (Figure 3.4).

Trends 2000 - 2006

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 'good' and a reduction in those considering theirs to be 'bad' in the 2006 survey. Changes over the four surveys were statistically significant ($P=0.01$).

As Figure 3.2 shows, over the period 2000 to 2004 the overall standard of living in New Zealand has been viewed increasingly more positively. The 2006 survey had slight reductions in the good and very good categories, but these were more than compensated for by an increase in the 'adequate' response. The overall change over the four surveys has high statistical significance ($P=0.000$).

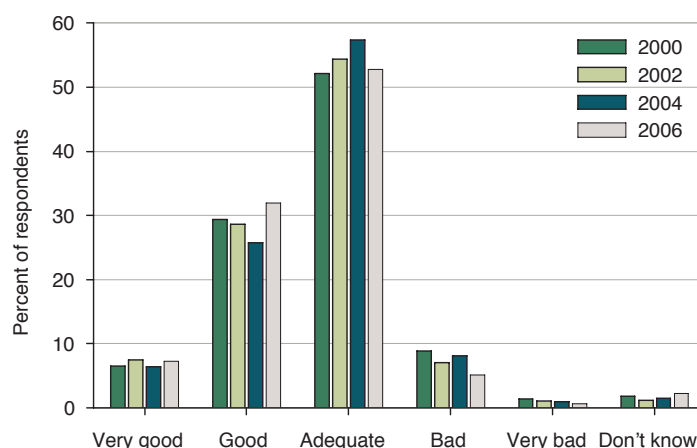


Figure 3.1. Knowledge of environmental issues.

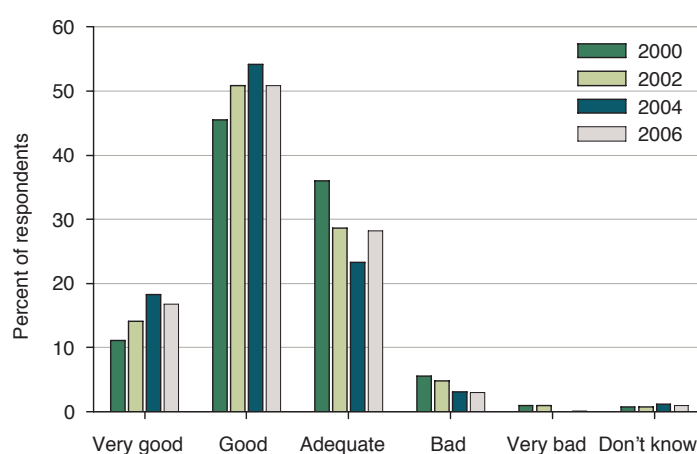


Figure 3.2. Standard of living in New Zealand.

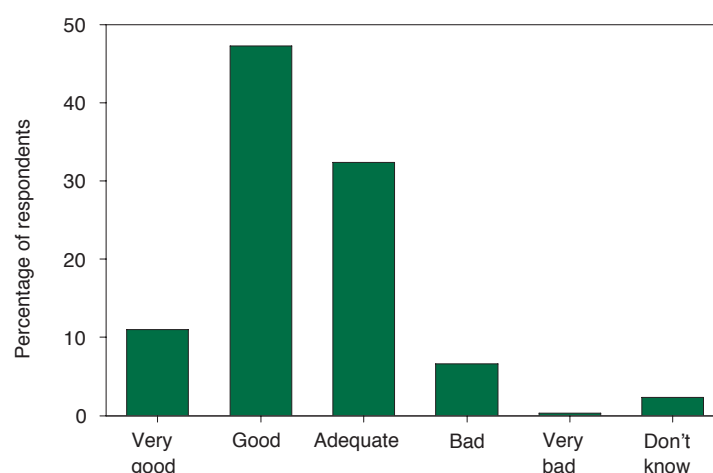


Figure 3.3. State of New Zealand's natural environment, 2006.

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. It seems that more people are unsure of New Zealand's 'clean and green' status, as shown by the increasing number

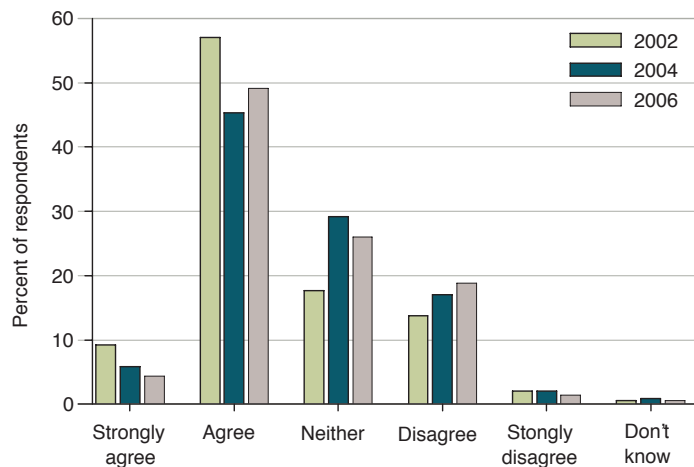


Figure 3.4. New Zealand's environment is 'clean and green'.

Table 3.1. Significant changes (cells with asterisks) in 'state' and 'response' ratings between the 2000-2006 survey periods. (↓) = deterioration; (↑) = an improvement; NA = not asked in all four surveys. Cells with only asterisks indicate significant changes between years, but with no consistent trend.

	State	Availability	Management
Natural environment in towns & cities	**	NA	
Air	*** (↓)	NA	***
Native land & freshwater plants & animals			*** (↑)
Native bush and forests	*		*** (↑)
Soils		NA	
Coastal waters & beaches	* (↑)	NA	*** (↑)
Marine fisheries		**	** (↑)
Marine reserves	NA	*** (↑)	** (↑)
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 $P < 0.001$.

of respondents who neither agreed nor disagreed with the statement, or who disagreed. The difference in responses between the three surveys is statistically significant ($P = 0.000$). 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 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 revision (maintained for 2006) 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 2006 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 and 2006 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 four surveys.

In the 2004 survey analysis (Hughey et al. 2004:15) statistical testing showed a significant difference in responses between years in 17 cases, but only five items exhibited clear trends over the four years, and they were:

Current condition of the natural environment in towns and cities	Better
Current condition of air quality	Worse
Condition of air quality compared to five years previously	Worse
Condition of native forests and bush compared to five years previously	Better
Management of native forests and bush	Better

By contrast, addition of the fourth survey data set resulted in a dramatic change in trends (Table 3.1), albeit with a reduced set of questions because questions about changes in perception over time were removed from the 2006 survey. Most notable is the perceived overall improvement of management of virtually all resources over the course of the 2000-2006 survey periods. In contrast, there are few significant changes to evaluations of 'state' or 'availability' over time, suggesting (perhaps) 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 2006 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 2006 native bush and forests were considered to be in the best condition of all the items tested, followed by air. Rivers and lakes were considered to be in the worst condition, with 22.8% 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 four surveys. Most aspects showed an improvement in perceived quality from 2000 to 2002, then a decline or a relatively static position from 2002 to 2006. The exceptions are air quality, which shows a slight, but significant, declining trend over all four surveys ($P=0.019$), and coastal waters and beaches, which show

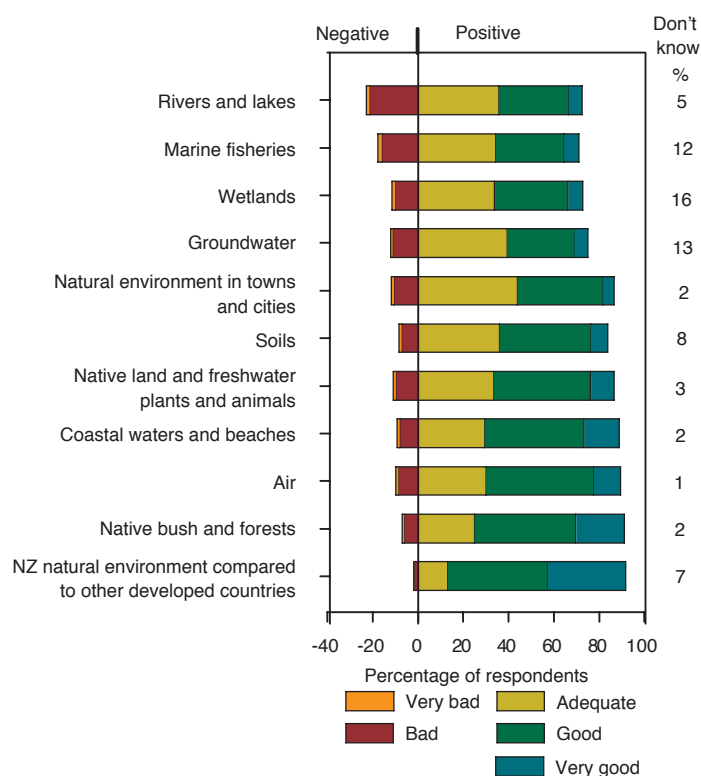


Figure 3.5. Perceived state of the environment.

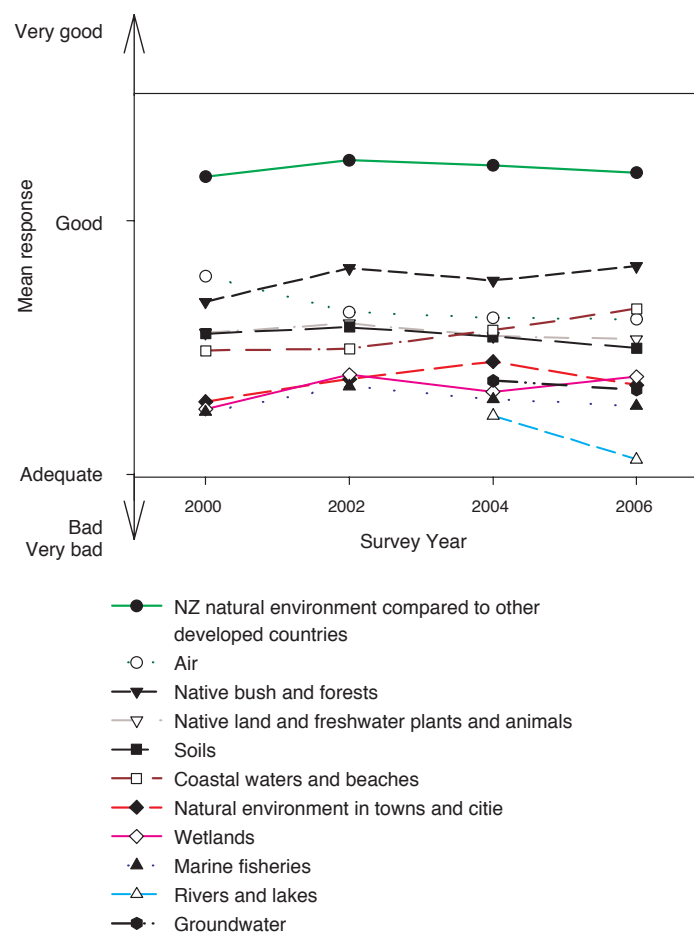


Figure 3.6. Trends in perceived state of the environment.

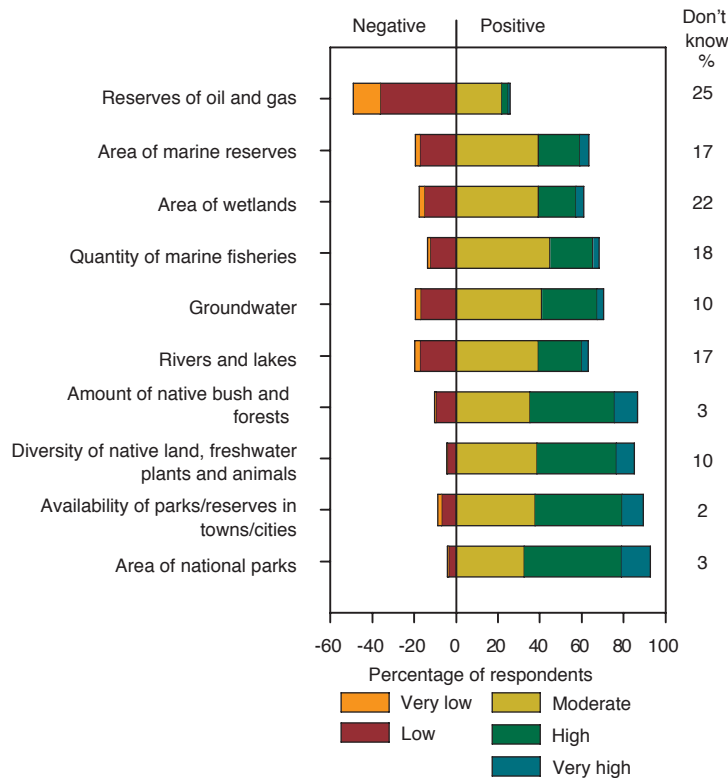


Figure 3.7. Perceived availability of natural resources.

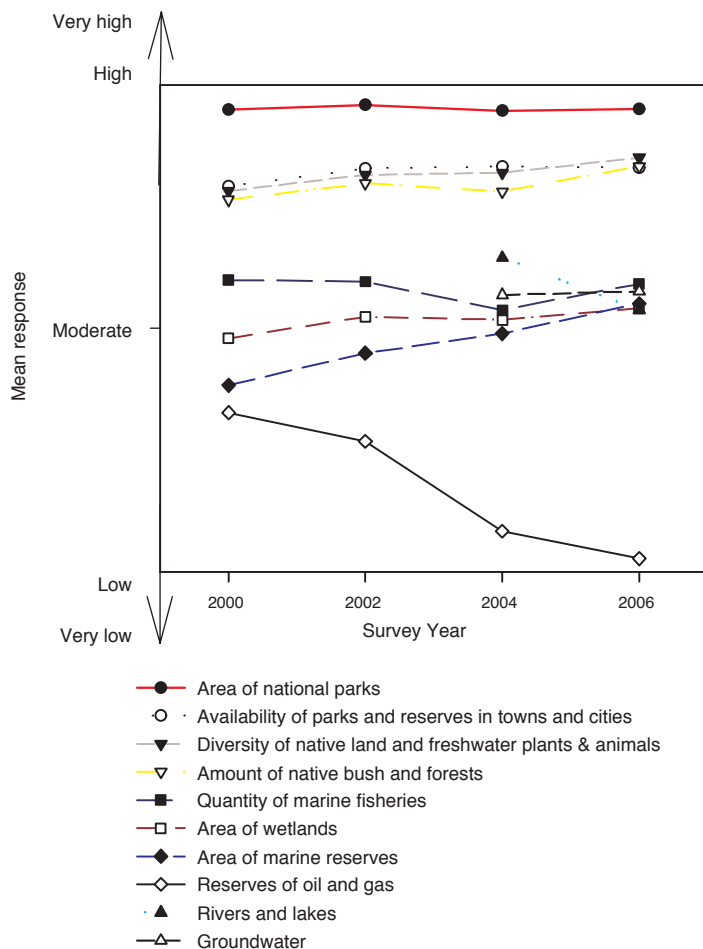


Figure 3.8. Trends in perceived availability of natural resources.

a significant improvement ($P=0.023$) over the four surveys.

The state of New Zealand's environment compared to other developed countries received the best rating each year, 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 for only 2004 and 2006, received the lowest ratings.

3.3.2 Resource availability

The 2006 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 49% 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 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 (25%), area of wetlands (22%) and quantity of marine fisheries (18%).

Trends 2000 - 2006

Figure 3.8 shows mean Likert scores for the eight natural resources that were included in all four surveys, and the two additional resources included only in 2004 and 2006. Reserves of oil and gas are increasingly perceived to be 'low' or 'very low', increasing from 28.6% of respondents in 2000 to 49.2% in 2006 ($P=0.000$). Ratings of the area of marine reserves had a significant improving trend ($P=0.000$).

The remaining natural resource ratings changed little over the four 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 2006 results showing groupings of native bush, animals and parks at the higher availability end of the scale, marine reserves, fisheries 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 2006 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 (47.9%) was 'bad' or 'very bad'. Pest and weed control had high frequencies of 'good' or 'very good' management ratings (23.4%), and 'bad' or 'very bad' ratings (32.4%). 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 (21.5%), followed by farm effluent and runoff (15.6%) and industrial impact (13.3%).

Trends 2000 - 2006

Over all four surveys the mean rating of quality of management activities is below adequate. However, Figure 3.10 shows an improvement in people's rating of the management of pest and weed control, sewage disposal, solid waste disposal, hazardous chemicals use and disposal (despite a decline in 2006), and (for 2002 - 2006 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.

Note that the values for sewage disposal and for solid waste disposal are almost identical so they are difficult to distinguish in places in Figure 3.10.

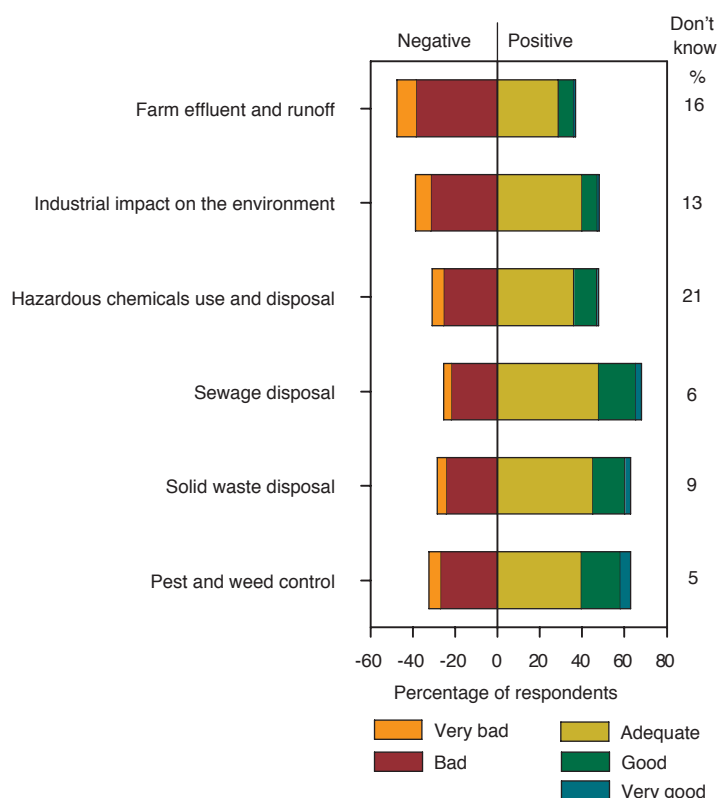


Figure 3.9. Perceived quality of management activities.

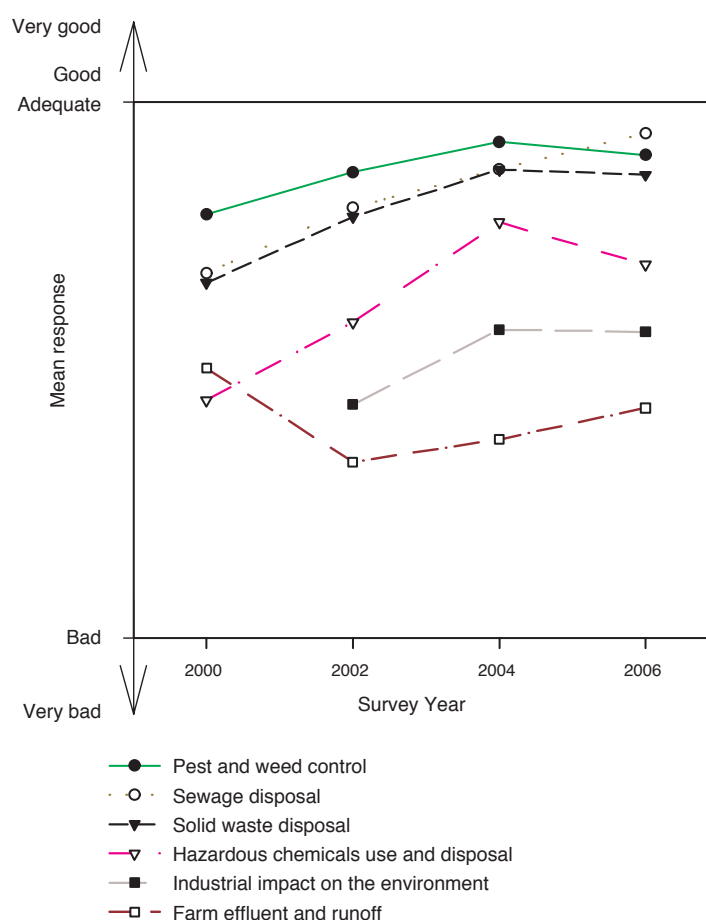


Figure 3.10. Trends in perceived quality of management activities.

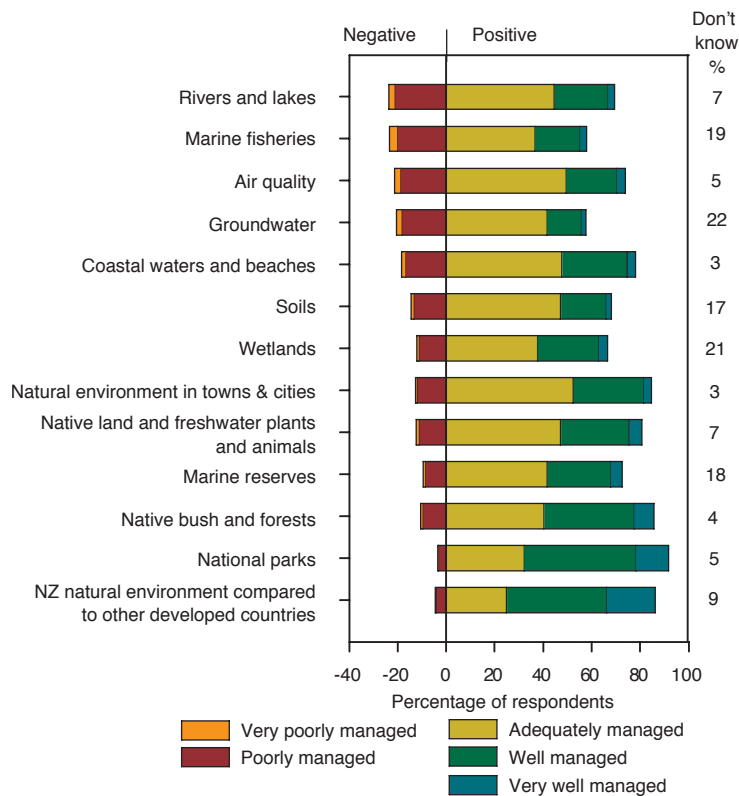


Figure 3.11. Perceived quality of management.

Table 3.2. Trends in perceptions of management activities.

Management activity	Probability	Trend
Pest and weed control	$P < 0.01$	consistent improvement 2000-2004; slight decline 2006
Solid waste disposal	$P < 0.001$	consistent improvement 2000-2004; steady 2006
Sewage disposal	$P < 0.001$	consistent improvement
Farm effluent and runoff	$P < 0.001$	declined between 2000 & 2002; slight improvement 2002-2006
Hazardous chemicals use and disposal	$P < 0.001$	consistent improvement 2000-2004; decline 2006
Industrial impact on the environment	$P < 0.01$	improved between 2002 & 2004; steady 2006

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

3.4.2 Current management of the environment

The 2006 Survey

The quality of management of thirteen environments or resources on a scale ranging from 'very well managed' to 'very poorly managed' was assessed (Figure 3.11). In general, most environmental features were considered to be 'adequately managed'. However, over 20% of respondents felt that rivers and lakes, marine fisheries, air quality, and groundwater were either 'poorly managed' or 'very poorly managed'. Over half the respondents rated national parks (59.5%) and New Zealand's natural environment compared to other developed countries (61.4%) as either 'very well managed' or 'well managed'. There were over 20% of 'don't know' responses for wetlands and groundwater.

Trends 2000-2006

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.

From 2000 to 2006 there has been a constant improvement in the rating of management of national parks, native bush and forests, wetlands, and coastal waters and beaches, and a slight improvement for native land and freshwater plants and animals and marine fisheries. The most evident trend over the four surveys, for all

resources examined, has been a virtually uninterrupted and significant improvement in people's perceptions of improved management, as shown in Table 3.3 (and see also Table 3.1). The biggest changes occurred between 2000 and 2002, and 2004 and 2006 with very little change between the 2002 and 2004 survey responses.

3.5 MAIN CAUSES OF DAMAGE TO THE ENVIRONMENT

The 2006 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 blue.

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 (74%), 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 72% of respondents nominating this cause, while 76% 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, urban development, 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 did not feature amongst the top causes of damage for any environmental component.

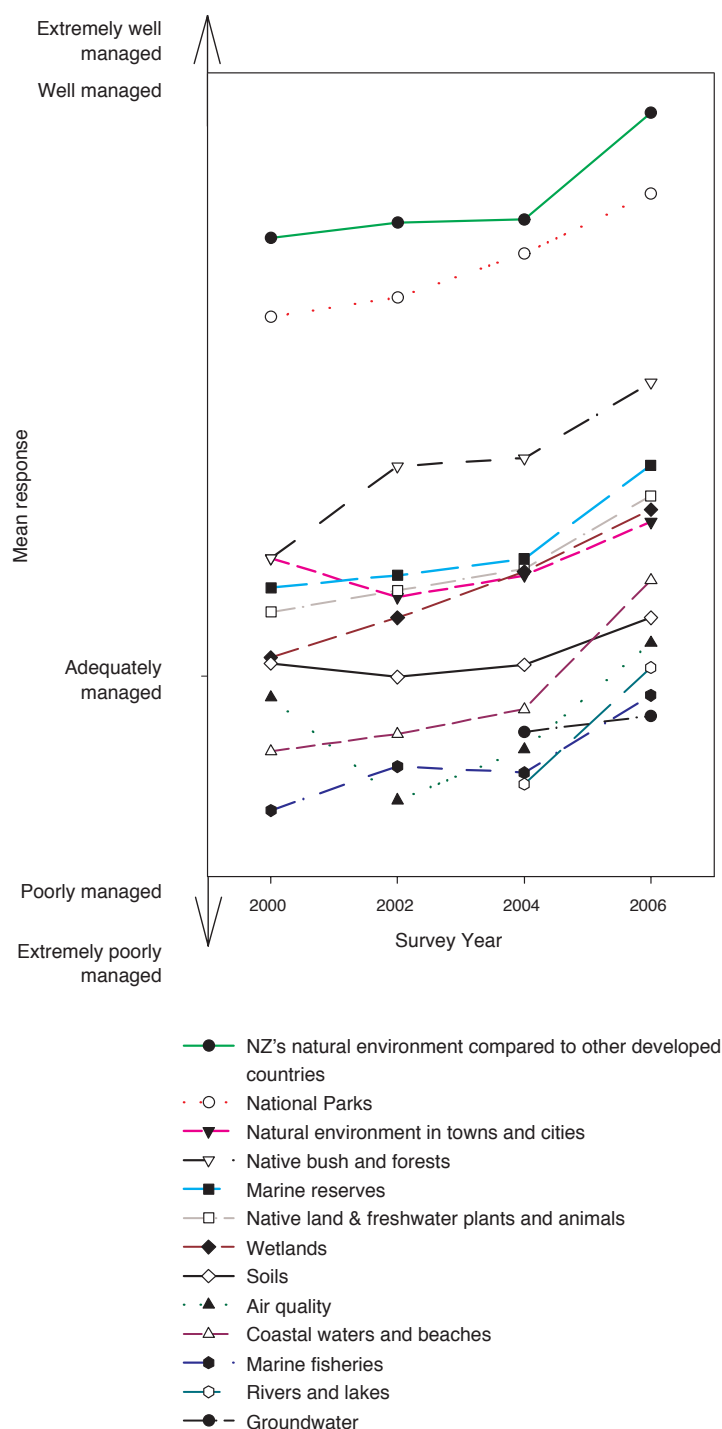


Figure 3.12. Trends in perceived quality of management.

Table 3.3. Mean Likert scores for management of resources 2000-2006.

Perception of change in management of ...	Likert score (1= very well managed; 5= very poorly managed)				
	2000	2002	2004	2006	Change 2006-2000
Natural environment in towns and cities	2.82	2.88	2.85	2.77	-0.05
Air quality	3.03	3.19	3.11	2.95	-0.08
Native land and freshwater plants and animals	2.90	2.87	2.84	2.73	-0.17
Native bush and forests	2.82	2.69	2.67	2.56	-0.26
Soils	2.98	3.00	2.98	2.91	-0.07
Coastal waters and beaches	3.11	3.09	3.05	2.86	-0.25
Marine fisheries	3.20	3.14	3.14	3.03	-0.17
Marine reserves	2.87	2.85	2.83	2.68	-0.19
National parks	2.46	2.43	2.37	2.28	-0.18
Wetlands	2.97	2.91	2.84	2.75	-0.22
Natural environment compared with other developed countries	2.35	2.32	2.32	2.16	-0.19

Table 3.4. Perceived main causes of damage to the environment (read down the columns). Red text signifies the most frequently cited cause of damage to the individual environmental component; Orange text indicates the second most frequently cited main cause; Blue text indicates the third most frequent response.

	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%	2%	3%	12%	4%	2%
Household waste and emissions	30%	8%	3%	18%	17%	6%	7%	3%	7%	20%
Industrial activities	74%	23%	13%	28%	18%	11%	11%	8%	17%	27%
Pests and weeds	3%	60%	62%	18%	7%	9%	13%	58%	44%	26%
Farming	6%	36%	21%	31%	5%	4%	6%	7%	30%	43%
Forestry	1%	15%	40%	8%	1%	1%	1%	17%	8%	5%
Urban development	19%	30%	32%	14%	26%	3%	6%	14%	30%	14%
Mining	1%	11%	21%	18%	2%	1%	2%	9%	7%	5%
Sewage and storm water	5%	22%	3%	16%	72%	37%	37%	3%	27%	45%
Tourism	1%	6%	17%	1%	13%	6%	20%	49%	7%	8%
Commercial fishing	1%	3%	0%	0%	25%	76%	44%	2%	1%	3%
Recreational fishing	0%	2%	0%	1%	6%	21%	28%	1%	1%	5%
Dumping of solid waste	7%	21%	12%	46%	22%	15%	15%	11%	18%	22%
Hazardous chemicals	24%	18%	9%	50%	18%	21%	19%	6%	19%	27%
Other	1%	1%	2%	1%	2%	2%	1%	2%	1%	1%

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

Trends 2000-2006

Respondents' judgements of the main causes of damage to the 10 environmental components which were included in all four surveys are shown

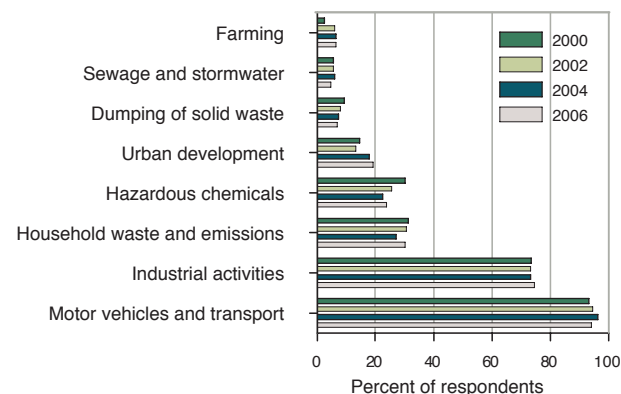


Figure 3.13a. Perceived main causes of damage to air. Categories less than 5% are omitted.

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 four surveys, Table 3.5 identifies the changes that are statistically significant.

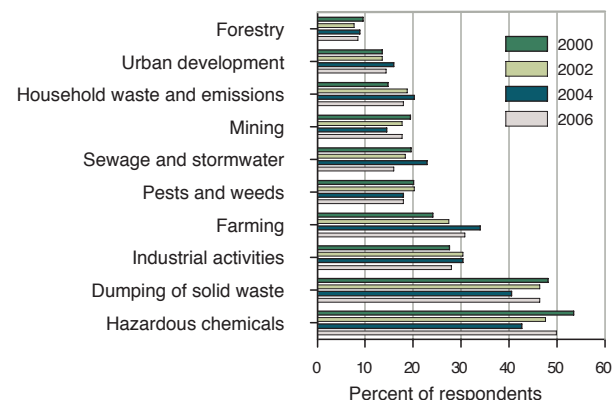


Figure 3.13d. Perceived main causes of damage to soils. Categories less than 5% are omitted.

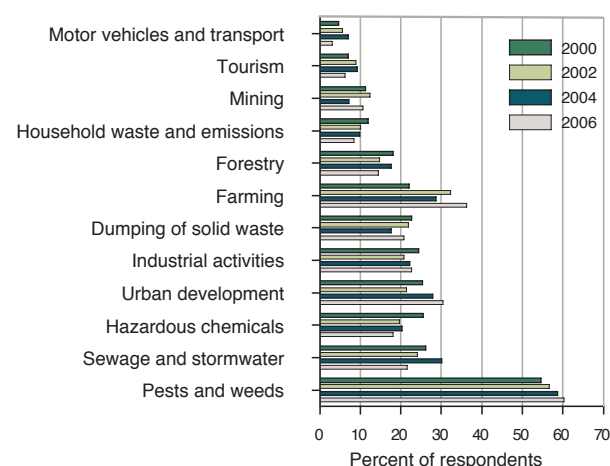


Figure 3.13b. Perceived main causes of damage to native land and freshwater plants and animals. Categories less than 5% are omitted.

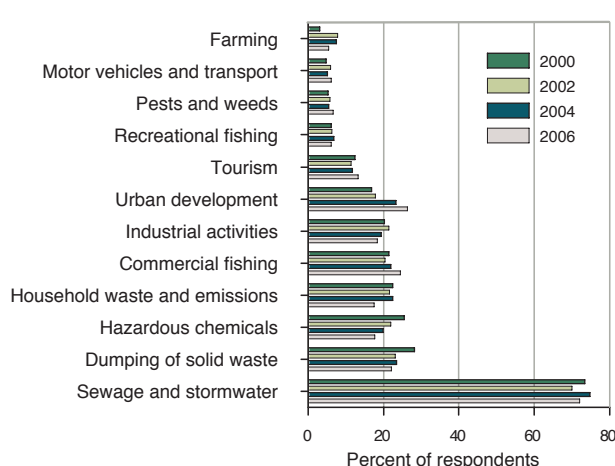


Figure 3.13e. Perceived main causes of damage to beaches and coastal waters. Categories less than 5% are omitted.

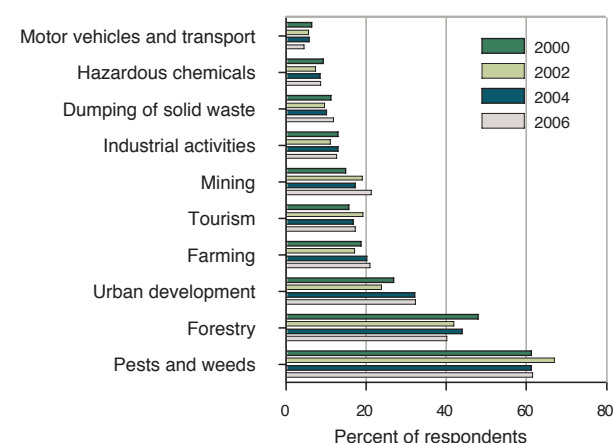


Figure 3.13c. Perceived main causes of damage to native forests and bush. Categories less than 5% are omitted.

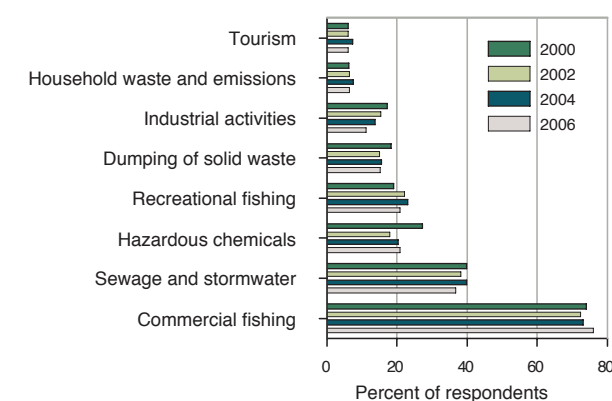


Figure 3.13f. Perceived main causes of damage to marine fisheries. Categories less than 5% are omitted.

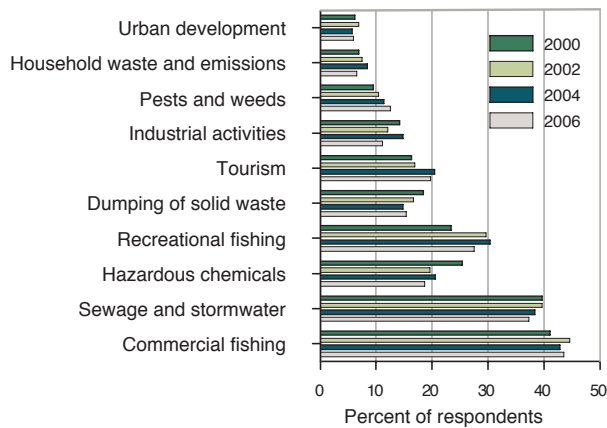


Figure 3.13g. Perceived main causes of damage to marine reserves. Categories less than 5% are omitted.

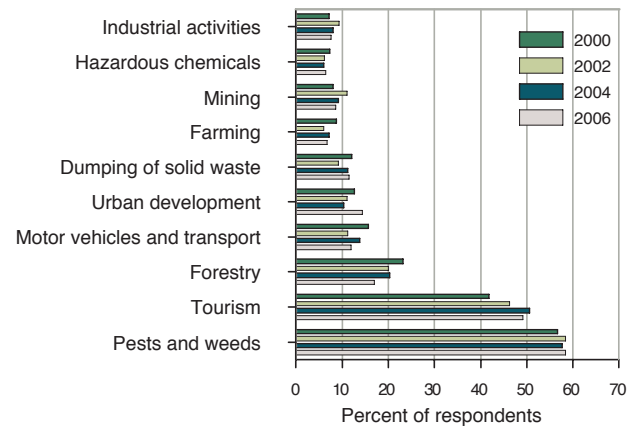


Figure 3.13i. Perceived main causes of damage to national parks. Categories less than 5% are omitted.

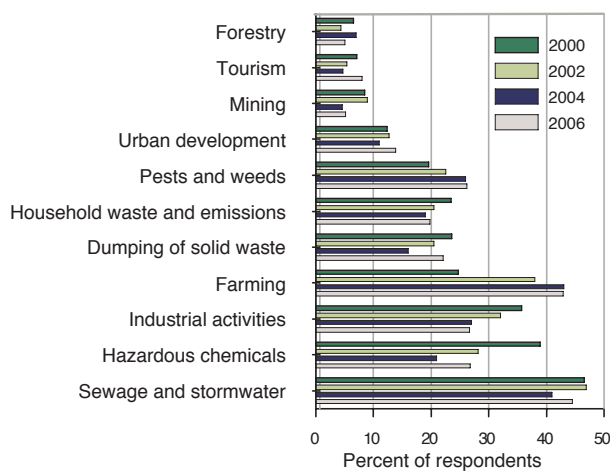


Figure 3.13h. Perceived main causes of damage to fresh waters. Categories less than 5% are omitted.

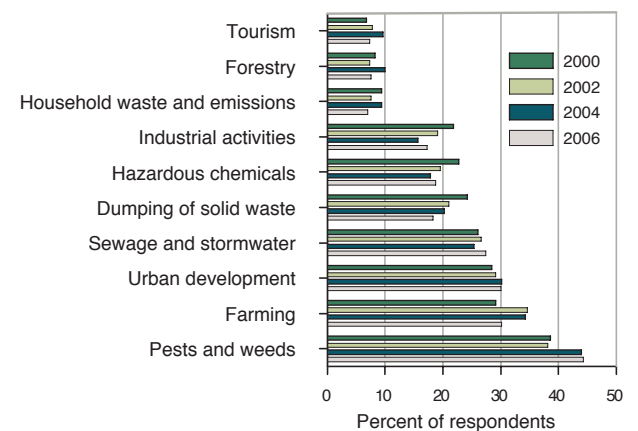


Figure 3.13j. Perceived main causes of damage to wetlands. Categories less than 5% are omitted.



Respondents stated that farming was a main cause of damage to many natural resources. Above: Inquisitive dairy cows (photo Shutterstock).

The most notable result in Table 3.5 is the dramatic increase in negative judgements about the environmental impacts of farming. Farming has received an overall increase in blame for environmental damage inflicted to air, native land and fresh-water plants and animals, soils, beaches and coastal waters, and fresh waters. 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	Wetlands, Fresh waters
Urban development	Air, Native land and fresh-water plants and animals, Native forests and bush, Beaches and coastal waters
Mining	Native forests and bush
Tourism	National parks
Recreational fishing	Marine reserves

Urban development was increasingly rated as a cause of damage for most of the environmental components over the four surveys.

On the positive side, respondents to more recent surveys were less likely to nominate mining, hazardous chemicals and dumping of solid waste as one

of the three most important causes of damage to the environment.

Reading down the columns of Table 3.5 indicates shifts in attributed main causes of damage to particular environmental areas. For example, mining and hazardous wastes are now less implicated in damage to soils, whereas household waste and emissions, farming and other causes have risen in prominence as perceived main causes of damage to soils.

Responses are consistent across years for a number of items. Motor vehicles and industrial activities were clearly rated as the main causes of damage to air in each year the survey was undertaken. Similarly, sewage and stormwater was clearly rated 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.

Respondents consistently rated sewage and stormwater as the main cause of damage to beaches and coastal waters across the four survey years. Below: questionable water quality in the popular Avon-Heathcote Estuary, Christchurch (photo L. Clark).



Table 3.5. Significant changes (cells with asterisks) in ratings of main causes of damage between the 2000-2006 survey periods. (↑) indicates the cause is judged to be more important now than it was two surveys earlier, (↓) indicates the cause is judged to be less important now than it was two surveys earlier. Cells with only asterisks indicate significant changes between years, but with no consistent trend.

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

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

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 was an overall significant difference in ratings of causes of damage to air ($P=0.033$) (Figure 3.14). Within-category analysis of the different causes was then undertaken, showing that people of "other ethnicity" were less likely to attribute cause to industrial activities or to motor vehicles and transport ($P<0.001$ and $P<0.05$ respectively), while NZ Europeans in particular attributed little causality to hazardous chemicals ($P<0.001$).

Although the overall ethnic analysis of damage to fresh waters was not significant ($P=0.09$) (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 ($P<0.05$), they were less likely to have identified hazardous chemicals ($P<0.01$) and dumping of solid waste ($P<0.01$).

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 on air and freshwaters identified significant regional differences ($P=0.000$ in both cases).

Northern and Central region respondents were more likely than Southern region respondents to identify hazardous chemicals as major causes of damage to air ($P<0.05$, Figure 3.16). Most notably, Southern respondents were far more likely to attribute a major cause of damage to air to household waste and emissions ($P<0.000$).

Northern respondents were more likely to identify household waste and emissions as a major cause of damage to fresh waters ($P<0.001$, Figure 3.17) and were less likely to identify hazardous chemicals ($P<0.001$). Southern respondents were much more likely to have identified farming as a major cause of damage to freshwaters than either of the other two regions ($P<0.001$), but not as likely to have identified sewage and stormwater as a major cause ($P<0.05$).

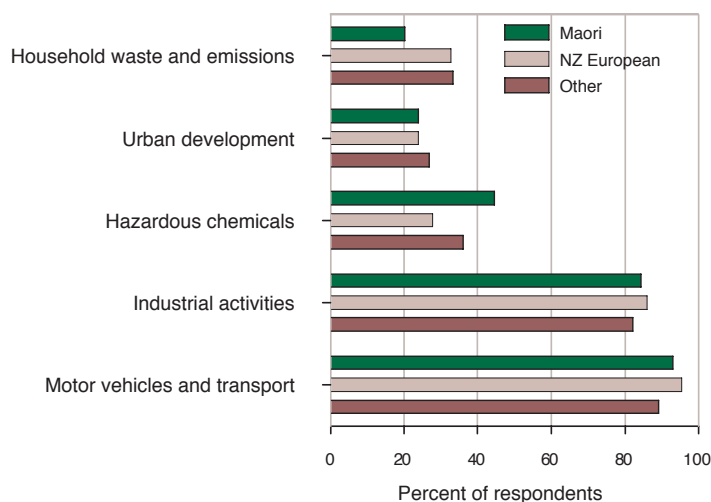


Figure 3.14. Perceived main causes of damage to air, by ethnicity. Categories less than 10% are omitted.

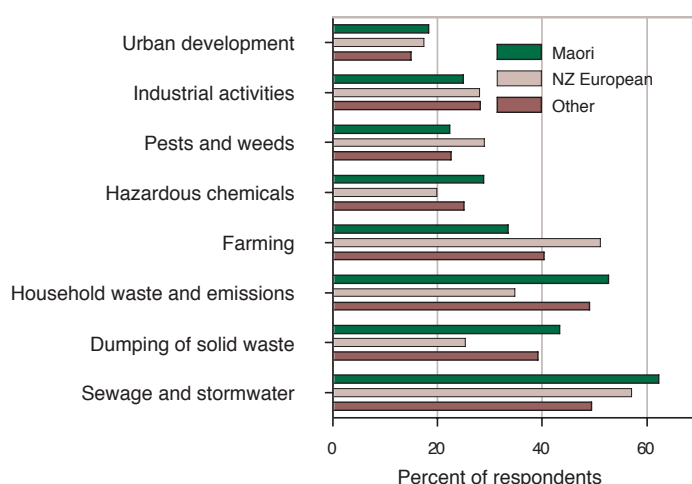


Figure 3.15. Perceived main causes of damage to fresh waters, by ethnicity. Categories less than 10% are omitted.

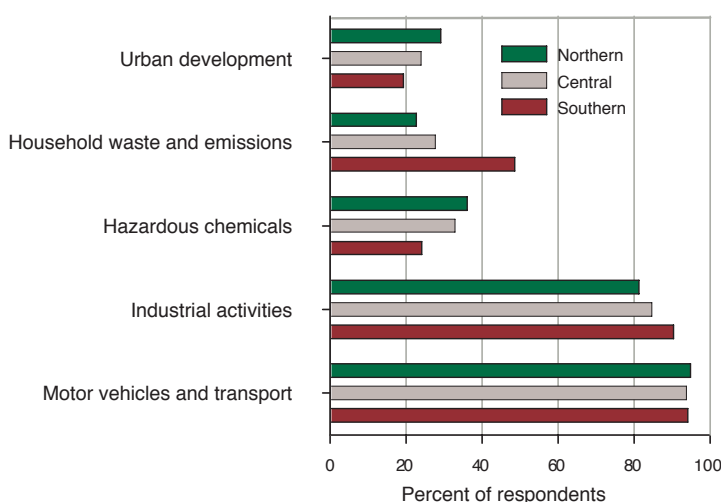


Figure 3.16. Perceived main causes of damage to air, by region. Categories less than 10% are omitted.

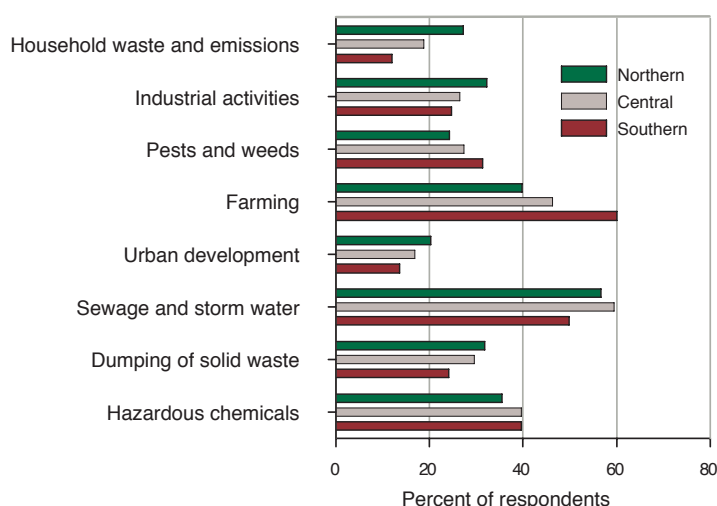


Figure 3.17. Perceived main causes of damage to fresh waters, by region. Categories less than 10% are omitted.

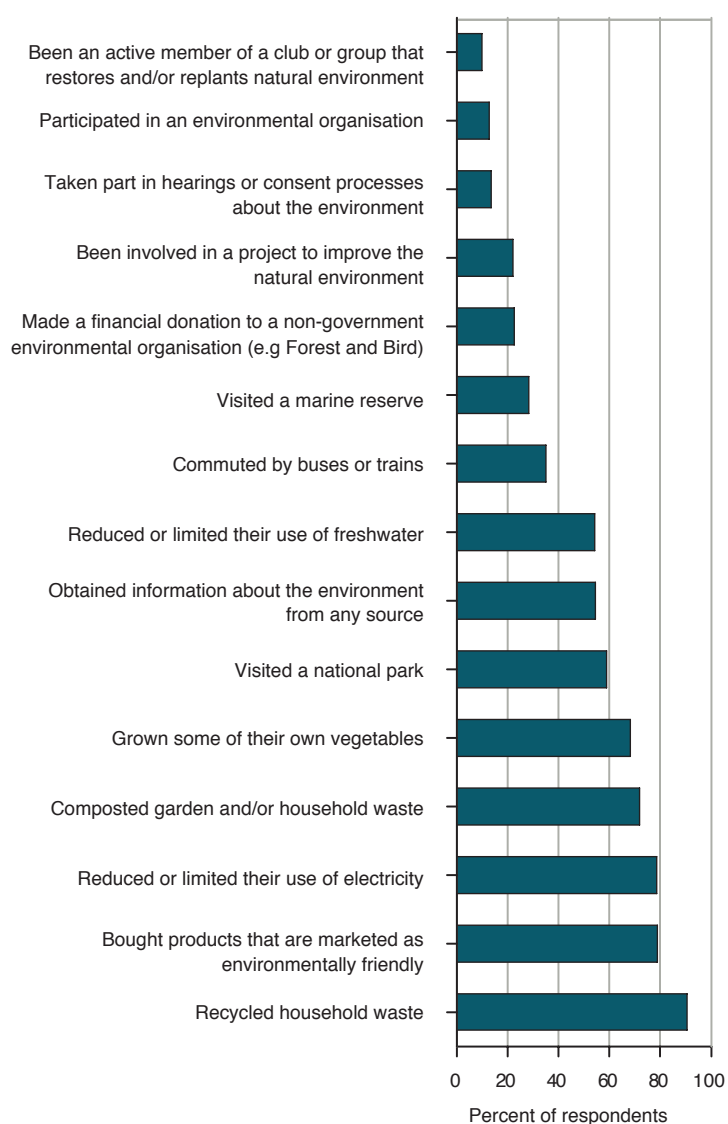


Figure 3.18. Reported participation in environmental activities, 2006.

3.6 PARTICIPATION IN ENVIRONMENTAL ACTIVITIES

The 2006 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 and 2006 surveys are presented here. Figure 3.18 shows levels of participation in 15 environmental related activities in the preceding twelve months. Over 75% of respondents to the 2006 survey recycled household waste, bought products marketed as environmentally friendly, or had reduced or limited their use of electricity. More than 70% had composted garden and/or household waste. 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 freshwater' (54.2% participation) and 'Made a financial donation to a non government environmental organisation (e.g., Forest and Bird)' (22.7% participation).

There were some significant differences between activities performed by each age group. Eighty percent of people thirty years or older had limited their use of electricity, compared to 69% of younger respondents. Overall, 56% of respondents reported efforts to reduce their use of fresh water. The most frequent water conservers were the 30 to 39 year age group (65%), whereas only 43% of those under the age of 30 attempted to reduce water use. Visits to marine reserves were least frequent for those over the age of 60, with 16% of these people visiting marine reserves compared with 31% for all other age groups. A similar result occurred for national parks. Whereas the overall visit rate was 58%, only 37% of the 60 and over age group visited national parks. Highest use was recorded for 30 to 39 year olds, 72% of whom had visited a national park in the previous year. The major effort to purchase environmentally friendly products was reported by 30 to 49 year olds (90%), compared with 82% for other age groups.

Older people were more likely to grow their own vegetables. The sample average was 66%, but this jumped to 76% for the 60 and over age group, and was only 47% for the under 30 year age group. Under 40 year olds were unlikely to have taken part in a consent hearing (4.1%), compared with 17.4% of older respondents.

These results indicate that the younger age groups are least likely to take environmentally friendly actions. Younger groups were least active in saving water, saving electricity, growing vegetables or attending resource consent hearings. However, under thirty year olds (53%) were more likely to commute by bus or train than were older people (33%).

Trends 2002 - 2006

Figure 3.19 shows the extent of between-survey changes in behaviour. There are no statistically significant differences.

Respondents' participation in environmental activities concentrated on recycling household waste, buying environmentally friendly products, and reducing electricity use (75%). Few respondents had been involved in restorations or participated in an environmental organisation. Visiting national parks was highest in the 30-39 year old category (72%), with an overall visit rate of 58%. Below: view of Lake Matheson (famous for its mirror views) and Fox Glacier, Westland National Park (photo Shutterstock).

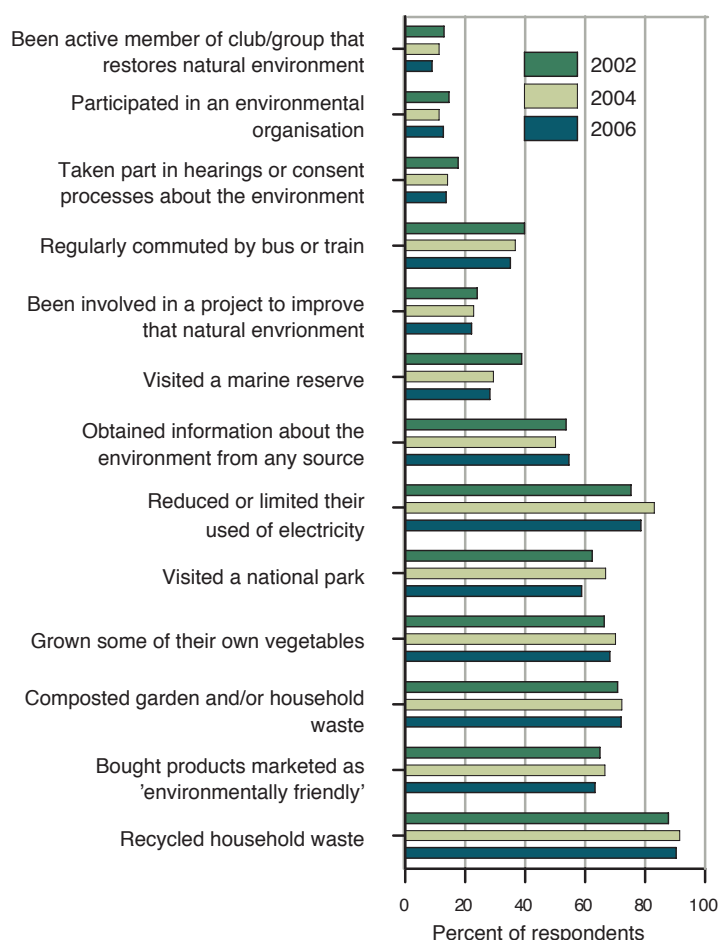
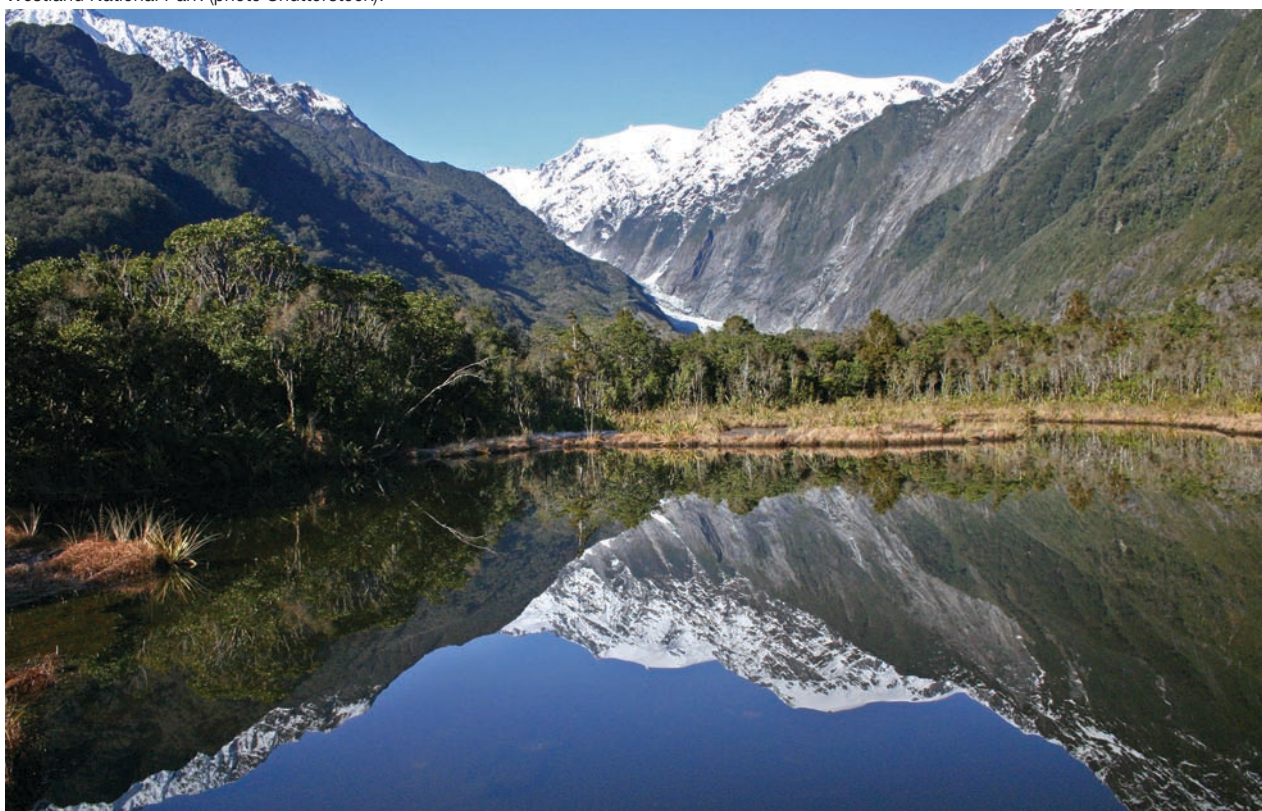


Figure 3.19. Respondent's participation in environmental activities.



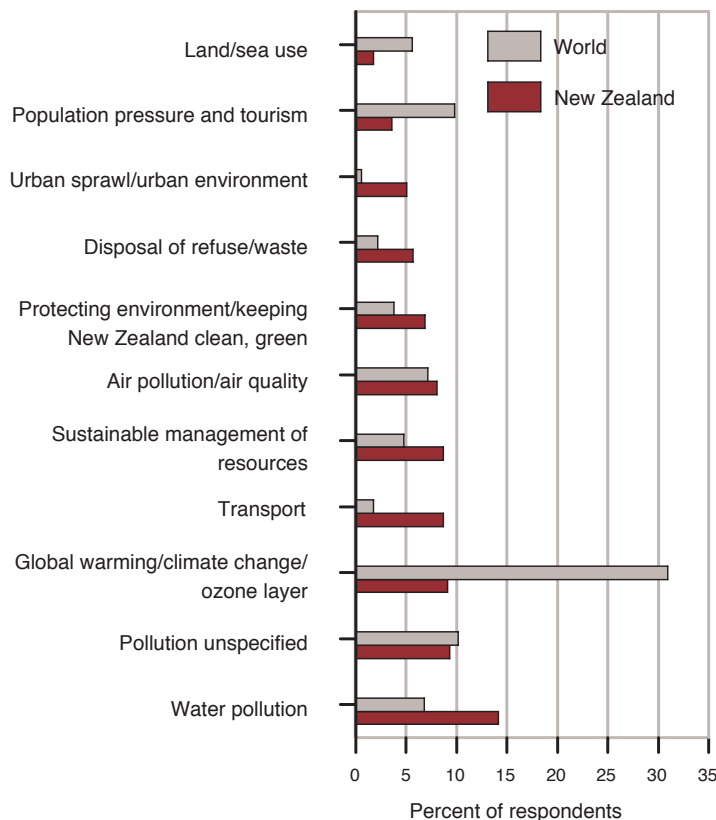


Figure 3.20. Most important issues facing New Zealand and the World.
Note: items only included where at least 5% of respondents identified the issue for either New Zealand or the world.

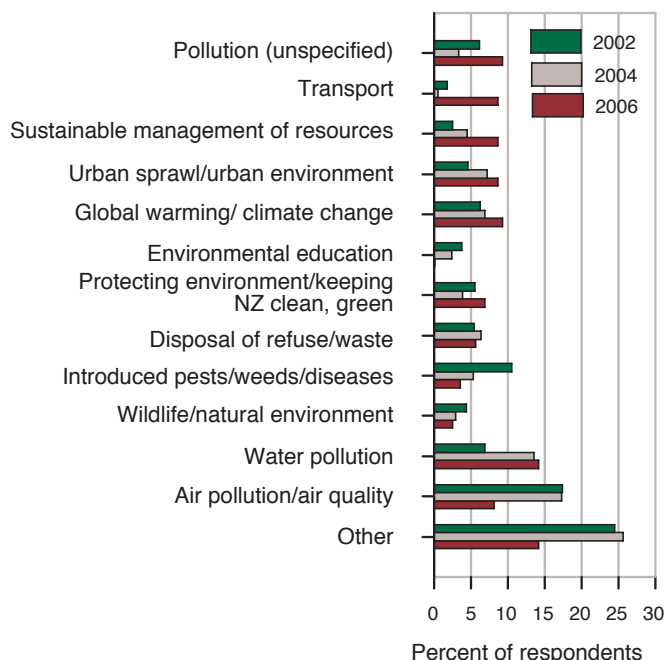


Figure 3.21. Trends in the most important environmental issues facing New Zealand today.

3.7 MAJOR ENVIRONMENTAL ISSUES - NEW ZEALAND AND THE WORLD

The 2006 Survey

Respondents were asked, in two open-ended questions, to identify the most important environmental issues facing New Zealand and the World today (Figure 3.20). 'Water quality and/or water pollution' (14.2% of respondents) was identified as the most important environmental issue facing New Zealand. Respondents identified 'Global warming/climate change' (30.9%) as the single biggest issue facing the world, followed by various forms of pollution (24.2% total across all pollution categories).

A comparison of responses for New Zealand and the World indicates that globally New Zealanders are much more concerned about 'Global warming/ climate change', whereas domestically the concern is about 'matters' the country can do something about, such as transport and water pollution.

Trends 2002 - 2006

Figure 3.21 compares the most important environmental issues facing New Zealand, as rated by respondents to the 2002 - 2006 surveys. There were highly significant differences between the surveys ($P < 0.001$).

The major change between surveys was the increased response for 'water pollution' as the single most important environmental issue, increasing significantly ($P = 0.000$) from 6.9% in 2002 to 14.2% in 2006. There were also notable increases over the surveys for 'urban sprawl/urban environment' (4.6 to 8.7%), 'global warming/climate change' (6.3 to 9.3%), and 'sustainable management of resources' (2.5 to 8.7%). There was a major increase in those reporting 'transport' in 2006 (8.7%, up from 0.6% in 2004) which might have been driven in part by the case study in this survey, although transport has been a major issue of intense media interest in the period before and during the survey.

Issues to decline over the surveys were 'introduced pests/weeds/diseases' (10.5 to 3.6%), and 'air pollution/air quality' (17.4 to 8.1%).



04

Te Apiti wind farm (photo Shutterstock)

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;
- Freshwaters (incorporating rivers and lakes; and groundwater);
- National parks;
- Wetlands; and
- 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 2. Thus, each graph contains four important elements:

- 2000 survey data;
- 2002 survey data;
- 2004 survey data; and
- 2006 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 four 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.

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 (see for example Eason 2003, North Shore City Council et al. 2003, Gravitas Research and Strategy Ltd 2005) with a major focus on the greater Auckland conurbation. In terms of

policy initiatives the Ministry for the Environment has introduced the New Zealand Urban Design Protocol (<http://www.mfe.govt.nz/issues/urban/design-protocol/index.html> - accessed 6 October 2006). 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; and
- Well-governed places that have a shared vision and sense of direction.

This initiative has been complemented by activities of the Big Cities Project (<http://www.bigcities.govt.nz/> - accessed 6 October 2006). This latter project has incorporated perceptions surveys (Gravitas Research and Strategy Ltd 2005) and de-



The majority of New Zealanders live in urban centres. There is no national set of urban environmental indicators yet there are policy initiatives such as the New Zealand Urban Design Protocol that are being launched at a government level. Above: the waterfront view from Picton's central urban area, South Island (photo S. McMurtrie).

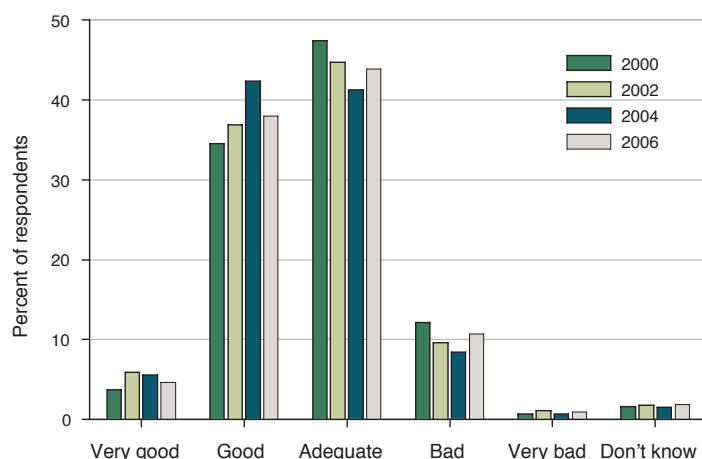


Figure 4.1a. Perceived condition of the natural environment in towns and cities.

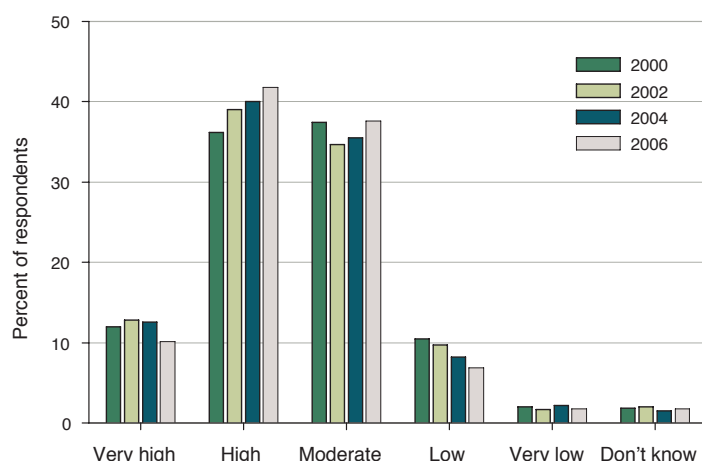


Figure 4.1b. Perceived availability of parks and reserves in towns and cities ($P=0.01$).

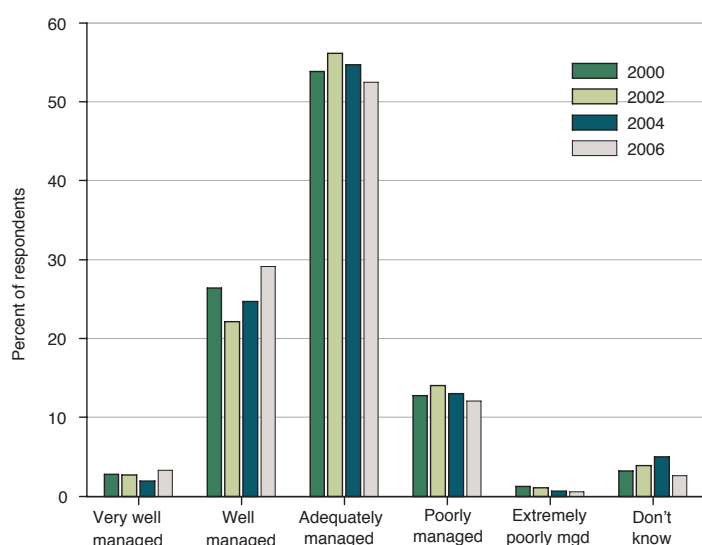


Figure 4.1c. Perceptions about current management of the natural environment in towns and cities.

veloped a set of quality of life indicators which included the natural environment. These latter indicators are reported in North Shore City Council et al. (2003). In terms of biodiversity, the indicator most closely associated to that reported here, they concluded that “in general, the eight cities are doing better than the rest of New Zealand in surveying and mapping the presence of significant terrestrial biodiversity ... (and) they reported plans and management programmes in the development phase which, once implemented, would put the largest cities in a leadership position relative to New Zealand as a whole. It is not so clear that they are doing better at actually protecting the biodiversity thus identified” (North Shore City Council et al. 2003: 104).

Perceptions of state, pressures and management trends

It is clear from all four surveys that most people consider the natural environment in towns and cities to be ‘adequate’ or ‘good’ (Figure 4.1a) and that the availability of parks and reserves is ‘moderate’ or ‘high’. The only significant difference between surveys is for the perceived availability of parks and reserves in towns and cities, which has improved significantly over the four surveys (Figure 4.1b). All other ‘indicators’ in this set scored positively, unlike any other environmental component that was examined. Management is considered to be adequate to good (Figure 4.1c).

Commentary

Given that most New Zealanders live in an urban environment their knowledge of environmental issues associated with this setting 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 poor air quality 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, or that air quality is only a major issue in Christchurch (see Gravitas Research and Strategy Ltd 2005: 247).

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 is increasing concern amongst scientists about the health effects of air pollution in New Zealand, e.g., Fisher et al. (2002), regarding increased mortality from vehicle emissions in the greater Auckland region, and Hales et al. (2000) who link increases in air-borne particulates to increased mortality and to an increase in respiratory hospital admissions in Christchurch. On the other hand, Ministry for the Environment (1997: section 6:24) reports that “as with suspended particulate matter, smoke levels around the country have also shown some improvements over the last 10 to 20 years. In Christchurch and Dunedin, for example, wintertime levels of smoke have decreased - significantly in the case of Christchurch - especially over the last decade”. Further analysis of the information available from Ministry for the Environment (1997) indicates that in general air quality in New Zealand is good. 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 was ranked highly compared to other nations (Esty et al. 2005), 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’.

Perceptions of state, pressures and management trends

From all four 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 in the last six years (see Figure 4.2a). Air remains the only resource examined for which there are significant differences for all of the measures that can be compared statistically between surveys.

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

Most respondents over all four surveys consider the quality of air management to be adequate and either staying constant or improving. Management



New Zealanders appear to rate our air quality highly compared to other nations. Yet while air quality in rural areas may be good, the evidence is clear that our major urban areas (especially Auckland and Christchurch) have ongoing air pollution issues. There is some regional difference in views however, with Canterbury tending towards more negative views of air quality. Respondents rated motor vehicles and transport, and industrial activities as the main pressures on air quality in New Zealand. Above: a winter's sunrise over Christchurch brings with it a scattering of early morning mist and associated smog (photo S. McMurtrie).

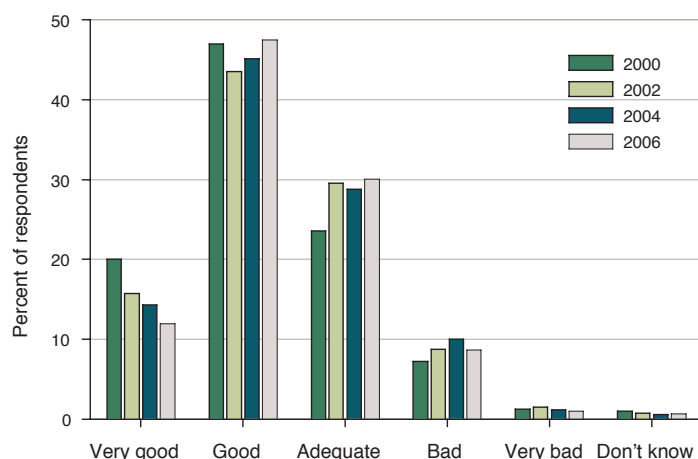


Figure 4.2a. Perceived state of air quality ($P < 0.001$).

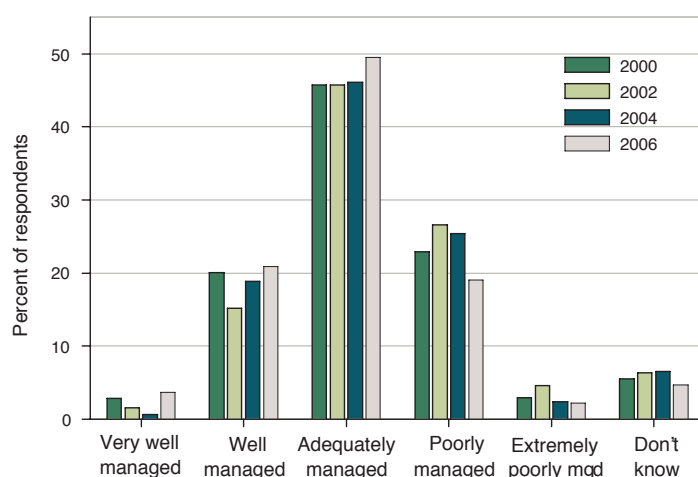


Figure 4.2b. Perceptions about management of air quality.

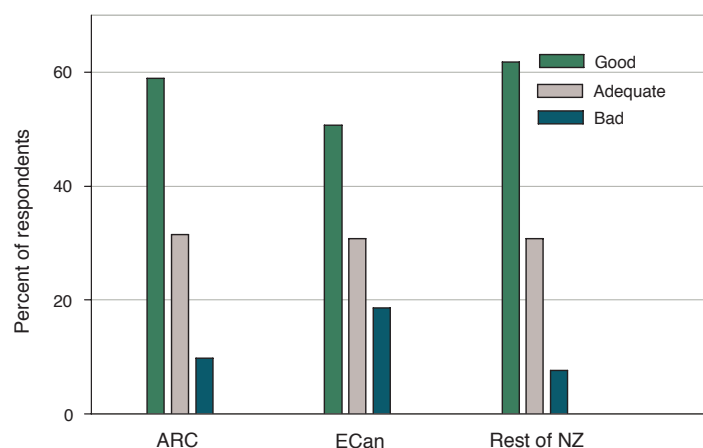


Figure 4.2c. Perceived state of air quality by regional council ($P < 0.01$).

is rated as 'adequate' by almost fifty percent of respondents in 2006. Overall, respondents have perceived air management more positively than did 2000-2004 respondents.

The 2006 survey was subjected to a limited regional level analysis with respondents from 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), with Canterbury residents 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 those in Canterbury.

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 has kept matters of air quality in the media. Discussion about climate change and greenhouse gases increased prior to the 2004 survey as the Government launched a national publicity campaign related to its climate change awareness programme. The Ministry for the Environment introduced National Environmental Standards for Air Quality in 2004 (<http://www.mfe.govt.nz/laws/standards/air-quality-standards.html> - accessed 6 October 2006). 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 led to much public debate, especially in Christchurch and Auckland, throughout 2005. In combination these policy initiatives and associated environmental and health problems have helped sustain the high profile of air quality issues.

4.3 NATIVE LAND AND FRESHWATER PLANTS AND ANIMALS

Scientific information on state and trends

Esty et al. (2005: Appendix B: 200) have ranked New Zealand very poorly in terms of biodiversity performance - indeed one of the worst of 142 nations evaluated. This should hardly be surprising given the country's very poor record in terms of extinct bird, bat, freshwater fish and other species, and given the many species still under threat.

Despite the above comments, conservation of New Zealand's native plants and animals remains one of the country's main environmental issues (DoC and MfE 2000). New Zealand has diverse flora and fauna with many endangered plants and animals, some of which, e.g., kakapo and kiwi, are national symbols and attract high levels of media interest. About 800 of New Zealand's known animal, plant and fungi species and 200 subspecies are considered threatened. It is likely that many still unknown species are also threatened (<http://www.biodiversity.govt.nz/picture/biodiversity/state/index.html> - accessed 19 August 2004). According to the Department of Conservation "An increase in active conservation management and changes in attitude to the natural environment over the past two decades appear to be slowing the rate of decline" (<http://www.doc.govt.nz/conservation/001%7eplants-and-animals/index.asp> - accessed 19 August 2004).

Based on the above, the state of New Zealand's biodiversity should 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 significant component of the indigenous biodiversity is clearly in significant decline.

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

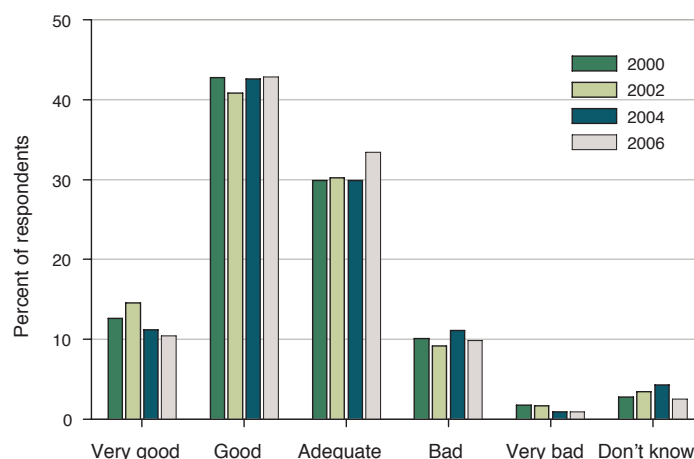


Figure 4.3a. Perceived state of native land and freshwater plants and animals.

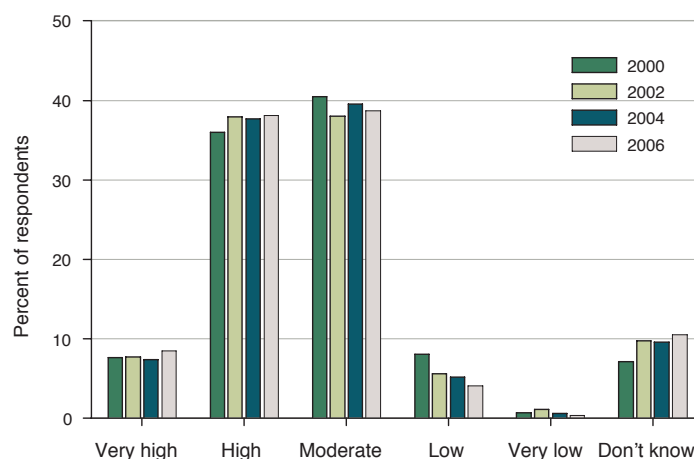


Figure 4.3b. Perceived diversity of native land and freshwater plants and animals.

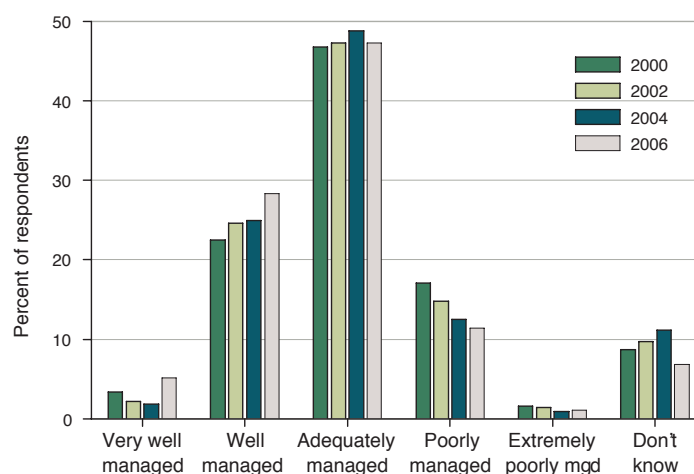


Figure 4.3c. Perceptions about management of native land and freshwater plants and animals ($P < 0.001$).

(see Figure 3.13b) as pests and weeds (by between 55-60% of respondents) and, increasingly, farming (between 22-36%). And, while native land and freshwater plants and animals are rated as adequately to well managed (Figure 4.3c), the proportion rating this category as poorly managed has continued to decline significantly ($P < 0.001$).

Commentary

That respondents continue to rate the condition of New Zealand's native plants and animals as 'adequate' or 'good' remains somewhat surprising when clearly it is not the case. Both the National Biodiversity Strategy, which notes that many ecological processes have been damaged and that there are over 1000 threatened species in New Zealand (DoC and MfE, 2000), and the conclusions drawn

in the comparative global performance reported by Esty et al. (2005) attest to the poor biodiversity performance of New Zealand in comparison to other environmental resources and in international comparisons. More research is needed 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.

The conservation of New Zealand's native plants and animals remains one of the main environmental issues for this country, despite respondents believing the condition of our plants and animals is adequate to good. Below: The iconic megaherbs of Campbell Island, such as *Pleurophyllum speciosum*, are unique to the subantarctic islands. The unique flora and fauna of Campbell Island has been recovering since the final removal of sheep in 1991 and eradication of rats in 2002, although details for insect, floristic, and aquatic life are largely unknown (photo C. Meurk).



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, such as the 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 23% (MfE 1997: 9:59). Most (19.1%) of this remaining 23% is now managed for conservation purposes by the Department of Conservation (Ministry of Agriculture and Forestry 2001). The state of these forests varies, but is not reported on in the national State of the Environment Report (MfE, 1997). 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" (<http://www.biodiversity.govt.nz/picture/biodiversity/state/pests.html> - accessed 19 August 2004). Some very large pest control programmes, particularly those targeting possums, are attempting to redress some of this damage. 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 therefore likely to be mixed and to range from good to very poor.

Perceptions of state, pressures and management trends

Both the perceived condition (Figure 4.4a) ($P < 0.05$) and perceived quality of management (Figure 4.4c) ($P < 0.001$) have improved considerably over the four surveys. Respondents consider condition of native bush and forests to be adequate to very good, with management being

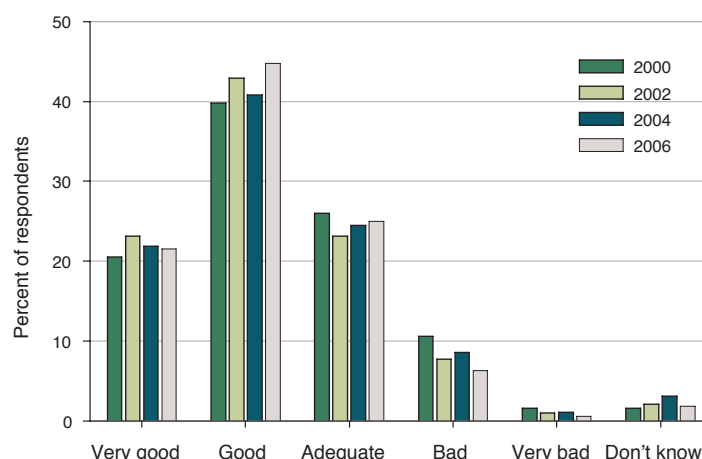


Figure 4.4a. Perceived condition of native bush and forests ($P < 0.05$).

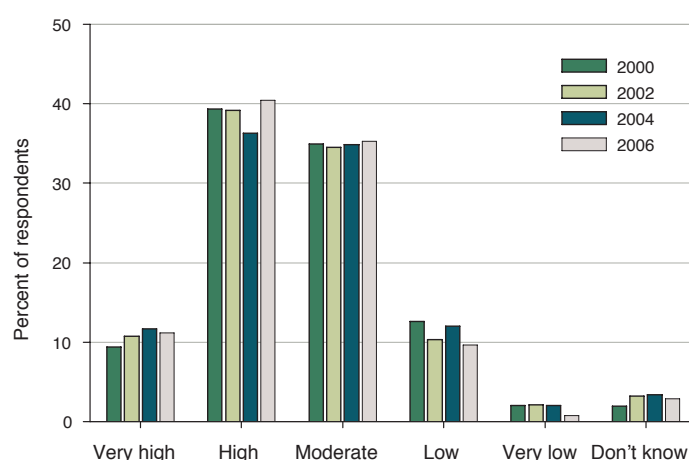


Figure 4.4b. Perceived quantity of native bush and forests.

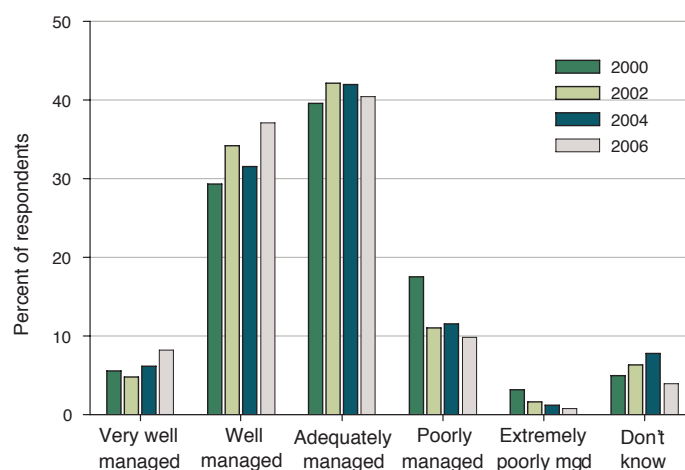


Figure 4.4c. Perceptions about management of native bush and forests ($P < 0.01$).

adequate to good. There has been no significant change in perception of the quantity of native bush and forests (Figure 4.4b), with most thinking there is a moderate to high amount. The main perceived pressures (see Figure 3.13c) have been 'pests and weeds' (61-67% of respondents) and 'forestry' (42-48%). Management is increasingly perceived positively, with most respondents rating native forests and bush as adequately to well managed.

Commentary

It is difficult to determine scientific trends in condition and amount of native bush and forests in New Zealand. However, despite a lack of overall scientific trend data it seems likely that while the extent of native bush and forest is in fact increasing, its overall quality is probably declining as a result of pest and weed damage. This problem does not appear to be reflected in the public response, which views native bush and forests very positively, possibly because of the large number of restoration programmes and well known projects, such as Project Crimson which is designed around the need to project pohutakawa trees (<http://www.projectcrimson.org.nz/WSMApage/> - accessed 8 October 2006).

4.5 SOILS

Scientific information on state and trends

Soils are critical resources for agriculture, horticulture and forestry, yet are often the unseen resource that receives little or no media attention and/or public interest. It is clear from the State of the Environment Report (MfE, 1997) and from soil experts (Phil Tonkin, pers. comm.) 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 this 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. MfE (1997: section 8:90) conclude that:

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



Respondents were positive about the condition, quality, and management of native bush and forests. However, it is likely that while the extent of native forest could be increasing, the overall quality is decreasing due to pest and weed damage. Above: Densely mossed understory that is typical of podocarp forests on the West Coast of the South Island. The understory of such forests are often heavily browsed by introduced herbivores including deer and possum (photo S. McMurtrie).

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).

Soils are likely to be another area where public perception is distant from research and monitoring findings. Given these findings 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 perceived quality or condition of soils is good to adequate (Figure 4.5a). The main pressures on soils (see Figure 3.13d) are 'hazardous chemicals' (43-54% of respondents), 'dumping of solid waste' (41-48%) and 'farming' (24-34%). 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.

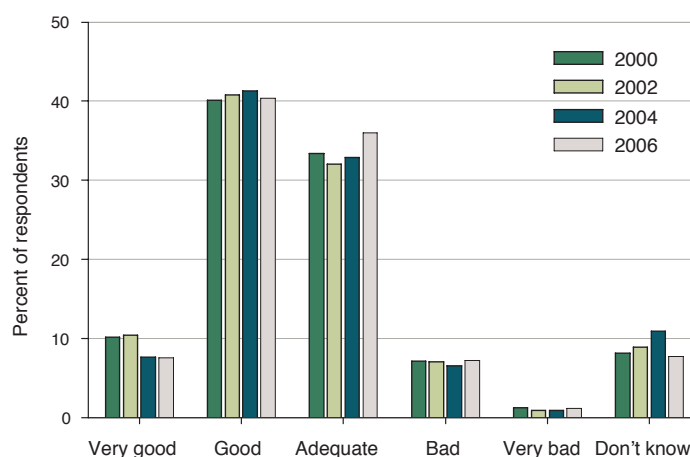


Figure 4.5a. Perceived quality or condition of soils.

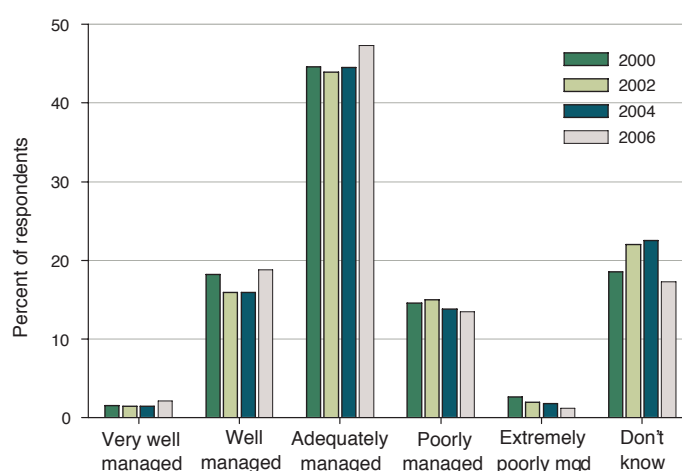


Figure 4.5b. Perceptions about management of soils.

4.6 COASTAL WATERS AND BEACHES

Scientific information on the 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 1997). It is near the latter areas where most of the New Zealand population lives. No overall trend in the state of coastal waters and beaches has been reported, but MfE (1997) reports a loss of mangroves during the 20th century, continued discharges of concentrated nutrients into estuaries and harbours, and ongoing reclamations. Statistics New Zealand (2002: 34) reported that 94% or more of between 33 and 141 monitored beaches were safe for recreational contact over the period 1998/99 to 2001/02. MfE (2006) showed that, at the national level, there has been a slight improvement in recreational water quality between 2003/04 and 2004/05, although there is insufficient data to determine whether this is a long term trend.

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

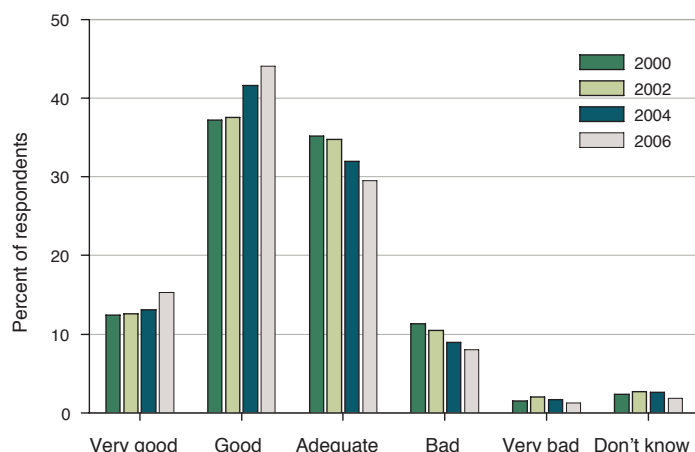


Figure 4.6a. Perceived quality or condition of coastal waters and beaches ($P < 0.05$).

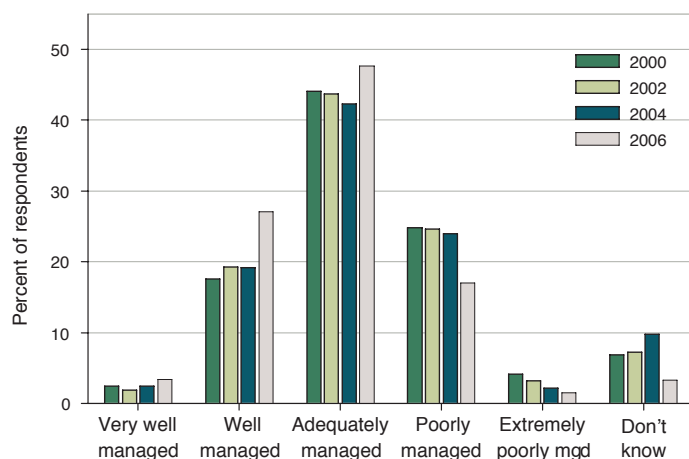


Figure 4.6b. Perceptions about management of coastal waters and beaches ($P < 0.001$).

Perceptions of state, pressures and management trends

The 2006 survey has demonstrated the continuation of a surprising trend - people's perceptions of the condition (Figure 4.6a) of coastal waters and beaches and management (Figure 4.6b) thereof continues to be more favourable. This increasingly positive view is especially evident for 'management' where there were big increases in those with a positive view and a large decline in 'don't know' responses. Overall, respondents now consider the resource to be in an adequate to good condition and coastal water and beaches to be adequately to well managed. In terms of pressures (see Figure 3.13e), 'sewage and stormwater' has consistently recorded the largest response (70-75%).

Commentary

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

New Zealand's extensive coastline and relatively low population density might be contributing to the very favourable views about coastal waters and beach conditions. Below: Horse riding along Bayllys Beach, Northland (photo L. Clark).



4.7 MARINE FISHERIES

Scientific information on state and trends

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

Measures of sustainability are available for only 76 of 272 fish stocks in the Quota Management System (Statistics New Zealand, 2002: 35). Note that as of October 2006 MFish considered there to be 343 significant fishstocks that need to be closely monitored: <http://www.fish.govt.nz/en-nz/SOF/default.htm?WBCMODE=PresentationUnpublished> - accessed 9 October 2006. Fourteen of 40 stocks for which there is information are below target stock levels. 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 steadily declined 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 the country there is much debate about the direction of management. There are initiatives underway to establish integrated fisheries plans to overcome remaining management issues, i.e., stakeholder-led fisheries plans and Ministry-led fisheries plans (see <http://www.fish.govt.nz/en-nz/Fisheries+Plans/default.htm?WBCMODE=PresentationUnpublished> - accessed 9 October 2006).

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

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 4.6b) by most respondents who expressed an opinion - over time an increasing proportion have made this choice. Key pressures on marine fisheries (see Figure 3.13f) are perceived to be 'commercial fishing' (72-76% of respondents) and 'sewage and wastewater' (37-40%). As with all other resources, there is a perceived improvement in management over time, with the modal response now being 'adequate' (Figure 4.7c).



The condition of New Zealand's marine fishery and the quantity of marine fish stocks are considered to be adequate to good. However, despite the QMS, some fish stocks have declined, with illegal fishing and environmental effects of fishing considered important drivers. Scientific uncertainty over marine fish populations may also be a factor in the high number of 'don't know' responses. Above: small fishing fleet at the Buller river mouth, Westport, South Island (photo S. McMurtrie).

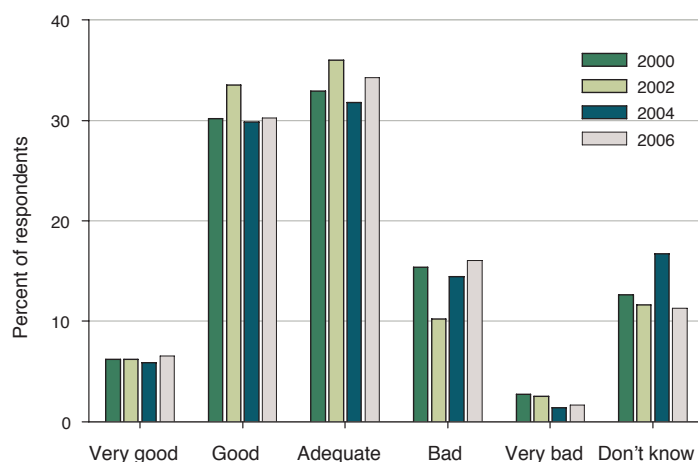


Figure 4.7a. Perceived quality or condition of marine fisheries ($P=0.06$).

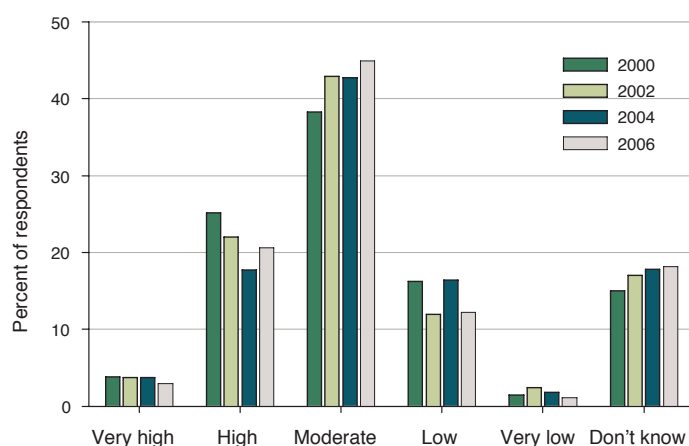


Figure 4.7b. Perceived quantity of marine fisheries ($P<0.01$).

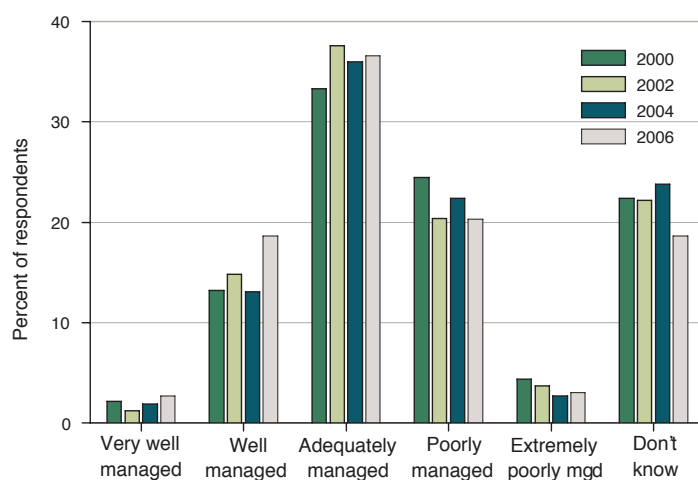


Figure 4.7c. Perceptions about management of marine fisheries ($P=0.01$).

Commentary

In all four surveys large numbers of people expressed 'don't know' responses for many marine fishery-related questions, the proportions ranging from around 12-27% 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 the claims and counter claims made by fisheries and environmental organisations about the status of New Zealand marine fisheries (see for example Anderton, 2006). Increase in intensity of that debate could be associated with the increasing frequency of 'don't know' responses. 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 28 marine reserves in New Zealand, representing 0.3% of New Zealand's Exclusive Economic Zone (EEZ) (<http://www.doc.govt.nz/Conservation/Marine-and-Coastal/Marine-Reserves/index.asp> - accessed 9 October 2006). This fraction is very low when compared to terrestrial reserves, which cover about 30% of New Zealand's land area (www.doc.govt.nz - accessed 19 August 2004).

The overall state of resources in these 28 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, there is a lack of empirical research internationally that demonstrates gains in resource quality inside marine reserves (see Willis et al. 2003b: 101). It is also clear that the marine reserves network is 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 is insufficient to meet basic conservation requirements.

Perceptions of state, pressures and management trends

Most respondents think there is a moderate to high quantity of marine reserves in New Zealand. For the first time the 2006 survey recorded more people on the higher than lower side in this evaluation. The most frequently identified pressures (see Figure 3.13g) are 'commercial fishing' (41-45% of respondents), 'sewage and stormwater' (37-40%) and 'recreational fishing' (23-30%). Marine reserves are considered to be adequately to well managed, with this perception improving 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 fifth of all respondents provide this response in 2006). 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, about a third of New Zealanders engage in marine recreational fishing (Hughey et al. 2002a) and may lose recreational fishing opportunities with an increase in marine reserves. It is notable that marine recreational fishers frequently express strong opposition to marine reserve proposals (Hughey 2000), although there are notable exceptions, e.g., the 10 reserves proposed and implemented by fishers in the Fiordland area (Challis and McCrone 2005).

There is a distinct dichotomy between New Zealanders' perception of a high quantity of marine reserves and the reality of the tiny fraction of the New Zealand coastal and marine environment they occupy. This misperception may be influenced by the proximity of many of our marine reserves to large urban centres. Right: a school of blue maomao at Poor Knights Island marine reserve (photo Shutterstock).

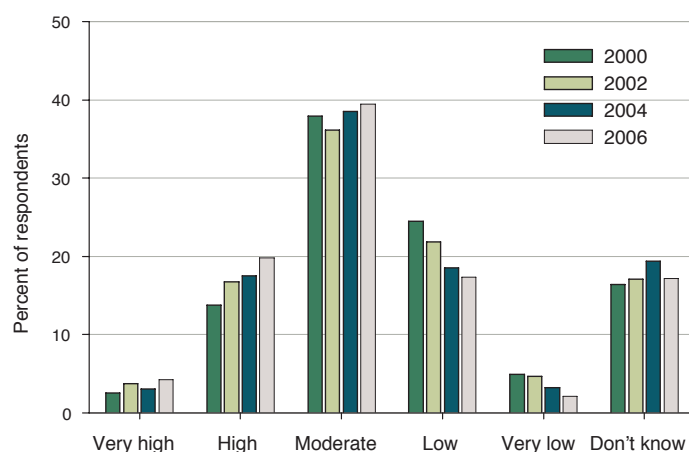


Figure 4.8a. Perceived quantity of marine reserves ($P < 0.01$).

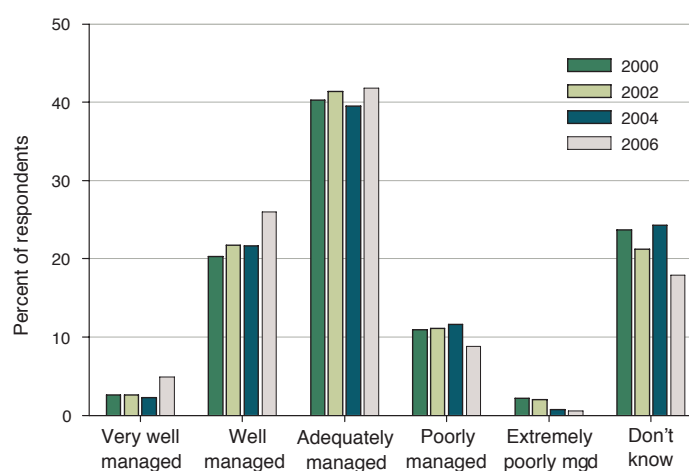


Figure 4.8b. Perceptions about management of marine reserves ($P < 0.01$).



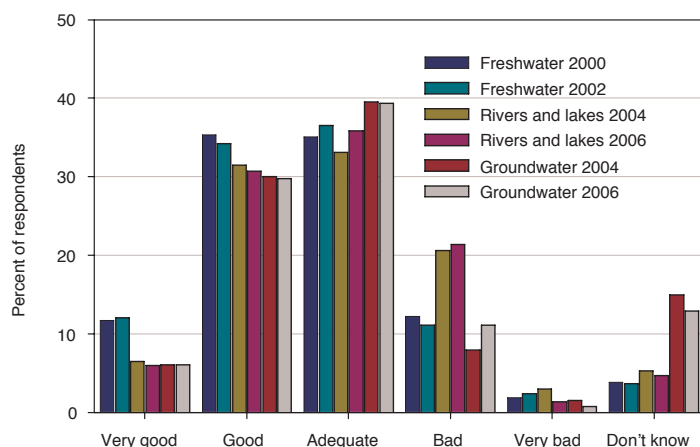


Figure 4.9a. Perceived quality or condition of freshwaters (2000, 2002), rivers and lakes (2004, 2006) and groundwater (2004, 2006).

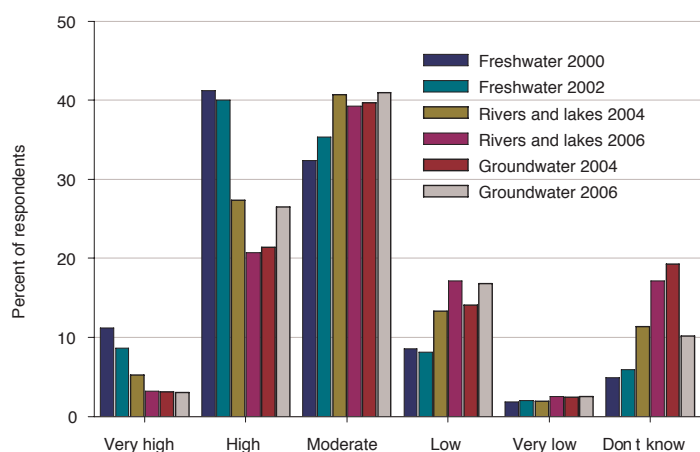


Figure 4.9b. Perceived amount of freshwaters (2000, 2002), rivers and lakes (2004, 2006) and groundwater (2004, 2006).

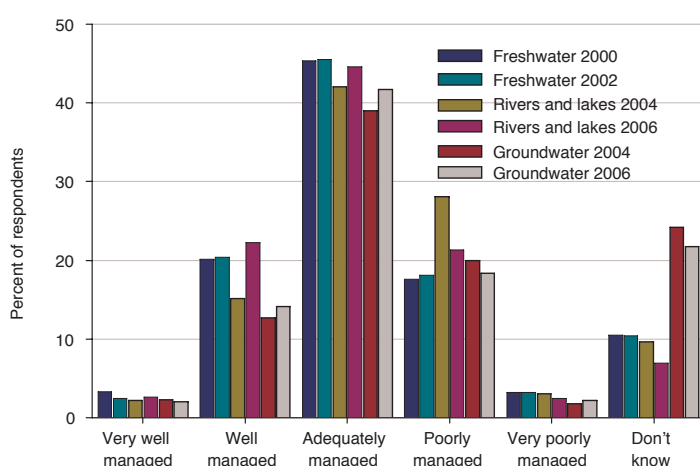


Figure 4.9c. Perceptions about management of freshwaters (2000, 2002), rivers and lakes (2004, 2006) and groundwater (2004, 2006).

4.9 RIVERS, LAKES AND GROUNDWATER

Scientific information on state and trends

MfE (1997: section 7: 88) conclude that:

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

In similar vein, Statistics New Zealand (2002: 36) notes:

“As a general rule ‘lowland’ rivers, whose catchments are dominated by agricultural land use, ‘pull down’ general compliance with nutrient criteria ...”

Recent reports by Hamill (2006) for lakes, and by Scarsbrook (2006) for rivers provide more contemporary contexts. For lakes there are some examples of improving trends, e.g., in terms of trophic status, but 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 (including Lake Taupo) and only 22% an improvement (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. (In press) compared perceptions gathered at national and context-specific levels and found there was a good connection with what biophysical scientists were also reporting. Generally, water quality is good and there is a large quantity available on a national level, but for lowland streams performance is much more varied 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 freshwater. In 2004 (and retained for 2006), the freshwater category was replaced by two separate categories, 'rivers and lakes' and 'groundwater', because of the different environmental impacts and management issues related to them (Figures 4.9 a-c). In this analysis the data from these different questions have been combined for ease of presentation and interpretation.

Although most people have opinions on the quality, quantity and management of freshwater (2000-2002) and rivers and lakes (2004-2006), there is a much higher proportion of 'don't know' responses for questions on groundwater (2004), possibly because groundwater is not 'seen'.

The quality of freshwater (Figure 4.9a) is judged to be 'adequate' or 'good', and the amount of freshwater (Figure 4.9b) is mostly considered to be either 'moderate' or 'high' (total of about 75%) in the 2000 and 2002 surveys. The 2004 and 2006 surveys obtained somewhat more pessimistic responses. Whereas in the 2000 and 2002 surveys about 45% of respondents rated freshwater quality as better than adequate, this figure fell to around 35% in 2004 and 2006. An even more emphatic shift occurred for water availability, with about 50% providing ratings of better than moderate in the two early surveys, but less than 30% doing so in 2004 and 2006.

The main causes of damage to fresh waters (see Figure 3.13g) are considered to be 'sewage and stormwater' (41-47%), 'farming' (25-43%), and 'hazardous chemicals' (21-39%). Farming, in particular, has increased hugely in importance over the course of the survey period.

Nearly half of respondents in 2000 and 2002 considered that freshwater management (Figure 4.9c) was 'adequate', with about equal numbers holding more positive or more negative views. Perceived quality of management was slightly lower in 2004 and 2006 (noting the different questions), with 40 to 45% of respondents believing that groundwater and rivers and lakes are adequately managed and with more people evaluating management as 'poor' or 'very poor' than evaluating these

resources as 'well managed' or 'very well managed'. However, in 2006 perceptions of management for both groundwater and rivers and lakes improved.

Commentary

There is clearly a perception that the quality of freshwaters, particularly rivers and lakes, is worsening, although this conclusion needs to be tempered by the fact that the vast majority still view quality or condition as being adequate or better. This perception of change might still be a response to heightened 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 reported by Hamill (2006) and Scarsbrook (2006). The ongoing and significantly lower ratings provided by Maori perhaps indicates the importance of freshwaters to this ethnic grouping. Development of a Cultural Health Index for streams and waterways (Tipa and Teirney 2003) may be reflective of the importance of this resource and the unsurprising low ratings given by Maori.

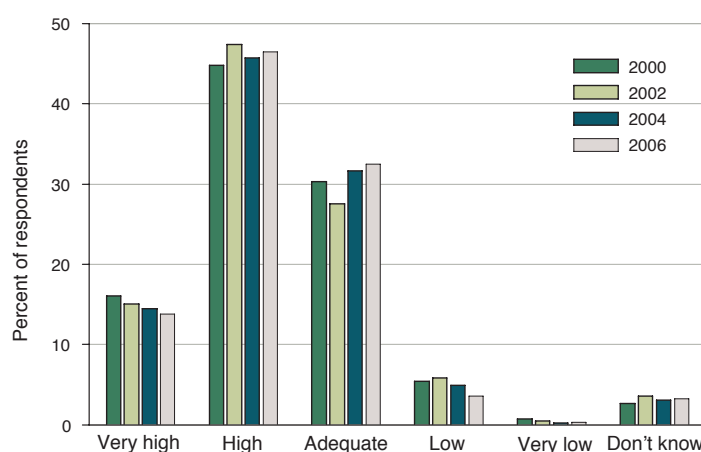


Figure 4.10a. Perceived area of national parks.

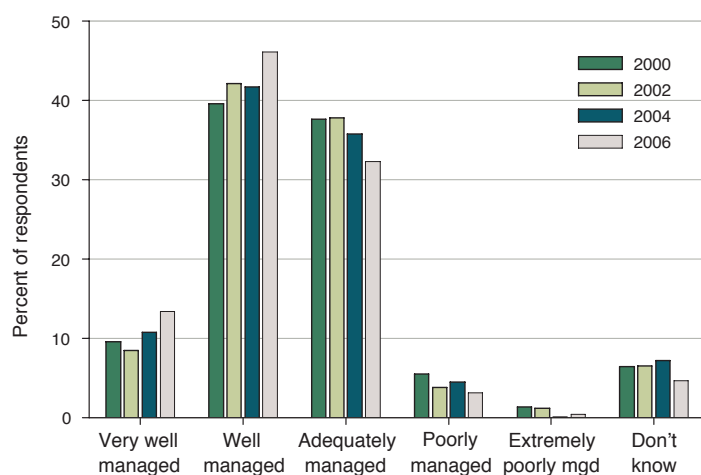


Figure 4.10b. Perceptions about management of national parks (P<0.001).

4.10 NATIONAL PARKS

Scientific information on state and trends

New Zealand has more than nine million hectares - a third of New Zealand - protected in national parks and other reserve areas. While these areas embody a remarkable variety of landscapes and vegetation types (www.doc.govt.nz), an incomplete range of environments and ecosystems are represented within the country's protected area network (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 (see Figure 3.13i) on national parks are 'pests and weeds' (57-58% of respondents) and 'tourism' (42-51%). Respondents report national parks are adequately to well managed (Figure 4.10b) with improvement occurring over the four 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 very positively, including their management.

New Zealanders clearly perceive the quality of freshwaters to be worsening, although most feel the quality is still adequate or better. Below: contemplating the emerald green waters of the lower Nina River, Lake Sumner Forest Park (photo S. McMurtrie).



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 (MfE, 1997). A Sustainable Management Fund project on the co-ordinated monitoring of NZ wetlands, including classification and assessment of wetland quality, has been developed (Clarkson et al. 2003) but there are insufficient results to determine the overall state of wetlands (Jonet Ward, Lincoln University, pers. comm. 2004). 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 Convention¹”.

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

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 four surveys (Figure 4.11a). The area of wetlands is considered to be moderate, with almost equal numbers (15-

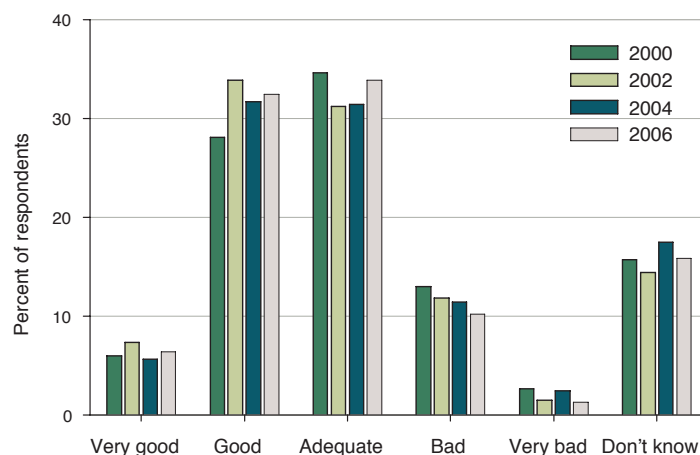


Figure 4.11a. Perceived condition of wetlands.

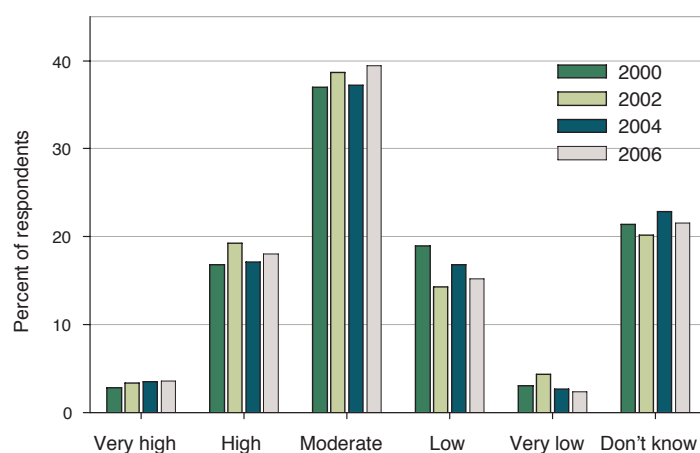


Figure 4.11b. Perceived area of wetlands.

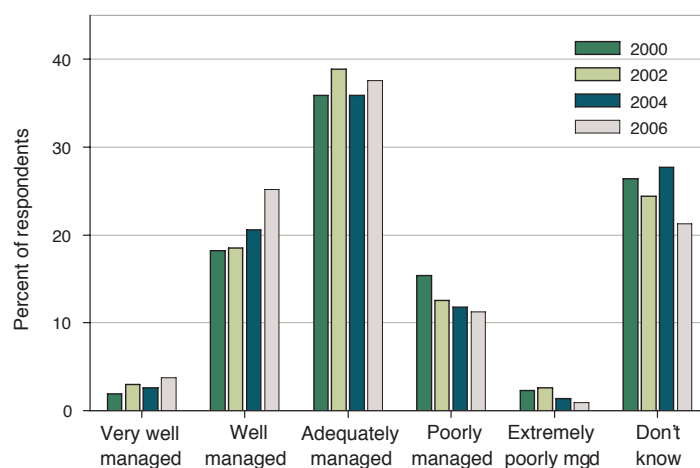


Figure 4.11c. Perceptions about management of wetlands ($P < 0.01$).

¹ The Ramsar Convention is the Convention on Wetlands of International Importance adopted in 1971 and signed by New Zealand in 1976.

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 (see Figure 3.13j) are 'pests and weeds' (34-44% of respondents), 'farming' (29-35%) and 'urban development' (28-30%). Wetlands are considered to be adequately to well managed, with an increasing proportion expressing very positive views about wetland management (Figure 4.11c).

Commentary

There is a lack of knowledge about 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 70% of respondents consider the condition or quality of wetlands to be adequate to good.

Respondents continue to rate wetlands as in adequate to good condition, and have a similar view of their management. Wetlands, however, are under pressure from anthropogenic sources and management does not always appear to be successful. Below: interpretation panels at the upper Ahuriri Valley, South Island, help to engage visitors (photo K. Hughey).

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.

The Environmental Sustainability Index (ESI) is a joint initiative of the World Economic Forum's Global Leaders for Tomorrow Environment Task Force, The Yale Center for Environmental Law and Policy, and the Columbia University Center for International Earth Science Information Network (CIESIN). The ESI provides a measure of overall progress towards environmental sustainability, developed 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 (See Esty et al. 2005). Overall, New Zealand ranks 14th of 142 nations evaluated in



the ESI - it ranks highly for water quantity, water quality, and for air quality and badly for biodiversity loss. Given the above it would be appropriate to conclude that the state of the New Zealand environment is broadly comparable to nations in the upper quartile of the ESI.

An alternative ranking, the Environmental Performance Index, has been released on a trial basis in 2006. It has been built around two objectives: 1) reducing environmental stresses on human health; and, 2) protecting ecosystem vitality (Esty et al. 2006). New Zealand is ranked 1st of 133 nations evaluated in this index, and is seen 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 overfishing.

Overall then, evaluated against both indices New Zealand can be considered to be performing well against other 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

Massey University (2001) found that 42% of people do not believe New Zealand is clean and green. However, that does not mean that New Zealanders evaluate the quality of their environment negatively when compared with other countries. Survey responses reinforce the view that New Zealanders believe they live in a cleaner and greener environment than is 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.

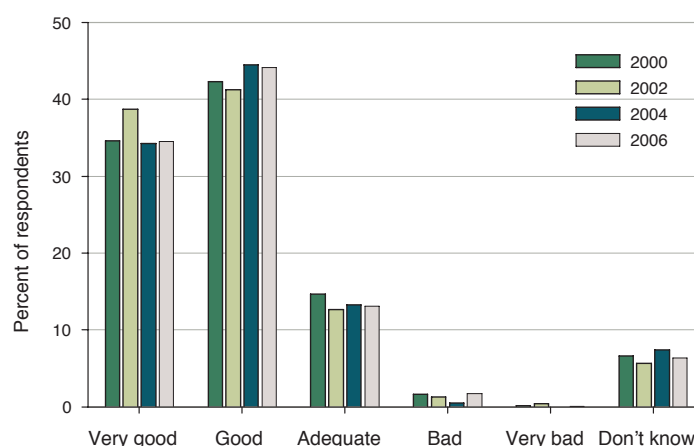


Figure 4.12a. Perceived condition of New Zealand's natural environment compared to other developed countries.

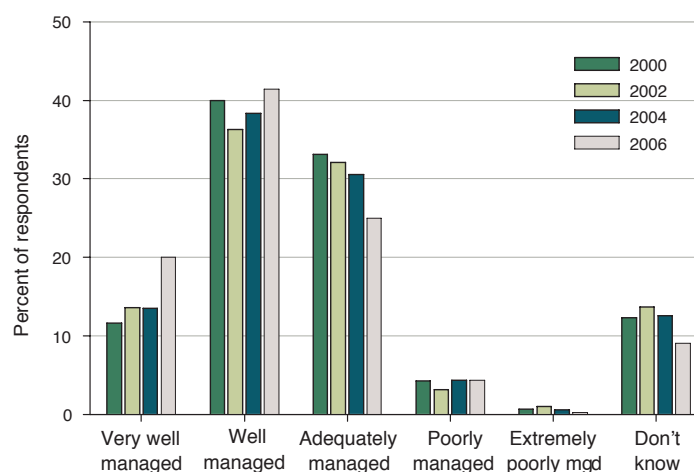


Figure 4.12b. Perceptions about current management of New Zealand's natural environment compared to other developed countries ($P < 0.001$).



05

View of Auckland City by night (photo Shutterstock)

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 ASSESSMENT OF THE STATE OF THE ENVIRONMENT

Respondents believe the standard of living in New Zealand is good. Their assessment is that New Zealand is a 'clean and green' land, although their responses are a little less positive than in 2002 or 2004. Respondents indicate the state of the New Zealand natural environment is good to adequate. New Zealanders judge that they have good knowledge of the environment. While the quality of the knowledge they have is unknown, their concern about the environment is evident, with more than 50% of respondents participating in eight different environmental activities during the past year (Figure 3.18).

5.2 PRESSURES ON THE ENVIRONMENT

The New Zealand economy has grown strongly during the period of the four surveys (2000-2006), with cumulative GDP growth of 22.3%. During the same period the New Zealand population has grown by 7.3%. Growth in the economy can increase pressures on the environment. Each of the four 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 including farming, forestry, tourism and fishing, is increasing pressure on components of the environment.

- Respondents in 2006 judged that water and air

quality are the most important environmental issues facing New Zealand. Other forms of pollution (including waste disposal and industrial pollution), global warming/climate change, urban sprawl/environment, sustainable management of resources, and transport were also stated to be important environmental issues (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, and it has been an increasing influence over time (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 be exerting considerable pressure on native forests and bush. Farming was judged to be damaging native land and freshwater plants and animals. 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 3.4).



- The surveys have not sought direct comment from respondents on the source of pressure on New Zealand's stocks of oil and gas. However, concerns about supplies of these resources are likely to be linked to continued economic and population growth and limited success in finding new oil and gas reserves.

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 four surveys asked respondents to assess the state of nine components of the environment.

- In the first two surveys New Zealanders rated the state of marine fisheries as worse than other parts of the environment. However, the 2004 and 2006 surveys, which disaggregated freshwater into two separate categories, indicated that rivers and lakes are rated slightly worse than marine fisheries (Figure 3.5).
- Three distinct clusters reflected the perceived availability of natural resources in New Zealand. 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. Area of marine reserves, area of wetlands, amount of groundwater, amount of freshwater in rivers and lakes, and quantity of marine fish were rated as having moderate availability. Oil and gas reserves were perceived to be increasingly scarce over the surveys (Figure 3.7).
- The downward trend in perceptions of the amount of oil and gas reserves continued. On the other hand there is an increasing perception

that the area of marine reserves is increasing. Both trends reflect reality. Perceptions about availability of all other resources are static, or there is insufficient 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. However, this statement conceals a wide range of views held about specific parts of the environment.

- For rivers and lakes, marine fisheries, air quality, groundwater, coastal waters and beaches, more than 20% of respondents thought that management was poor or very poor. Around the same proportions, slightly more in some cases, considered the same resources to be well to very well managed. Management of New Zealand's natural environment compared to other developed countries and of national parks, were both rated significantly more highly than other parts of the environment (Figure 3.11).
- Across the four surveys, air quality, marine fisheries, coastal waters and beaches, and soils have consistently been rated the worst managed environmental sectors (Figure 3.12). Separate questions for rivers and lakes and groundwater have been included only in the 2004 and 2006 surveys and, while ratings are relatively lower than some other resources, there is insufficient data to determine temporal trends.

Farming maintained its prominent position as a perceived source of pressure on the environment, particularly on fresh waters. Below: the huge semi-circular paddocks and lack of shelter belts are designed to allow the automatic movement of large central-pivot irrigation systems that are seen by some as the solution to the higher water usage of dairy farm conversions in Canterbury (photo S. McMurtrie).





06

Kea at the Arthur's Pass Viaduct - the viaduct is a land transport solution to environmental and hazard management issues (photo Shutterstock)

SPECIAL TOPICS

In this section three topic areas of contemporary interest are examined. First, research is presented into land transport and potential ways and means of internalising its social, environmental and related externalities. The second part deals with a range of issues related to people's perceptions of sources and quality of environmental information. Finally, people's concerns about government priorities, their own priorities, and an evaluation of the performance of key agents of environmental change are reported. Appendix 3 reports data for each of the items addressed in this chapter.

6.1 LAND TRANSPORT

6.1.1 Introduction

New Zealand and many other countries face a range of unresolved transport related social, environmental and economic issues. Recent New Zealand debate has focused around major congestion issues, around proposals for a carbon tax on transport fuels, and on the death toll associated with traffic accidents. The recent dramatic rises in fuel prices have raised even more issues and these are being hotly debated. The government has been intensely involved in these debates and in early 2006 opened a range of initiatives to public discussion (Ministry of Transport 2005). Over recent years the Ministry has commissioned wide ranging research to quantify the impacts of transport, which indicates a range of social, environmental and economic costs that are not being internalised or managed on a true cost basis (Fisher et al. 2002, Booz Allen Hamilton 2005, Ministry of Transport 2005). Policy options to address these matters include some potentially unpalatable choices, such as increasing taxes on fuels to address climate change policy requirements.

Clearly, issues surrounding sustainable and integrated transport management are topical and worthy of further investigation (May et al. 2006, May and Tight 2006, Zhang et al. 2006). Much of the research effort is focused on integrated systems development (e.g., Ülengin et al. in press) and on transport optimisation strategies (e.g., Zhang et al. 2006). Although both May and Tight (2006) and Zhang et al. (2006) acknowledge the importance of public acceptability of policy options, it is not clear how these concerns have been combined in their proposed tools for integration. Perceptions research is widely incorporated into aspects of transport planning. Some examples relevant to this research include Johansson et al. (2005),

who examined how attitudes and personality affect transport mode choice, Podgorski and Kockelman (2006), who assessed public perceptions of toll roads, and Schade and Baum (2006), who examined reactions towards the introduction of road pricing. None of this research has examined the broader range of social, environmental and economic costs of land transport. Some of these concerns are addressed in the present study, which reports people's perceptions about a range of transport related issues, including policy approaches to address externalities associated with land transport. The following section summarises the survey and analysis methods used.

6.1.2 Methods

In preparing the transport case study relevant literature and policy documents were first reviewed. Liaison then occurred with Ministry of Transport policy analysts in Christchurch and Wellington. Topics and finalised questions were developed in an iterative manner until agreement was reached on the final set. Pretesting was undertaken and changes made as appropriate.

Contextual questions addressed:

- current ownership and use of private vehicles;
- people's perspectives on public transport;
- the extent of satisfaction with the land transport system; and
- perceived trends in traffic congestion.

Road users have major impacts on society and the environment through costs of road building and maintenance, air pollution, noise pollution, water pollution, habitat loss and other outcomes not covered directly by road users. These impacts cost about \$1.2 billion per year (Booz Allen Hamilton, 2005), with each vehicle's share of these costs being about \$600 per year. Estimates of the proportions of total costs paid by different types of vehicle

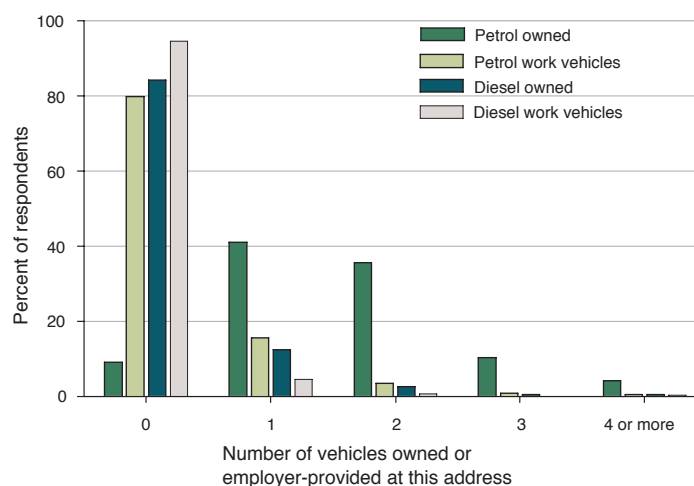


Figure 6.1. Light vehicles at respondents' homes.

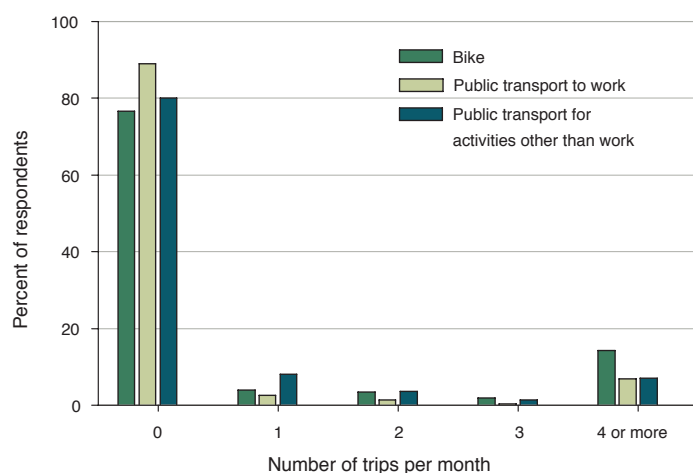


Figure 6.2. Bike and public transport use.

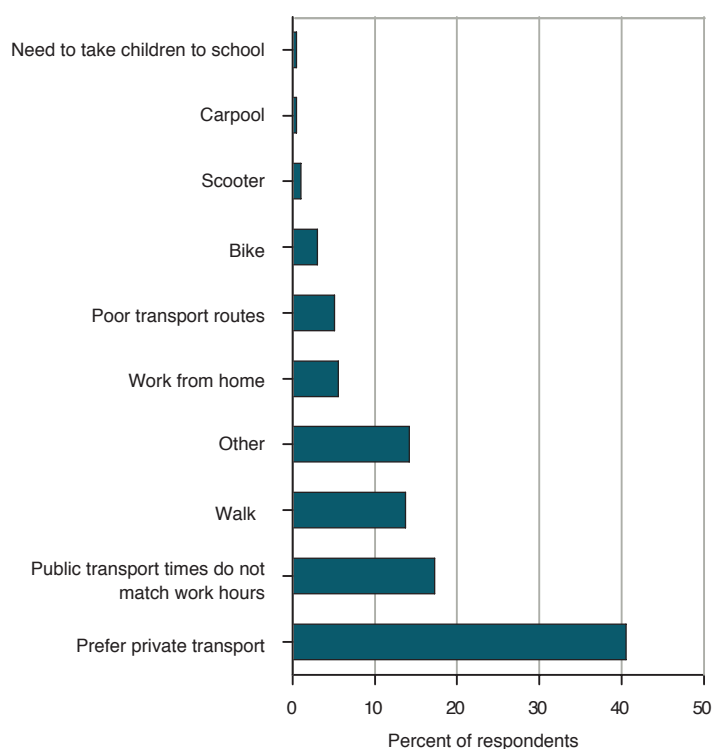


Figure 6.3. Reasons for not using public transport.

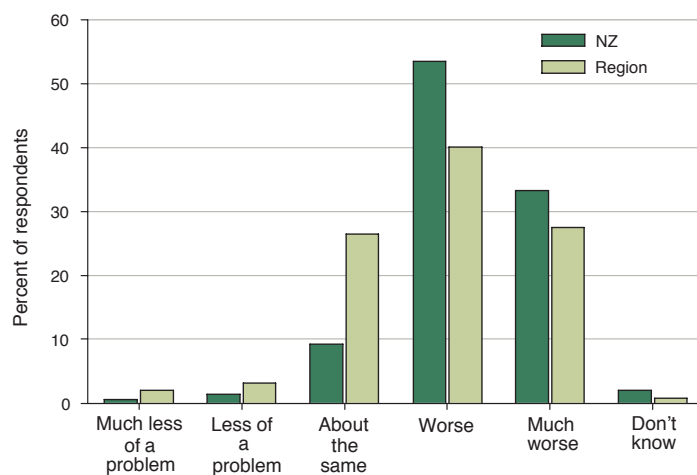


Figure 6.4. Changes in national and regional traffic congestion.

operators are: trucks - 56%, cars - 64%, and buses, 68%.

In the first instance the survey explored people's willingness to pay for road use impacts. Second, the survey explored support for a range of methods of paying for these costs, assuming the costs would be paid by transport users. Finally, support for some alternative broad policy tools, which have a range of impacts, was examined. In order to identify factors influencing levels of support for cost internalisation mechanisms, exploratory analysis has been undertaken using an ordered logit model.

6.1.3 Results

Transport context

Questions were asked about the use of cars and other forms of private and public transport to help explain responses to the policy-related questions (Figure 6.1). Over 95% of respondents reported at least one motor vehicle in their household. On average, households had access to 2.18 cars, vans or light trucks. When adjusted to conform with NZ census classifications this figure declines to 1.73 vehicles per household, slightly more than the NZ census result of 1.52. The discrepancy might be explained by over-representation of people with higher incomes in the current survey. A minority of respondents used bikes or public transport (Figure 6.2).

Respondents were asked why they chose not to use public transport for work purposes if it was reasonably accessible (Figure 6.3). This question was not relevant for some people (e.g. retirees), so they have not been included in the analysis. Only two substantive reasons are given, timing and routing related issues, and the need to take children to school, which together amounted to 28% of responses. The remaining responses merely reflect people's preferences for alternative options.

People's views of trends on traffic congestion and the quality of the transport system were investigated. Overall, most people considered national traffic congestion to be getting worse (Figure 6.4). When asked to assess changes in traffic congestion in their own region people were more favourable in their evaluations than they were in assessing the national situation (Figure 6.4). There were no differences in

national perceptions by region. Perceptions about changes in traffic congestion in the respondent's home region did vary by region (Figure 6.5), with respondents from Northern being much more likely to express very negative views ($P=0.000$).

Respondents were asked to compare land transport systems across New Zealand (Figure 6.6). The majority of respondents judged the quality of passenger rail much more poorly than either bus or roading systems, the latter of which gained positive ratings from over 75% of respondents.

The quality of the nation's roading system (Figure 6.7a) was rated more highly by Southern respondents ($P=0.01$). Northern residents gave a much lower rating (Figure 6.7b) to their region's roads than did residents of other regions ($P=0.000$).

There was a similar pattern of views about the national bus system (Figure 6.7c), with Northern respondents being significantly more negative in their views ($P=0.000$). However, there were no significant differences between respondents' views of their regions' bus systems, with most reporting them to be adequate to poor (Figure 6.7d).

The main reasons for not using public transport were related to timing or routing issues, and the need to take children to school. The majority of respondents also felt their region's bus system was adequate to poor, with Northern respondents being more negative in their views. Below: the iconic tram overlooking downtown Wellington (photo Shutterstock).

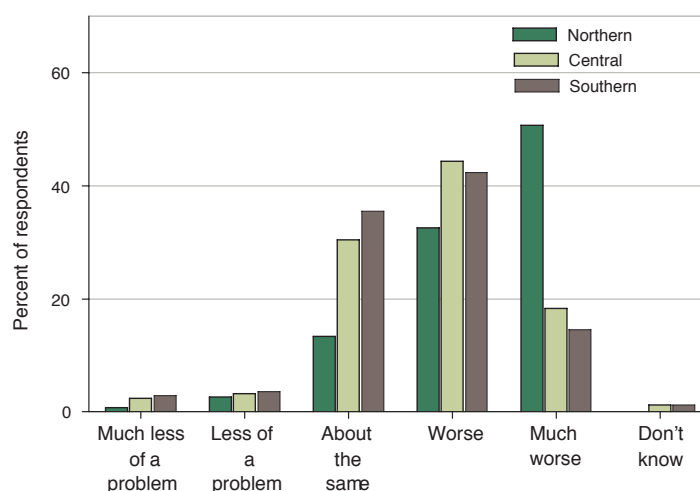


Figure 6.5. Changes in regional traffic congestion, by region.

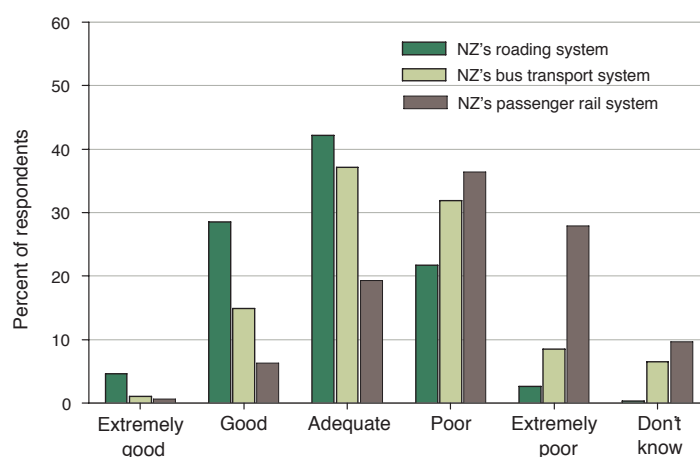


Figure 6.6. Quality of transport systems.



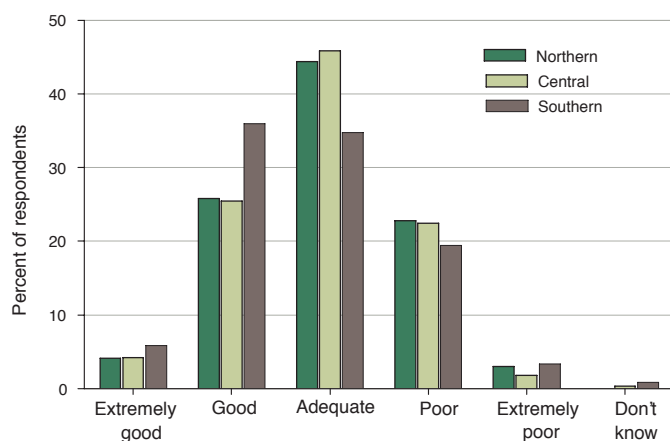


Figure 6.7a. Quality of New Zealand's roading system, by region.

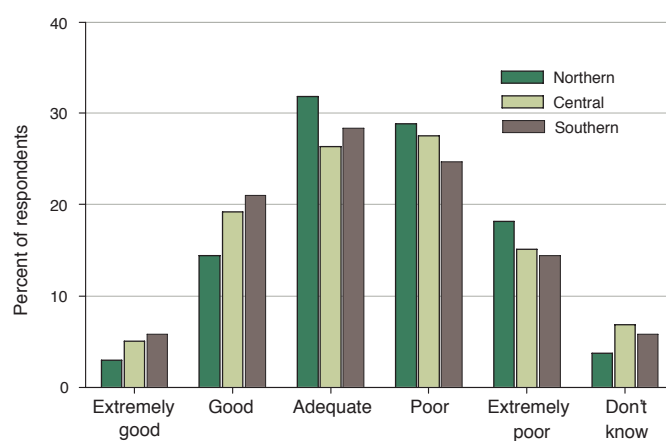


Figure 6.7d. Quality of my region's bus transport system, by region.

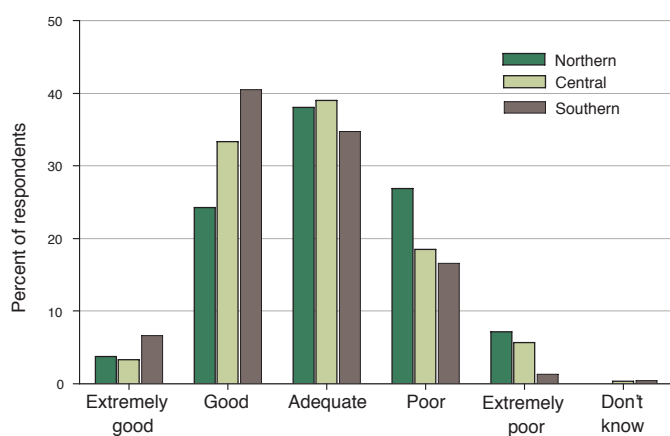


Figure 6.7b. Quality of my region's roading system, by region.

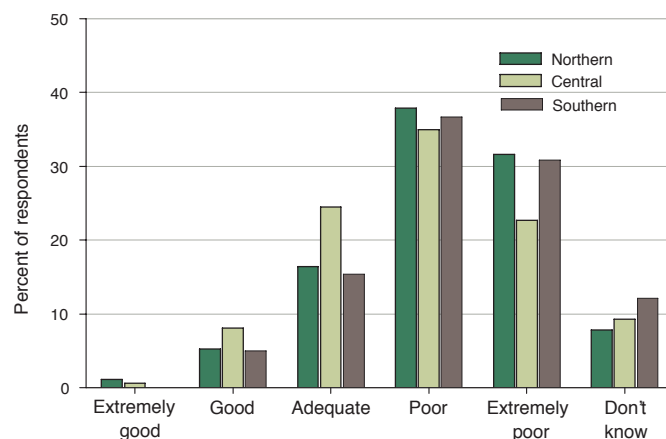


Figure 6.7e. Quality of New Zealand's rail system, by region.

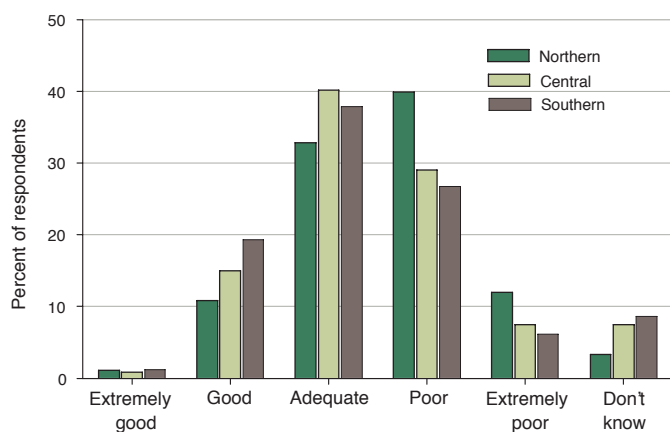


Figure 6.7c. Quality of New Zealand's bus transport system, by region.

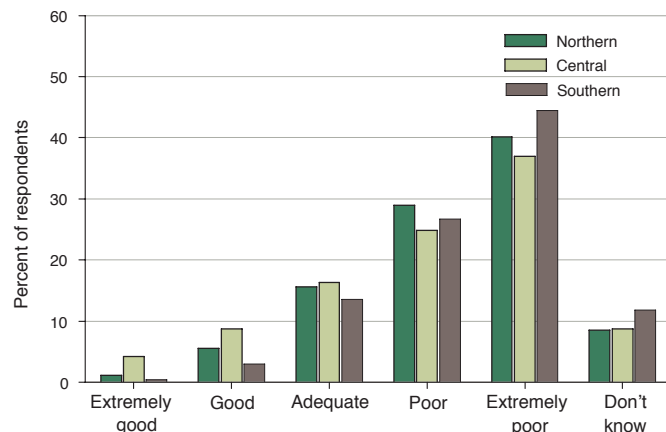


Figure 6.7f. Quality of my region's rail system, by region.

Finally, perceptions of the rail system were mostly poor or very poor at both national (Figure 6.7e) and regional (Figure 6.7f) levels of analysis. For both of these analyses ($P=0.006$ and $P=0.000$ respectively) the Rest of the North Island had a more positive view than other New Zealanders ($P=0.002$), probably attributable to the urban rail transport system in Wellington.

Willingness to pay for road use impacts

The following proposition was put to respondents:

'Road users have major impacts on society and the environment, for example, air pollution, noise pollution, water pollution and habitat loss. It has been estimated that these impacts cost about \$1.2 billion per year and are not covered directly by road users. If each vehicle was charged their full share of these costs then this would be around \$600 per vehicle per year'.

Respondents were then asked whether or not they agreed with the following: 'The full costs of vehicle use, including social and environmental costs, should be paid for by vehicle owners'. Most people would not be willing to pay for their road user impacts (Figure 6.8). People who use public transport for travel to work are more frequently willing to pay the full costs of their road use impacts ($P=0.02$).

Options for paying for impacts

A further question was asked about methods of paying for road transport damage. The question was preceded by the following statement:

'Suppose it had been decided that vehicle owners must pay full costs of road use including all of the environmental and social costs. Please indicate your views about the following payment methods. Note that ALL revenue collected would be used specifically for road building and maintenance and meeting environmental and social costs from road use'.

Five options were assessed on a five-point Likert scale anchored by strongly support (1) and strongly oppose (5). Almost all options were either opposed or were strongly opposed, although there was moderate support for the introduction of road user charges for all vehicles. Higher fuel taxes were strongly opposed (Figure 6.9). Ranked mean Likert scores of

the options, from most opposed to least opposed were:

Higher fuel taxes	most opposed 3.8
Higher registration fees	3.6
Higher passenger fares or freight charges	3.4
Increase road user charges for existing users	3.4
Introduction of road user charges for all vehicles	3.2 least opposed

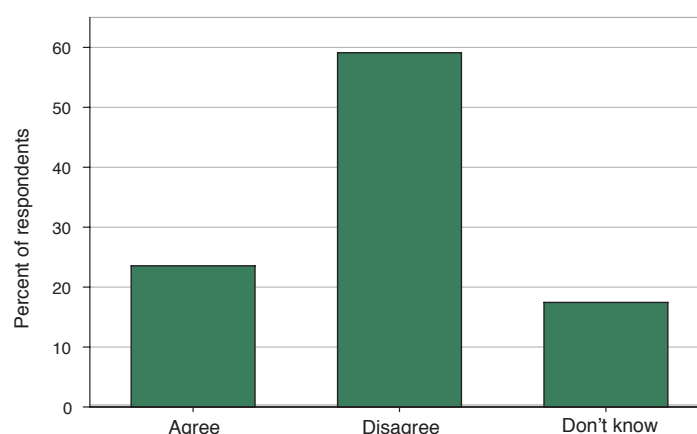


Figure 6.8. Willingness to pay the full costs of road user impacts.

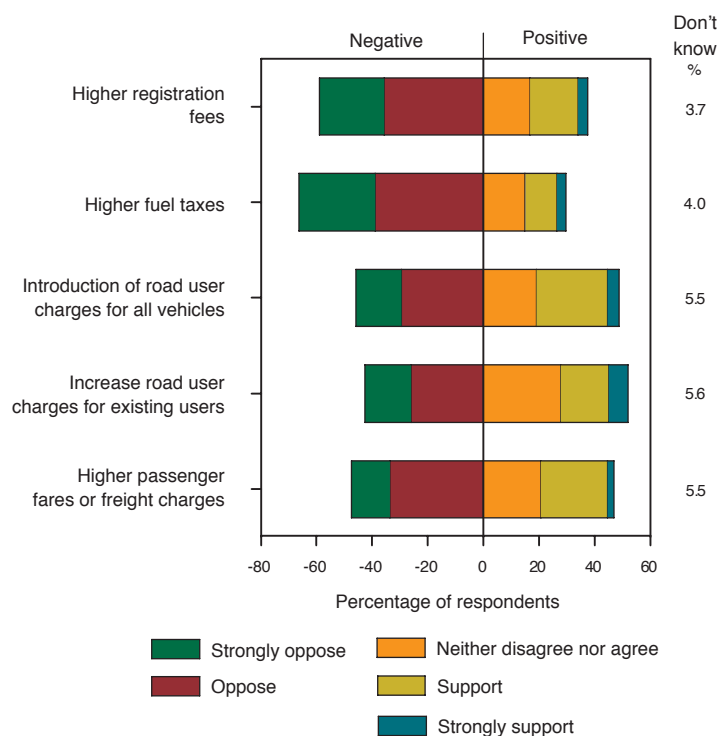


Figure 6.9. Acceptability of payment methods for road transport costs.

Targeting impacts

Perhaps the most difficult of the questions addressed broad policy options which result in different combinations of impacts. Respondents were presented with Table 6.1, which incorporated an evaluation of some of the benefits and costs of four options for reducing road transport impacts. They were then asked: 'based on the above what do you think about each of the four options?' The options were assessed on a five-point Likert scale anchored by strongly support (1) and strongly oppose (5).

Mean Likert scores were:

Fuel use efficiency standards for new cars	most support 1.7
Exhaust gas standards for all cars	1.9
Speed reduction	2.7
Road user charges	2.9 least support

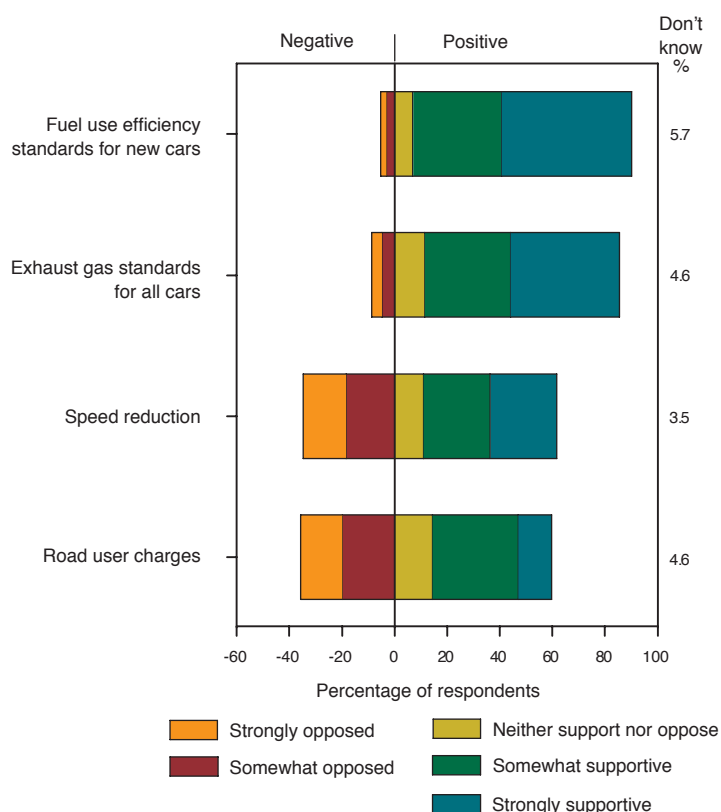


Figure 6.10. Support for policies.

As shown in Figure 6.10, exhaust gas standards for all cars and fuel use efficiency standards for new cars were much more strongly supported than the other options ($P < 0.000$). It is notable that the two options that either have the narrowest range of benefits (exhaust gas standards for all cars), or would apply to only a relatively small proportion of the vehicle fleet (fuel use efficiency standards for new cars), are the two most highly supported.

Factors influencing responses to these questions were analysed using ordered logit models (Table 6.2). Support for options 1 and 2 appear to be influenced by different factors than options 3 and 4. For example, females and public transport users were more supportive of increased road user charges and reduction in the open road speed limit (options 1 and 2), but those factors did not influence support for options 3 and 4. People from households that owned large numbers of vehicles supported fuel use efficiency standards and exhaust gas standards (options 3 and 4) at lower levels than did households with fewer vehicles. One effect common to all options was that people

Table 6.1. Policy options and their likely benefits.

Likely effects of implementing each option:	Option 1: New and/or increased road user charges, based on distance travelled and size of vehicle	Option 2: Open road speed limit reduction from 100 to 90 kph	Option 3: Fuel use efficiency standards for new cars	Option 4: Exhaust gas quality standards for all cars
Less Green House Gas emissions	✓	✓	✓	✗
Less other pollutants	✓	✓	✓	✓
Fewer and less severe accidents	✓	✓	✗	✗
Reduced vehicle running costs	✗	✓	✓	✗

born in New Zealand were less supportive of each option than were respondents who were born abroad.

6.1.4 Discussion and Policy Conclusions

New Zealanders judge that their roads, bus and rail services are of adequate to poor quality. There is a widespread perception that traffic congestion is increasing in New Zealand, but more especially in the Auckland region. Most people judge that there are few viable alternatives to cars for commuting to work. New Zealanders are not willing to pay the full costs of road transport. This places policy makers in a difficult situation - they face the prospect of dealing with social and environmental problems with an unwilling group of stakeholders. In such situations what can policy makers do to progress what is increasingly being referred to as a 'wicked' problem (Bardwell 1991)?

A clear majority were opposed to paying directly for the problem. However, there was slightly more support when five

methods of compulsory payments were assessed (although it should be noted that higher fuel taxes were especially strongly opposed). Given that overall willingness to pay was low, and that support for individual payment methods was generally only slightly higher, it is important to assess how integrated and targeted responses to the range of externalities might be perceived. Overall, there was a much higher level of respondent support for targeted options than those considered in the payment methods approach. Targeting appears to provide more publicly palatable policy prospects.

Female respondents and public transport users were more likely to support road user charges and speed reduction. Respondents were informed that both these options lead to 'fewer and less severe accidents'. Conversely, people born in New Zealand are less likely than others to be supportive of any of these policies. Given the size of this group, a strategy to change their perceptions is likely to be necessary to obtain political support for adoption of any policy changes of the nature considered here. Detailed analysis provides policy makers with insights into the demographics of acceptable policies, thus increasing the likelihood that targeted policy actions will be successful. There are significant differences between sectors of road users, implying that diverse methods may be needed to convince different people to support any of these policies. Further investigation of reasons for support of or opposition to specific road policies seems warranted. A summary of all these findings is displayed in Figure 6.11.

Table 6.2. Influences on support for policy options.

Level of Support	Option 1: New and/or increased road user charges, based on distance travelled and size of vehicle	Option 2: Open road speed limit reduction from 100 to 90 kph	Option 3: Fuel use efficiency standards for new cars	Option 4: Exhaust gas quality standards for all cars
More supportive	Females*	Females****	-	-
	-	Age**	Age**	Age****
	Bike riders**			Bike riders***
	Public transport users**	Public transport users **	-	-
	Degree****	-	Degree**	-
	-	Maori**	-	-
Less supportive	Born in NZ**	Born in NZ****	Born in NZ***	Born in NZ**
	-	-	Maori***	-
	-	-	Pacific**	Pacific***
	-	-	Asian***	Asian*
	Other ethnicities**	Other ethnicities**	-	-
	-	Wealthy***	Wealthy*	-
	-	-	Number of vehicles owned**	Number of vehicles owned***

The number of asterisks indicates the strength of significance: * Significant at $P < 0.05$, ** Significant at $P < 0.01$, *** Significant at $P < 0.001$. Ethnic categories used were: Maori, NZ European, Pacific Island, Asian, Other.

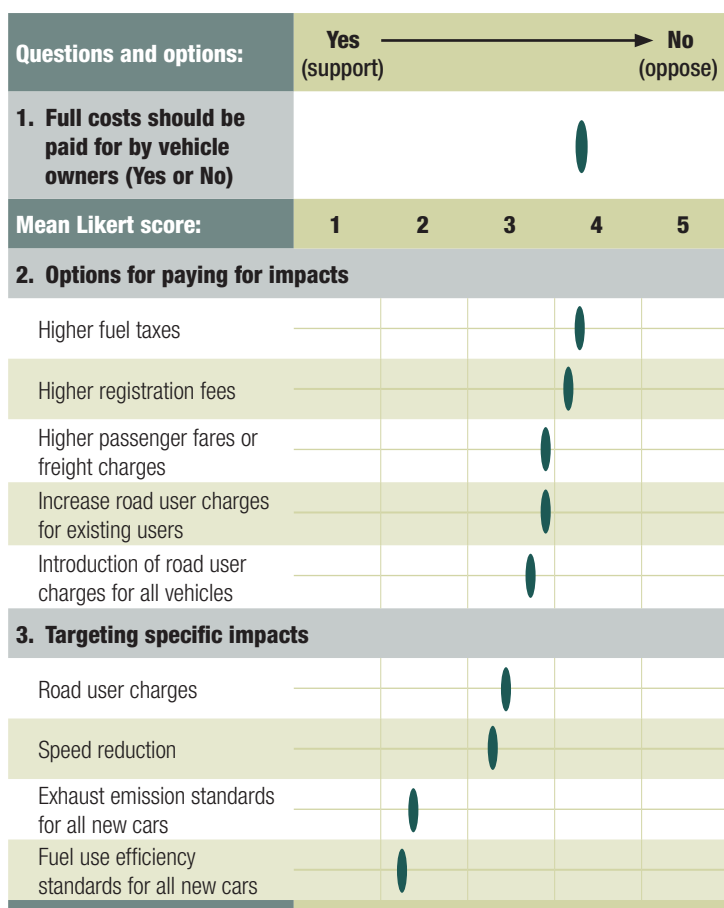


Figure 6.11. Summary of support for externalities management tools.

6.2 SOURCES AND RELIABILITY OF ENVIRONMENTAL INFORMATION

6.2.1 Introduction

In order to understand and promote changes in perceptions, attitudes and behaviours related to the environment it is important to identify where people obtain environmental information and the level of credence given to alternative sources of environmental information. These matters were broached with the following questions:

- 'What are your main sources of environmental information?' Respondents were asked to rank their top three sources.
- 'How reliable are the following sources of environmental information?'

Respondents feel that traffic congestion is increasing, but that there are few viable commuting options to cars. The fact that they are not willing to pay the full cost of road transport places policy makers in a difficult position. In this regard, targeting options (as opposed to the payment methods approach) appear to provide more publicly palatable policy prospects. Below: the increasing traffic levels on one of Christchurch's main roads into the city (photo G. Kerr).



6.2.2 Results

Television and newspapers were the most important sources of environmental information for the majority of people (Figure 6.12).

Figure 6.13 compares perceived reliability of sources of environmental information. While there are high frequencies of 'don't know' responses for some sources, the overall picture is clear - scientists achieve a high reliability rating and reliability of information from businesses is rated lowly.

Reliability was assessed on a five-point Likert scale, anchored by very reliable (1) and very unreliable (5). The ranked order of the average response from most to least reliable is:

Scientists	most reliable 1.83
Government departments	2.23
Lobby groups	2.46
Inter-governmental organisations	2.51
Regional councils	2.52
The media	2.93
Businesses	3.38 least reliable

Consistent with Figure 6.13, business has an overall negative rating, whereas scientific sources of information are seen as being very reliable. Lobby groups are judged to be more reliable than regional councils and inter-governmental organisations.

6.2.3 Discussion and Conclusions

Three implications stand out. First, the popular media (television and newspapers), are the main sources of environmental information. Policy makers, lobby groups and others would be wise to concentrate their activities with these media to reach the widest audiences. Second, television and newspapers are not trusted sources of environmental information: scientists and government agencies are clearly seen as being much more reliable than are the popular media and, more especially, businesses. Given their important roles in New Zealand so-

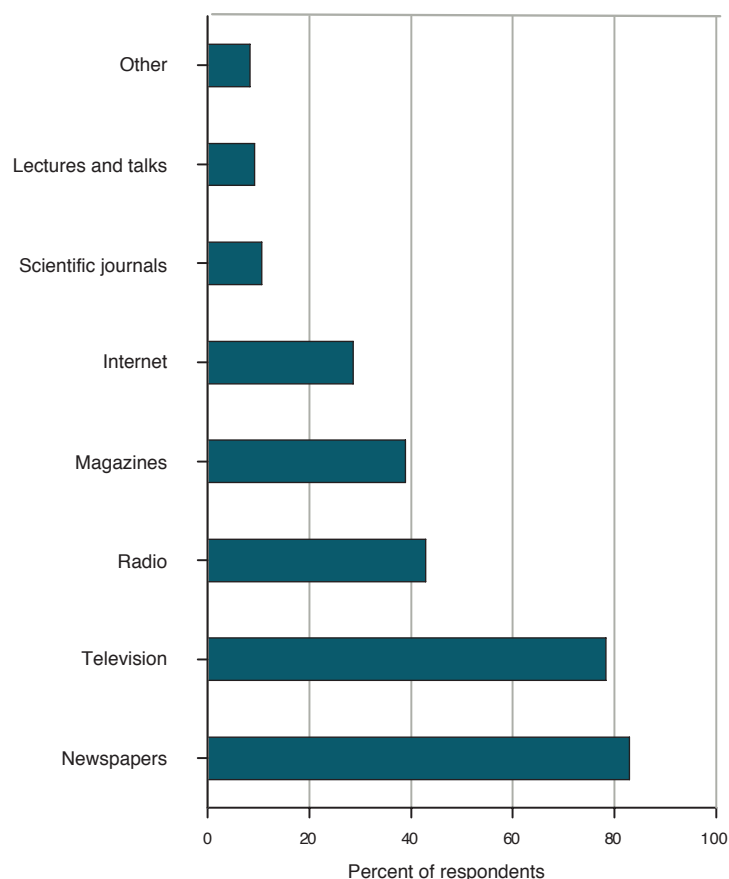


Figure 6.12. Main sources of environmental information.

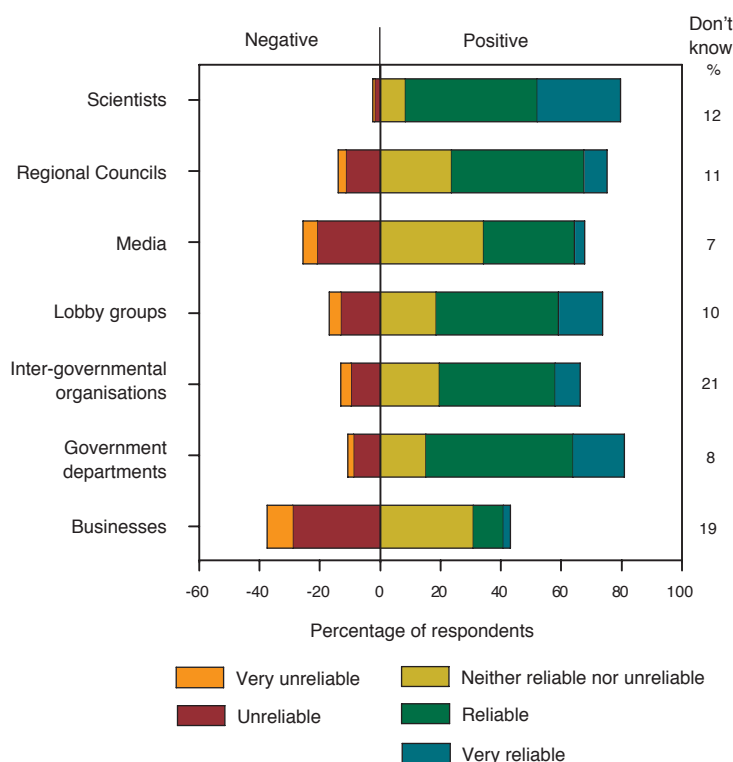


Figure 6.13. Reliability of environmental information sources.

ciety and the economy, both the popular media and businesses need to carefully consider the implications of such findings for their reputations. People are unlikely to change their own behaviours or to support environmental policies if they are unaware of environmental issues, or if they do not believe the information they receive about the environment. Enhancing prospects for change requires reaching the intended audience and ensuring they trust the information source. Putting the two together indicates the need for scientists and government agencies to become more active in disseminating environmental information through newspapers and television.

6.3 GOVERNMENT AND PERSONAL PRIORITIES AND PERFORMANCE

6.3.1 Introduction

The Growth and Innovation Advisory Board (2004) for New Zealand and the Department of Environment and Conservation (2004) for New South Wales have both recently commissioned public surveys to assess the relationship between national or state government priorities and individual priorities associated with the environment, education, health and other matters. In this survey five questions were asked around similar issues.



Scientists and government departments were ranked as the most reliable source of environmental information. However, scientific journals are rarely accessed by respondents, with popular media (e.g., television and newspapers) ranking as the most widely used source of information. Above: The multi-million dollar super computer at the University of Canterbury is used by scientists to model environmental scenarios covering weather, atmospheric and oceanographic studies, amongst a wide gamut of other research (photo University of Canterbury).

6.3.2 Results

Government priorities

Respondents were asked to rank seven items from highest to lowest priority for the New Zealand government (Figure 6.14). The highest ranking was for a strong economy (28.2% of respondents ranked this first), closely followed by health and education, with the lowest priority given to defence (3.3%).

Ordered average rankings, on a scale of 1 (highest priority) to 7 (lowest priority), are:

A high quality health system	highest priority 2.29
A high quality education system	2.67
A strong economy	3.14
A high quality environment	3.97
A low crime rate	4.43
A fair level of superannuation and income support	5.08
A strong defence system	6.17 lowest priority

While a strong economy was the most commonly chosen top priority (Figure 6.14), when priority rankings are averaged the economy rates 3rd, with quality of the environment in 4th position. Overall, health receives the highest average ranking and defence the lowest. The four lowest priorities, including the environment, are ranked in the same order by both methods.

Individual priorities

Respondents were asked about the importance of various issues to them personally (Figure 6.15) on a five-point scale anchored by very important and very unimportant. For this question the survey adopted the approach used in the Growth and Innovation Advisory Board (2004), but with the following variations:

- the Growth and Innovation Advisory Board ten-point scale was reduced to a five-point scale, but with a 'don't know' response added;

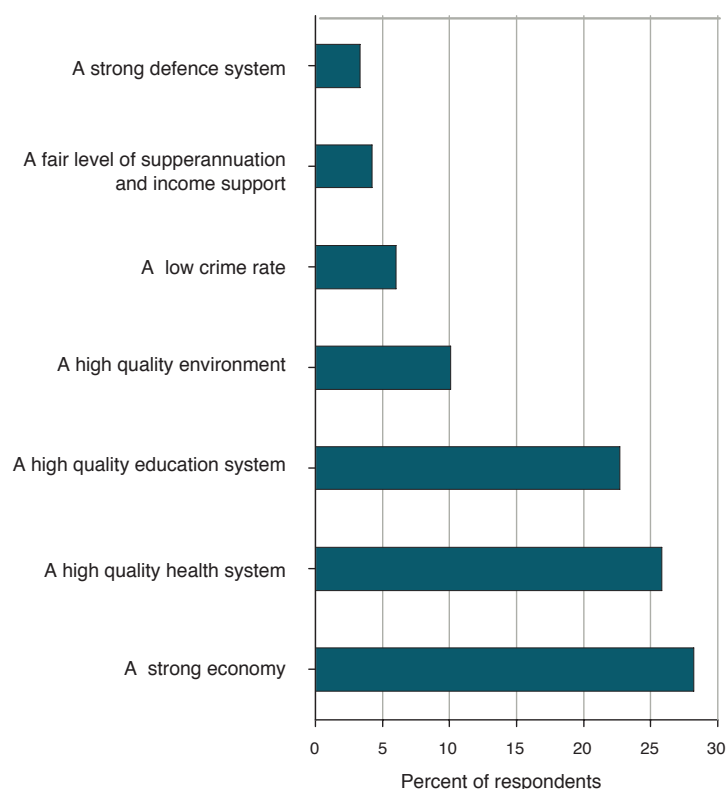


Figure 6.14. Highest priority for the New Zealand government.

Table 6.3. Personal importance (combined 'very important' and 'important' ratings).

	Growth and Innovation Advisory Board (2004)	This survey
Quality of life	93%	99%
Quality of education	83%	95%
Quality of natural environment	87%	95%
The public health system	78%	94%
Level of wages and salaries	67%	84%
Level of economic growth	67%	81%

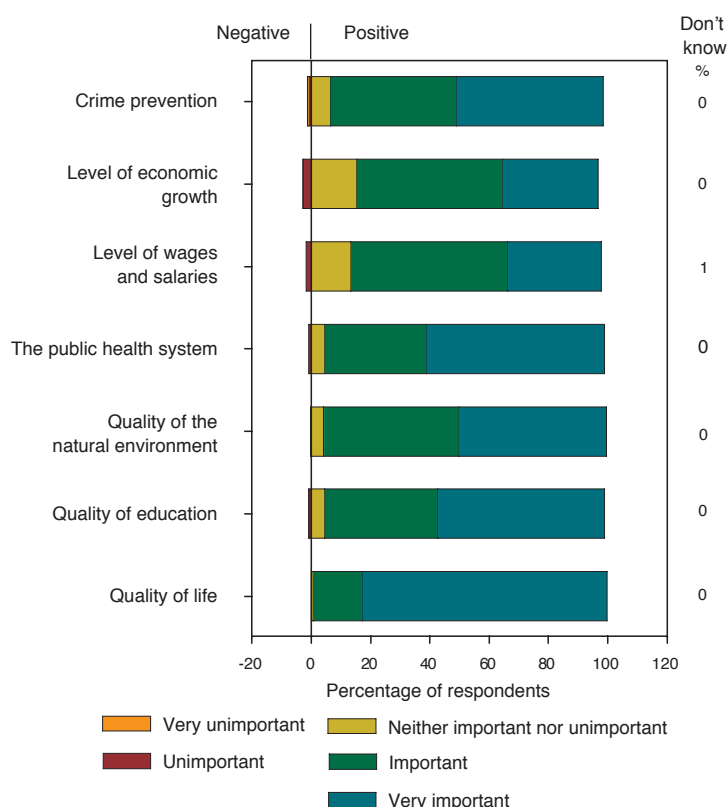


Figure 6.15. Importance of issues to respondents.

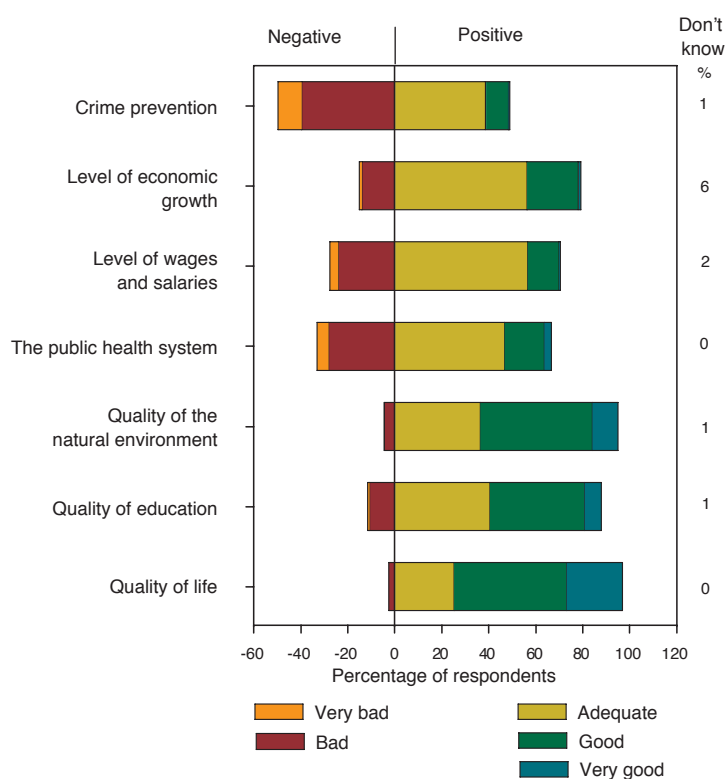


Figure 6.16. New Zealand's performance.

- whereas the Growth and Innovation Advisory Board survey had 12 categories, this survey contained only seven, including 'crime prevention' which was not in their survey.

Average Likert scores, on a scale of 1 (very important) to 5 (very unimportant), ranked from top to bottom are listed:

Quality of life	most important
	1.18
Public health system	1.49
Quality of education	1.50
Quality of the natural environment	1.55
Crime prevention	1.60
Level of wages and salaries	1.85
Level of economic growth	1.89
	least important

As with the Growth and Innovation Advisory Board (2004), this survey shows that quality of life and quality of the natural environment are more important than either the level of wages and salaries, or the level of economic growth. Again, health and education outrank the environment.

When the two studies are compared (Table 6.3) it is apparent that in this survey all items were more commonly rated as important or very important than in the Growth and Innovation Advisory Board (2004) survey. However, the ordering of items is essentially the same.

New Zealand's performance

The survey also assessed New Zealand's performance in the same areas (Figure 6.16). The highest modal responses were for quality of life and quality of the environment, for which the modes were 'good'. Crime prevention was the only aspect to record a 'bad' modal response.

Average Likert scores, on a scale of very good (1) to very bad (5), ranked from top to bottom, are listed overpage:

Quality of life	2.07 best performance
Quality of the natural environment	2.35
Quality of education	2.57
Level of economic growth	2.92
Performance in the public health system	3.15
Level of wages and salaries	3.17
Crime prevention	3.50 worst performance

Only crime prevention performance was considered overall to be less than adequate, with quality of the natural environment and quality of life both considered 'good'.

Environmental sustainability implications

Respondents were asked about the implications for New Zealand of achieving environmental sustainability. Seven categories were included with responses scored on a Likert scale anchored by strongly agree and strongly disagree (Figure 6.17).

Average Likert scores, on a scale of 1 (strongly agree) to 5 (strongly disagree), ranked from top to bottom, are listed below:

Enhance NZ's clean green image	most likely 1.65
Improve quality of life	1.94
Ensure access to recreational resources	2.04
Reduce pressure on limited resources	2.08
Enhance economic growth	2.30
Reduce climate change impacts	2.33
Lower living costs	2.94 least likely

Even for lower living costs, the lowest ranked of these implications, the average response remains positive.

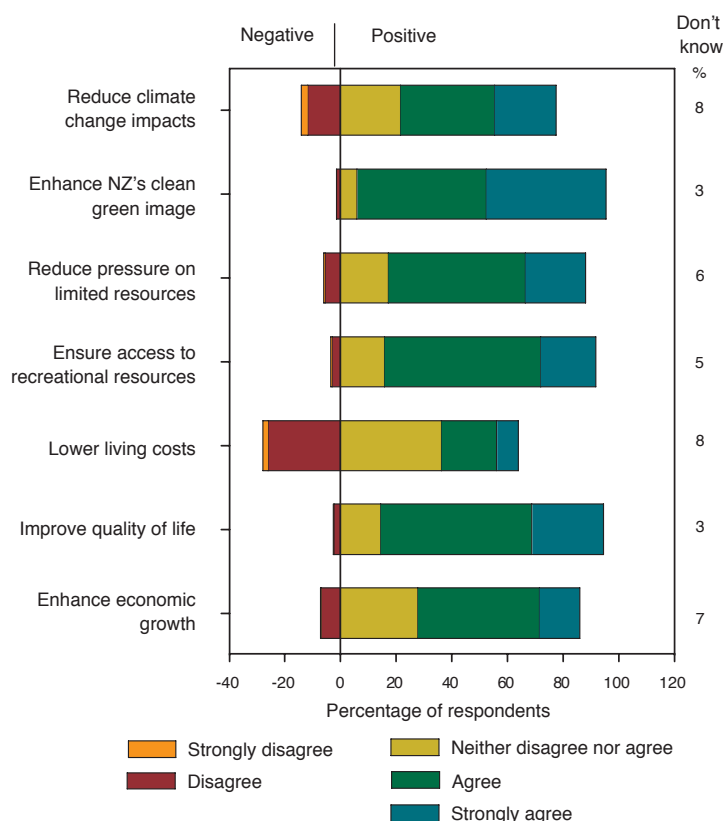


Figure 6.17. Achieving environmental sustainability in New Zealand would ...

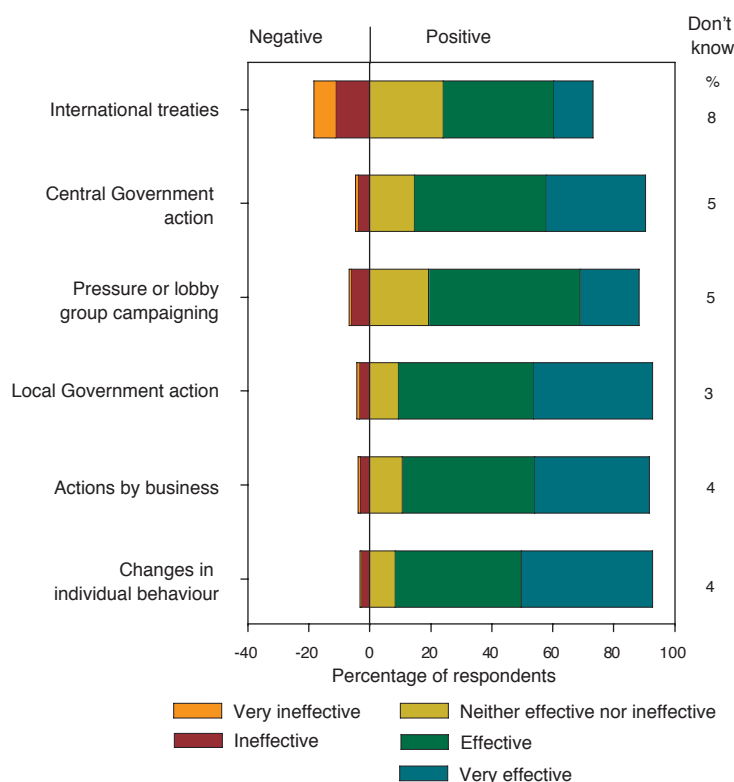


Figure 6.18. Effectiveness of actions in maintaining environmental quality.

Effect of actions

Finally, respondents were asked about the ‘overall effect’ of a range of possible actions on ‘maintaining environmental quality’. Six types of action were suggested, with respondents asked to score each on a five-point Likert scale from very effective to very ineffective (Figure 6.18).

Average Likert scores, on a scale of 1 (very effective) to 5 (very ineffective), ranked from top to bottom are listed below:

Changes in individual behaviour	most effective 1.71
Local government action	1.79
Actions by business	1.81
Central government action	1.92
Pressure or lobby group campaigning	2.15
International treaties	2.60 least effective



Respondents felt that changes in individual behaviour was the most effective action for maintaining environmental quality, and yet voluntary action by individuals has been very slow to change. Incentives from a central or local government level may be needed to spur on individual actions relating to environmental quality. Above: the curb-side recycling programme run by local councils has taken off around New Zealand, but is it really reducing the growth in waste production? (photo E. Henderson).

Most people view all actions as being effective. It appears somewhat contradictory that individual actions have received the highest rating when voluntary action at the individual level is very slow to change. However, if individuals remain unconvinced that other people will change their behaviour in desirable ways too there is little point in taking individual action. Such changes may be spurred by incentive or regulatory inducements, providing a role for central or local governments.

6.3.3 Summary and Conclusions

Nearly all New Zealanders rate quality of life to be important or very important. Fortunately, most people rate quality of life in New Zealand as good or very good, with nearly all the remainder claiming it is adequate. Importance scores for specific quality of life attributes are rated extremely uniformly, with least concern about the level of economic growth and wages and salaries. Consequently, the biggest differences between desires and performance are driven by performance. The three worst performing items are crime prevention, the public health system and wages and salaries.

Support for environmental sustainability could be hampered by perceptions that it would result in other, undesirable, outcomes. Overall, respondents judged impacts of New Zealand achieving environmental sustainability to be positive. A significant proportion disagreed that it would lower living costs. A small proportion disagreed that environmental sustainability would reduce climate change impacts, possibly because of perceived long term effects that cannot be prevented, or because people disagree that humans have caused climate change. There was near-universal agreement that achieving environmental sustainability will enhance New Zealand's clean green image and quality of life.

New Zealanders state that changes in individual behaviour are the most effective way to maintain environmental quality, although there is little difference in perceived effectiveness of this source of change and most others. International treaties are viewed as the least effective of the mechanisms tested for maintaining environmental quality.



07

Whitebaiting til sunset, Mohikinu River, Buller (photo K. Hughey)

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 model. 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 (see Gravitas Research and Strategy Ltd (2004) for their most recent results). The Waikato project has completed three biennial surveys and is embarking on its first triennial survey in late 2006. Both surveys now have the minimum three replicates to enable reports on trends in responses. In this section the main findings and implications from the 2006 PSR survey are identified and key trends over all four surveys examined.

7.1 THE 2006 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. 2005, 2006). 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 good knowledge of the environment. It is noteworthy that, while WWF et al. (2006: 14) reported that New Zealand was 9th of 148 countries in terms of the size of its Ecological Footprint¹ per capita, New Zealand has an ecocredit of biocapacity more than 50% larger than its national footprint (WWF et al. 2006: 17). The pressure on the New Zealand environment is much lower than it is in many other countries

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. Why

there is dissonance between science and perceptions for some of these items is unclear, it is one area where more research might be helpful.

New Zealanders judged that the environment was adequately managed. 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 management of rivers and lakes, air quality, coastal water and beaches, groundwater and marine fisheries lowest. The same five resources received the lowest ratings for the change in management over all surveys. There appear to be continuing issues for environmental managers here, who either need to deliver more effective management and/or are struggling to connect their initiatives with understanding or acceptance by the general public.

Over 75% of year 2006 respondents recycled household waste, bought products marketed as environmentally friendly, or had reduced or limited their use of electricity. Few respondents, however, had been involved in 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. Two activities were introduced to the survey for the first time: 54.2% of respondents had reduced or limited their use of freshwater, and 22.7% had made a financial donation to a non government organisation.

The single most important environmental issue in 2006 was again water quality (14.2% of respondents), down from 19% in the 2004 survey.

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.

Respondents stated that rivers and lakes, marine fisheries, air quality and groundwater were either poorly managed or very poorly managed. Opposite page top: Is this spraying in the South Island high country inappropriate for lake edge and native forest and bush management? (photo K. Hughey). Middle: The invasive northern hemisphere alga *Didymosphenia geminata* (didymo) was first discovered in New Zealand rivers almost two years ago. It can form massive, persistent blooms, even in low-nutrient rivers such as the Mararoa River, Southland. These unsightly blooms affect invertebrate communities and water quality, and will heavily impact on our 'clean green' image (photos N. Blair, NIWA). Bottom: Irrigators using an increasingly limited resource during heavy rainfall; is this sustainable management of our water resource? (photo K. Hughey).

¹Defined by WWF et al. (2006: 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.



7.1.2 Land transport

A case study focusing on the social and environmental externalities associated with land transport was included in the 2006 survey. Context questions were asked on vehicle ownership, patterns of public transport use, perceptions of the quality of transport systems, and changes in congestion. Responses to these questions largely confirmed widely held views, e.g. levels of vehicle ownership are high, use of public and other forms of transport are relatively low, and there are concerns about the quality of various forms of transport system within a context of growing congestion problems around the country.

These initial questions were followed by questions that aimed to explore people's attitudes to various ways of addressing the external costs associated with land transport. In the first instance respondents were provided with some general information about impacts of road use on the environment and society. They were then asked if they would be prepared to pay the full costs of road use impacts. Around 60% responded in the negative and around 23% positively. In the questions that followed respondents were asked about their support for five options, assuming they did have to pay the full costs. The majority of responses were opposed to paying higher registration fees and higher fuel taxes, with the remaining options also being considered relatively negatively. Finally, respondents were presented with a package of four options which targeted reductions to particular combinations of road user impacts. This approach led to the highest level of support amongst the range of questions asked about reducing or internalising the impacts of road use. Notably, however, the two most strongly supported of these targeted options, exhaust gas standards for all cars and fuel use efficiency standards for new cars, were the two options likely to have the smallest range of environmental and social benefits. Despite these findings, even the two lesser supported options, speed reduction and road user charges, received far higher levels of support than did options presented in the other questions.

Overall then it is clear that respondents accept that there are problems with the land transport system in New Zealand. However, if policy options are to be explored then it is clear that respondents are more likely to respond positively if they can make informed choices, as was the case here.

7.1.3 Sources and reliability of environmental information

There is increasing interest in knowing where people find information about the environment and their views on the reliability of information gained from different sources. Not surprisingly, newspapers and television were the main sources

of environmental information for around 80% of respondents. Perhaps of greater interest, however, is the perceived reliability question. Businesses were clearly thought to be the least reliable source of information, followed by the popular media. The most trusted sources are scientists, followed by NGOs and government departments. There are clear challenges from these findings, e.g. businesses wanting to promote messages of environmental responsibility need to be aware of 'greenwashing' claims and reputations, while the popular media needs to explore issues of balance and responsibility in its reporting.

7.1.4 Government and personal priorities and performance

In the 2002 survey (see Hughey et al. 2002a, Kerr et al. 2003a) a case study examined expenditure and budget preferences of respondents. In the 2006 survey no budget allocation was required, but respondents were asked to state their preferences and priorities and to evaluate various activities, some of which were similar to those considered in the Growth and Innovation Advisory Board (2004) survey. Generally speaking, respondents were likely to state that the highest priorities for the government should be health, education and the economy rather than the environment, crime reduction and other activities. When assessed as personal priorities there were some changes in rankings. People ranked quality of life, the public health system, education and the natural environment far more importantly than either the level of wages and salaries or the level of economic growth - this finding was similar to that reported by the Growth and Innovation Advisory Board (2004). In terms of New Zealand's performance, quality of life, quality of education, and quality of the natural environment were all ranked highly - lowest rankings were for crime prevention and the level of wages and salaries. Generally, respondents viewed the achievement of environmental sustainability in New Zealand very positively, with only its effect on lowering living costs viewed relatively negatively. Finally, there was support for all the alternative actions to achieve environmental sustainability suggested, with change in individual behaviour receiving the highest ranking. Findings from this survey are important and indicate the relative importance of the natural environment and quality of life in the priorities of New Zealanders.

Region

For a number of regions (Greater Wellington, Auckland, Environment Waikato and Environment Canterbury) sample sizes are sufficient to allow statistical analysis at regional council level. Despite

this opportunity we continued (with an exception in the transport case study) to concentrate on analysis of three ‘super’ regions: Northern, representing the area covered by the Northland and Auckland regional councils; Central being the rest of the North Island; and, Southern being the South Island. The key findings were that:

- Northern and Central respondents were more likely to consider ‘hazardous chemicals’ as a main cause of damage to air, whereas Southern respondents were more likely to have chosen ‘household waste and emissions’ (likely due to household heating pollution which is the major source of emissions in Christchurch and Nelson for example). Southern respondents named farming as a major cause of damage to freshwaters, whereas Northern and Central respondents were more likely to have identified ‘household waste and emissions’. The rapid rise of dairying as a land use in the South Island and the ongoing legacy of the ‘Dirty Dairying’ campaign have likely contributed to the ongoing identification of ‘farming’ as a major cause of damage.
- In terms of land transport it was clear that North-

ern respondents have much greater concerns about worsening trends in congestion and that Wellington residents, perhaps not surprisingly, are satisfied with their passenger rail system.

Ethnicity

In 2002 we undertook our first analysis of environmental issues by ethnicity of respondents. The findings in 2002, showed much higher levels of concern about the coastal and marine environment among Maori, followed by New Zealand Europeans, with other ethnicities much less concerned (See Hughey et al. 2002a, b). In the 2004 survey we undertook similar analyses for freshwater resources and also found differences in views on some issues. New Zealand European respondents were more likely to judge that farming exerts pressure on rivers and lakes, while Maori respondents were more likely

The perceived major causes of damage to natural resources differed regionally. Southerners regarded farming as a major cause of damage to freshwaters, in contrast to Northern and Central respondents who selected household waste and emissions. Below: Damage to a small stream on the Coromandel peninsula has been caused by stock accessing the stream to drink (photo S. McMurtrie).



to identify household and solid wastes as exerting pressure on rivers and lakes. 'Other' ethnicities were significantly more likely to rate water quality in rivers and streams, aquifers and lakes as good than were Maori and New Zealand European respondents (See Hughey et al. 2004). Findings from the 2006 survey reinforce some of these earlier patterns, particularly in terms of air. Maori in particular were more likely to identify 'hazardous chemicals' as a cause of damage to air, and less likely to attribute it to 'household waste and emissions'.

7.2 INTER-SURVEY COMPARISONS

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

7.2.1 Pressure-State-Response differences

- 'Farming' continues to be judged as a major cause of impact to many resources. Other pressures vary across resources but six have increasingly been implicated in causing damage, namely 'household wastes and emissions', 'pests and weeds', 'urban development', 'mining', 'tourism', and 'recreational fishing'.
- While the state of air is considered to be declining the condition of coastal waters and beaches is perceived to be improving. In terms of availability the increase over time in marine reserves is also reflected in people's responses.
- It is notable that management is perceived to be improving for almost all of the 11 resources we are monitoring. The exceptions are 'natural environment in towns and cities', 'air' and 'soils', where no trends are detectable.

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%).

Top: an example of the potential extreme weather predicted with climate change, the snowfall that blanketed the South Island in mid June 2007 was the heaviest in 60 years (photo A. McMurtrie). Middle: despite the scientific fact that our biodiversity conservation performance still ranks poorly; with nationally endangered animals such as the Hector's dolphin (left), and pests such as possums (right; photo M. Kavermann) that threaten our native flora and fauna; New Zealanders continue to perceive that our plants and animals are in good condition, which may hinder acceptance of further enhancement programmes. Bottom: the lack of active pest and weed control in some of our large forest areas, such as this stewardship conservation land on the West Coast, may result in long-term damage, but there appears to be little public awareness of this (photo E. Henderson).





7.3 IMPLICATIONS FOR POLICY MAKERS

Some of the findings from this survey 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 an enormous 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:

- Although most people rate air quality as adequate or good, unlike most other resources there is no perception that management is improving. Communication on policies, programmes and performance regarding air quality may therefore be of increasing importance.
- 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 2002) and the global Environmental Sustainability Index (Esty et al. 2005) indicate otherwise. This dissonance could 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 impact of farming on the environment remained quite negative in this survey, a trend which would be interesting to track in relation to new policies and programmes designed to address this issue. Results, where positive, from the 'Dairying and Clean Streams Accord' (see Hill 2004 for example) need to be made widely known and need to be reputable.

The case study results have implications for policy makers. In terms of land transport it is clear that targeted policies have a much higher potential acceptance rate than do broadly applied policy initiatives. And, it is clear from the other case study questions that people do rate the natural environment and quality of life as very important to New Zealand. In combination with recognition that global warming/climate change is the single most important issue facing the world, it is also apparent that distinct combinations of policies, e.g. those that address climate change and transport, are possible, and probably desirable. As such there will need to be close and strategic working relationships between a range of policy and management agencies at central government level.



08

Opening fern frond (photo L. Clark)

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09

Sunset over the Whakatane River Estuary (photo L. Clark)

APPENDICES

9.1 APPENDIX 1: SURVEY DEMOGRAPHICS AND COMPARABLE DATA

The tables that follow present all of the demographic data collected from the 2006 survey. Where comparable data were collected from earlier surveys this is also included. Finally, comparable external data, sourced largely from the 2001 census of New Zealand or from 2005 Statistics NZ data, are used as appropriate. In places some of this data has been amalgamated for comparative purposes – these adjustments are noted.

Table 1. Gender (%).

Year ...	2000	2002	2004	2006 survey	December 2005 Statistics NZ
Male	44.1	46.8	45.8	46.1	48.9
Female	55.9	53.2	54.2	53.9	51.5
N	883	822	818	856	3,055,220

Table 2. Age of respondents (%).

Year ...	2000	2002	2004	2006 survey	June 2006 Statistics NZ
18 to 19	1.4	1.1	1	1.3	3.9
20 to 29	15	9.5	9	8.7	18.0
30 to 39	18.2	15.9	15.6	15	19.0
40 to 49	19.7	22.8	22.5	22.8	20.1
50 to 59	18.1	20.8	22.2	19.6	16.3
60 to 69	12.8	16.1	16.1	17.5	11.0
70 and over	14.8	13.8	13.6	15.2	11.7
N	846	807	796	848	3,073,450

Table 3. Country of birth (%).

Country/region ...	2002	2004	2006 survey	2001 Census
New Zealand	80.0	77.8	77.1	77.4
Australia	1.7	1.7	1.8	1.5
Pacific Islands	2.6	0.7	2.5	3.2
Britain/Ireland	8.7	11.3	9.4	6.0
Rest of Europe	1.8	1.8	2.6	1.6
USA and Canada	0.4	1.4	0.9	0.6
Asia	2.9	3.6	3.4	4.4
Other	1.7	1.5	2.5	5.3
N	817	812	849	3,737,277

Table 4. Ethnicity (%).

Category ...	2002	2004	2006 survey	a) 2001 Census*#	b) 2001 Census*#	c) 2001 Census*#
Maori	5.8	8.1	5.3	7.5	7.1	11.2
Pacific Islander	2.7	1.4	2.3	4.1	3.9	3.9
NZ European	81.9	79	77.4	81.8	77.8	77.8
Asian	NC	NC	3.3	6.1	5.8	5.8
Other	9.6	11.5	11.7	0.5	5.3	1.3
N	810	810	854	2,389,095	2,510,310	2,510,310

NC: not recorded in these surveys.

* The 2001 census allowed New Zealanders to select either a single ethnicity or to choose multiple ethnicities. This survey, however, only allowed individual ethnicities, although there was an option of 'other'. Thus, it is not easy to compare the survey ethnicities with those reported in the 2001 census. In this table, therefore, three sets of data have been summarised from the Census:

- a) New Zealanders who selected one ethnic grouping only.
- b) New Zealanders who selected one ethnic grouping only, but also all other combinations, represented in 'Other'.
- c) New Zealanders selecting only Pacific Islander, NZ European, Asian or Other, and all those who selected Maori individually or in combination with other ethnicities.

Data for those aged 20 and over.

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

Council ...	2006 survey	2006 Statistics NZ estimate
Northland	4.3	3.6
Auckland	27.1	32.8
Waikato	8.4	9.4
Bay of Plenty	5.6	6.3
Gisborne/Poverty Bay	0.7	1.1
Taranaki	3.6	2.5
Hawkes Bay	4.2	3.6
Manawatu-Wanganui	6.1	5.5
Wellington	11.1	11.2
Nelson	2.1	2.2
Marlborough	1.5	1.0
Canterbury	16.5	12.9
West Coast	0.7	0.7
Otago	5.6	4.8
Southland	2.6	2.2
N	859	4,140,300

Table 6. Urban or rural respondents (%).

Area ...	2006 survey	2001 Census
Urban	81.4	85.8
Rural	18.6	14.2
N	854	3,735,519

This analysis is based on census 2001 data, which defines rural New Zealand in a way that is consistent with the definition in this report, i.e., 'the countryside or a town of less than 1000 people'.

Table 7. Education status (%).

Highest level of formal education ...	2000	2002	2004	2006 survey	2001 Census 20+ years*
Primary	4.2	4.3	3.8	3.3	27.5
High school without qualifications	18.4	19.8	17.8	18.7	
High school with qualifications	21.9	24.4	25.1	21.9	37.6
Trade or technical qualification	22.0	19.5	18.5	19.4	21.9
Undergraduate diploma	11.9	14.1	12.8	12.2	
Bachelors degree	13.7	12.0	14.3	14.9	8.9
Postgraduate	7.9	5.9	7.7	9.6	4.1
N	876	815	813	852	2,248,545

* It was difficult to fit the Census classification to the survey data and compromises, especially in the trade and diploma area have made comparison difficult.

Table 8. Employment status (%).

Status	2006 Survey	December 2005 Statistics NZ*
Paid, more than 30hrs	47.4	51.5
Paid, less than 30hrs	13.4	14.5
Unemployed	0.5	2.4
Retired	20.8	30.6
Unpaid Voluntary Work	2.3	
Student	4.6	
Homes Duties	5.1	
Other	6.0	
N	857	3,188,500

*Aged 15 and over.

Table 9. Employment sector (%).

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

* Note that the census classifications have been amalgamated and do not correspond exactly with the survey.

Table 10. Income (before tax) (%).

Income bracket ...	2000	2002	2004	2006 survey	2001 Census
Loss	0	2.0	2.4	1.4	0.5
\$0 - \$10,000	17.1	14.4	11.5	9.4	24.2
\$10,001 - \$20,000	20.1	18.9	19.5	17.5	22.1
\$20,001 - \$30,000	15.4	13.9	16.5	15.0	14.7
\$30,001 - \$40,000	13.6	13.3	13.4	14.5	10.8
\$40,001 - \$50,000	10.6	11.1	7.4	9.7	6.3
\$50,001 - \$70,000	7.5	9.4	10.5	13.3	5.7
\$70,001 - \$100,000	4.3	4.1	4.1	6.7	2.4
\$100,000 +	3.2	3.7	5.0	5.1	2.2
Not stated	8.1	9.2	9.6	7.4	11.1
N	894	836	820	880	2,889,534

9.2 APPENDIX 2: PSR DATA

Table 1. Respondents' knowledge of environmental issues and standard of living.

Respondents perceptions of ...	Percentage response						N	Mean (1-5)	Std. Dev.
	Very good (1)	Good (2)	Adequate (3)	Bad (4)	Very bad (5)	Don't know			
their own knowledge of environmental issues									
2000	6.5	29.4	52.1	8.9	1.4	1.8	878	2.69	0.78
2002	7.5	28.6	54.4	7.0	1.1	1.2	810	2.65	0.77
2004	6.4	25.7	57.4	8.1	0.9	1.5	812	2.71	0.74
2006	7.3	31.9	52.8	5.1	0.6	2.3	864	2.59	0.73
the overall standard of living in New Zealand									
2000	11.1	45.5	36.0	5.6	0.9	0.8	863	2.39	0.80
2002	14.1	50.8	28.6	4.8	0.9	0.8	766	2.27	0.80
2004	18.3	54.2	23.3	3.1	0.0	1.2	781	2.11	0.73
2006	16.8	50.9	28.2	3.0	0.1	0.9	864	2.18	0.74
the overall state of the natural environment in New Zealand									
2006	11	47.3	32.4	6.6	0.3	2.3	861	2.37	0.78

Table 2. Respondents' perceptions of New Zealand's 'clean and green' image.

	Percentage response						N	Mean (1-5)	Std. Dev.
	Strongly agree (1)	Agree (2)	Neither agree or disagree (3)	Disagree (4)	Strongly disagree (5)	Don't know			
New Zealand's environment is regarded as "clean and green"									
2000	Question not asked in 2000								
2002	9.2	57.0	17.6	13.7	2.0	0.5	816	2.42	0.91
2004	5.8	45.3	29.2	17.0	2.0	0.8	799	2.64	0.90
2006	4.3	49.1	26.0	18.8	1.4	0.5	863	2.64	0.88

Table 3. Perceived state of New Zealand's environment.

Respondents perceived quality of ...	Percentage response						N	Mean (1-5)	Std. Dev.
	Very good (1)	Good (2)	Adequate (3)	Bad (4)	Very bad (5)	Don't know			
natural environment in towns and cities									
2000	3.7	34.5	47.4	12.1	0.7	1.6	875	2.71	0.75
2002	5.9	36.9	44.7	9.6	1.1	1.8	815	2.62	0.79
2004	5.6	42.4	41.3	8.4	0.7	1.5	806	2.56	0.76
2006	4.6	30.8	43.9	10.7	0.9	1.8	868	2.65	0.77
other natural environments									
2000	11.1	45.5	36.0	5.6	0.9	0.8	863	2.39	0.80
2002	14.1	50.8	28.6	4.8	0.9	0.8	766	2.27	0.80
2004	18.3	54.2	23.3	3.1	0.0	1.2	781	2.11	0.73
2006	Question not asked in 2006								
air									
2000	20.0	47.0	23.6	7.2	1.3	1.0	866	2.22	0.89
2002	15.8	43.5	29.6	8.8	1.5	0.8	795	2.36	0.91
2004	14.3	45.1	28.8	10.0	1.2	0.6	803	2.38	0.90
2006	12.0	47.5	30.0	8.7	1.0	0.7	859	2.39	0.85

Respondents perceived quality of ...	Percentage response						N	Mean (1-5)	Std. Dev.
	Very good (1)	Good (2)	Adequate (3)	Bad (4)	Very bad (5)	Don't know			
native land and freshwater plants and animals									
2000	12.6	42.8	29.9	10.1	1.8	2.8	870	2.44	0.91
2002	14.6	40.8	30.2	9.2	1.7	3.5	808	2.41	0.92
2004	11.2	42.6	29.9	11.1	0.9	4.3	810	2.45	0.88
2006	10.4	42.8	33.4	9.8	0.9	2.5	864	2.47	0.85
native bush and forests									
2000	20.5	39.8	26.0	10.6	1.6	1.6	870	2.32	0.97
2002	23.1	42.9	23.1	7.7	1.0	2.1	808	2.19	0.92
2004	21.9	40.8	24.5	8.6	1.1	3.1	807	2.24	0.94
2006	21.5	44.8	25.0	6.3	0.6	1.9	864	2.18	0.87
soils									
2000	10.1	40.1	33.4	7.1	1.2	8.1	862	2.45	0.84
2002	10.4	40.8	32.0	7.0	0.9	8.9	797	2.42	0.83
2004	7.6	41.3	32.9	6.5	0.9	10.9	800	2.46	0.79
2006	7.6	40.4	36.0	7.2	1.2	7.7	859	2.5	0.80
coastal waters and beaches									
2000	12.4	37.2	35.2	11.3	1.5	2.4	873	2.51	0.91
2002	12.6	37.5	34.8	10.5	2.0	2.7	817	2.50	0.92
2004	13.1	41.6	32.0	9.0	1.7	2.6	810	2.43	0.90
2006	7.6	40.4	36.0	7.2	1.2	7.7	859	2.50	0.8
marine fisheries									
2000	6.2	30.2	32.9	15.4	2.7	12.6	875	2.75	0.93
2002	6.2	33.5	36.0	10.2	2.5	11.6	801	2.65	0.88
2004	5.9	29.8	31.8	14.4	1.4	16.7	808	2.70	0.89
2006	6.5	30.3	34.2	16.1	1.6	11.3	859	2.73	0.90
freshwater									
2000	11.7	35.3	35.1	12.2	1.9	3.8	875	2.56	0.93
2002	12.1	34.2	36.5	11.1	2.4	3.7	803	2.56	0.94
2004	Question not asked in 2004								
2006	Question not asked in 2006								
rivers and lakes									
2000	Question not asked in 2000								
2002	Question not asked in 2002								
2004	6.5	31.5	33.1	20.6	3.0	5.3	810	2.81	0.96
2006	6.0	30.7	35.8	21.4	1.4	4.7	866	2.80	0.91
groundwater									
2000	Question not asked in 2000								
2002	Question not asked in 2002								
2004	6.1	30.0	39.5	8.0	1.5	15.0	801	2.63	0.82
2006	6.0	29.7	39.4	11.1	0.8	12.9	861	2.67	0.82
wetlands									
2000	6.0	28.1	34.6	13.0	2.6	15.7	872	2.74	0.91
2002	7.3	33.9	31.2	11.8	1.5	14.4	836	2.61	0.89
2004	5.6	31.7	31.4	11.4	2.4	17.5	805	2.68	0.90
2006	6.4	32.5	33.9	10.2	1.3	15.8	865	2.61	0.85
New Zealand's natural environment compared to other developed countries									
2000	34.6	42.3	14.7	1.6	0.2	6.6	879	1.83	0.77
2002	38.7	41.2	12.7	1.3	0.4	5.7	821	1.76	0.76
2004	34.3	44.5	13.3	0.5	0.0	7.4	806	1.78	0.70
2006	34.5	44.1	13.1	1.7	0.1	6.4	863	1.81	0.75

Table 4. Perceived availability of natural resources.

Respondents perceptions of ...	Percentage response						N	Mean (1-5)	Std. Dev.
	Very high (1)	High (2)	Moderate (3)	Low (4)	Very low (5)	Don't know			
diversity of native land and freshwater plants and animals									
2000	7.6	36.0	40.5	8.0	0.7	7.1	841	2.55	0.79
2002	7.7	37.9	38.0	5.6	1.1	9.7	807	2.50	0.79
2004	7.4	37.7	39.5	5.2	0.6	9.6	794	2.49	0.76
2006	8.4	38.0	38.6	4.0	0.4	10.5	841	2.44	0.74
amount of native bush and forests									
2000	9.4	39.3	34.9	12.6	2.0	1.9	855	2.58	0.90
2002	10.7	39.2	34.5	10.3	2.1	3.2	812	2.52	0.90
2004	11.7	36.3	34.8	12.0	2.0	3.3	797	2.55	0.93
2006	11.1	40.4	35.3	9.6	0.7	2.8	853	2.47	0.85
quantity of marine fisheries									
2000	3.8	25.2	38.3	16.2	1.5	15.0	846	2.84	0.84
2002	3.7	22.0	42.9	12.0	2.4	17.0	808	2.85	0.92
2004	3.7	17.7	42.7	16.4	1.8	17.8	793	2.94	0.82
2006	2.9	20.6	44.9	12.2	1.2	18.1	849	2.85	0.76
area of marine reserves									
2000	2.5	13.8	37.9	24.5	4.9	16.4	849	3.19	0.88
2002	3.7	16.7	36.1	21.8	4.6	17.1	808	3.08	0.93
2004	3.0	17.5	38.5	18.5	3.2	19.4	790	3.02	0.87
2006	4.2	19.8	39.4	17.3	2.1	17.2	850	2.92	0.87
amount of freshwater									
2000	11.2	41.2	32.4	8.5	1.8	4.9	851	2.46	0.88
2002	8.6	40.0	35.4	8.1	2.0	5.9	813	2.52	0.86
2004	Question not asked in 2004								
2006	Question not asked in 2006								
rivers and lakes									
2000	Question not asked in 2000								
2002	Question not asked in 2002								
2004	5.2	27.4	40.7	13.3	1.9	11.4	787	2.77	0.85
2006	3.2	20.7	39.3	17.2	2.5	17.2	850	2.94	0.85
groundwater									
2000	Question not asked in 2000								
2002	Question not asked in 2002								
2004	3.1	21.4	39.7	14.1	2.4	19.3	794	2.89	0.84
2006	3.1	26.5	41.0	16.8	2.5	10.1	849	2.88	0.85
area of National Parks									
2000	16.1	44.8	30.3	5.4	0.8	2.7	858	2.28	0.83
2002	15.1	47.4	27.5	5.9	0.5	3.6	812	2.27	0.81
2004	14.5	45.7	31.6	4.9	0.3	3.1	795	2.29	0.79
2006	13.8	46.4	32.5	3.6	0.4	3.3	855	2.28	0.76
area of wetlands									
2000	2.8	16.8	37.0	18.9	3.0	21.4	855	3.03	0.87
2002	3.3	19.2	38.7	14.3	4.3	20.2	807	2.96	0.90
2004	3.5	17.1	37.2	16.8	2.6	22.8	794	2.97	0.87
2006	3.5	18.0	39.4	15.2	2.4	21.5	850	2.93	0.85
availability of parks and reserves in towns and cities									
2000	12.0	36.2	37.4	10.5	2.0	1.9	856	2.53	0.91
2002	12.8	39.0	34.7	9.7	1.7	2.0	812	2.47	0.90
2004	12.6	40.0	35.5	8.2	2.2	1.5	801	2.47	0.90

Respondents perceptions of ...	Percentage response						N	Mean (1-5)	Std. Dev.
	Very high (1)	High (2)	Moderate (3)	Low (4)	Very low (5)	Don't know			
2006	10.2	41.8	37.6	6.9	1.8	1.8	856	2.47	0.84
reserves of oil and gas									
2000	1.2	10.0	32.8	24.7	3.9	27.5	851	3.28	0.83
2002	1.4	7.3	29.9	28.7	3.8	28.9	812	3.37	0.81
2004	1.5	3.8	23.6	34.4	10.9	25.8	796	3.67	0.86
2006	1.1	3.0	21.9	36.3	12.9	24.9	855	3.76	0.83

Table 5. Perceived quality of management activities.

Respondents perceptions of the management of ...	Percentage response						N	Mean (1-5)	Std. Dev.
	Very good (1)	Good (2)	Adequate (3)	Bad (4)	Very bad (5)	Don't know			
pest and weed control									
2000	2.9	18.8	34.5	30.2	7.0	6.6	852	3.21	0.95
2002	4.2	17.6	40.6	26.4	6.0	5.2	812	3.13	0.94
2004	5.7	22.3	33.6	26.8	7.0	4.5	783	3.07	1.02
2006	5.0	18.4	39.6	26.9	5.5	4.7	859	3.10	0.95
solid waste disposal									
2000	1.6	12.8	38.8	32.8	7.4	6.7	854	3.34	0.87
2002	2.4	14.3	42.5	27.0	5.8	8.1	807	3.21	0.87
2004	3.5	17.3	41.7	24.0	5.9	7.6	779	3.12	0.92
2006	2.6	15.2	45.0	24.3	4.2	8.8	857	3.14	0.84
sewage disposal									
2000	2.0	14.0	39.7	31.4	8.6	4.3	853	3.32	0.90
2002	3.0	13.6	46.5	24.6	6.8	5.5	806	3.20	0.88
2004	3.6	19.3	38.0	26.9	5.6	6.6	782	3.12	0.94
2006	3.0	17.5	47.7	21.8	3.6	6.4	858	3.06	0.84
farm effluent and runoff									
2000	0.7	9.2	29.8	32.7	9.2	18.4	849	3.50	0.87
2002	1.0	6.9	25.4	34.8	14.9	17.0	811	3.67	0.91
2004	1.3	8.8	24.3	37.9	13.8	13.9	783	3.63	0.92
2006	0.8	7.1	28.8	38.5	9.2	15.6	855	3.57	0.83
hazardous chemicals use and disposal									
2000	1.6	8.1	28.1	29.2	13.5	19.6	854	3.56	0.95
2002	1.9	9.4	30.8	28.9	8.4	20.6	806	3.41	0.91
2004	2.3	14.1	30.7	24.7	5.7	22.4	785	3.22	0.93
2006	0.8	10.9	36.1	25.3	5.5	21.5	857	3.30	0.83
industrial impact on the environment									
2000	Question not asked in 2000								
2002	0.6	7.4	31.9	37.9	10.2	12.0	811	3.56	0.83
2004	1.3	9.0	36.1	31.9	8.2	13.6	781	3.43	0.86
2006	0.9	7.1	39.9	31.5	7.3	13.3	858	3.43	0.80

Table 6. Respondents' perceptions of current management of the environment.

Perceived quality of management of ...	Percentage response						N	Mean (1-5)	Std. Dev.
	Very well managed (1)	Well managed (2)	Adequately managed (3)	Poorly managed (4)	Very poorly managed (5)	Don't know			
natural environment in towns and cities									
2000	2.8	26.4	53.8	12.7	1.2	3.2	852	2.82	0.73
2002	2.7	22.1	56.1	14.0	1.1	3.9	814	2.88	0.72
2004	1.9	24.7	54.7	13.0	0.6	5.0	784	2.85	0.69
2006	3.3	29.1	52.5	12.0	0.6	2.6	856	2.77	0.73
air quality									
2000	2.8	20.1	45.7	22.9	2.9	5.5	851	3.03	0.84
2002	1.6	15.2	45.7	26.6	4.6	6.3	805	3.19	0.82
2004	0.6	18.9	46.1	25.4	2.4	6.5	779	3.11	0.77
2006	3.6	20.9	49.5	19.0	2.2	4.7	851	2.95	0.82
native land and freshwater plants and animals									
2000	3.3	22.5	46.8	17.1	1.6	8.7	849	2.90	0.80
2002	2.2	24.6	47.3	14.8	1.4	9.7	805	2.87	0.76
2004	1.8	24.9	48.8	12.5	0.9	11.1	775	2.84	0.72
2006	5.2	28.3	47.3	11.4	1.1	6.8	852	2.73	0.79
native bush and forests									
2000	5.5	29.3	39.6	17.5	3.1	4.9	850	2.82	0.91
2002	4.7	34.2	42.1	11.0	1.6	6.3	807	2.69	0.81
2004	6.1	31.5	42.0	11.5	1.2	7.7	781	2.68	0.82
2006	8.2	37.0	40.4	9.8	0.7	3.9	856	2.56	0.82
soils									
2000	1.5	18.2	44.6	14.5	2.6	18.5	847	2.98	0.78
2002	1.4	15.9	43.9	15.0	1.9	22.0	800	3.00	0.75
2004	1.4	15.9	44.5	13.8	1.8	22.5	773	2.98	0.74
2006	2.1	18.8	47.3	13.4	1.2	17.2	848	2.91	0.74
coastal waters and beaches									
2000	2.5	17.6	44.1	24.8	4.1	6.9	846	3.11	0.85
2002	1.9	19.3	43.7	24.6	3.2	7.3	808	3.09	0.83
2004	2.4	19.2	42.3	24.0	2.2	9.8	782	3.05	0.83
2006	3.4	27.1	47.7	17.0	1.5	3.3	853	2.86	0.80
marine fisheries									
2000	2.2	13.2	33.3	24.5	4.4	22.4	848	3.20	0.89
2002	1.2	14.8	37.6	20.4	3.7	22.2	809	3.14	0.83
2004	1.9	13.1	36.0	22.4	2.7	23.8	780	3.14	0.83
2006	2.7	18.7	36.6	20.3	3.1	18.7	852	3.03	0.87
marine reserves									
2000	2.6	20.3	40.3	10.9	2.2	23.7	853	2.87	0.80
2002	2.6	21.7	41.4	11.1	2.0	21.2	802	2.85	0.79
2004	2.3	21.6	39.5	11.6	0.7	24.3	769	2.82	0.75
2006	4.9	26.0	41.8	8.8	0.6	17.9	850	2.68	0.77
freshwater									
2000	3.3	20.1	45.3	17.6	3.2	10.5	846	2.97	0.84
2002	2.4	20.4	45.5	18.1	3.2	10.4	807	2.99	0.82
2004	Question not asked in 2004								

Perceived quality of management of ...	Percentage response						N	Mean (1-5)	Std. Dev.
	Very well managed (1)	Well managed (2)	Adequately managed (3)	Poorly managed (4)	Very poorly managed (5)	Don't know			
2006	Question not asked in 2006								
rivers and lakes									
2000	Question not asked in 2000								
2002	Question not asked in 2002								
2004	2.2	15.1	42.0	28.1	3.0	9.6	779	3.16	0.83
2006	2.6	22.2	44.6	21.3	2.5	6.9	855	2.99	0.83
groundwater									
2000	Question not asked in 2000								
2002	Question not asked in 2002								
2004	2.3	12.7	39.0	20.0	1.8	24.2	774	3.08	0.80
2006	2.0	14.1	41.7	18.3	2.2	21.7	852	3.06	0.79
National Parks									
2000	9.6	39.5	37.6	5.5	1.4	6.4	848	2.46	0.81
2002	8.5	42.1	37.8	3.8	1.2	6.5	810	2.43	0.77
2004	10.8	41.7	35.7	4.5	0.1	7.2	779	2.37	0.76
2006	13.4	46.1	32.2	3.2	0.5	4.7	853	2.28	0.76
wetlands									
2000	1.9	18.2	35.9	15.4	2.3	26.4	842	2.97	0.83
2002	3.0	18.5	38.9	12.6	2.6	24.4	807	2.91	0.84
2004	2.6	20.6	35.9	11.8	1.4	27.7	772	2.85	0.80
2006	3.7	25.2	37.6	11.2	0.9	21.3	854	2.75	0.80
New Zealand's natural environment compared to other developed countries									
2000	11.6	39.9	33.1	4.3	0.7	12.3	852	2.35	0.80
2002	13.6	36.3	32.1	3.2	1.0	13.7	815	2.32	0.82
2004	13.5	38.3	30.5	4.4	0.6	12.6	776	2.32	0.82
2006	20.0	41.4	24.9	4.4	0.2	9.1	846	2.16	0.83

Table 7. Respondents' participation in environmental activities.

In the last 12 months the respondent had.....	Year	N	Percentage Response			
			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
reduced or limited their use of freshwater	2006	849	43.8	35.8	18.4	2.0
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
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
bought products that are marketed as environmentally friendly	2002	805	11.7	64.8	15.2	8.3
	2004	799	12.1	66.6	16.4	4.9
	2006	850	15.1	63.3	15.6	6.0
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
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
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
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
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
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
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
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
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
made a financial donation to a non NGO	2006	852	76.2	20.0	2.7	1.2

Table 8. Respondents' opinions of the most important environmental issues facing New Zealand and the World today.

	Percentage Response			
	2002 N=678	2004 N=671	2006 (NZ) N=507	2006 (World) N=502
Introduced pests/weeds/diseases	10.5	5.4	3.6	0.0
Pesticides/poisons	1.9	0.4	0.4	0.4
Biosecurity	0.0	0.0	1.8	1.4
GE	1.3	2.7	0.0	0.0
Waste quality/pollution				
Global warming/climate change/ ozone layer	6.3	6.9	9.1	30.9
Pollution (unspecified)	6.2	3.4	9.3	10.2
Air pollution/air quality	17.4	17.3	8.1	7.2
Water Pollution	6.9	13.6	14.2	6.8
Sewerage and water supply	3.4	5.5	0.8	0.8
Disposal of refuse/waste	5.5	6.4	5.7	2.2
Industrial pollution/waste	4.4	2.4	1.2	1.8
Other	5.5	5.2	1.8	7.8
Insufficient environmental controls/resources	0.7	0.3	0.0	0.0
Environmental controls too restrictive	1.8	1.6	1.2	0.8
Agriculture	0.0	0.0	3.7	0.2
Transport	1.8	0.6	8.7	1.8
Too much power to one Party/agency/ethnic group	1.6	4.2	0.0	0.8
Wildlife and natural environment	4.4	3.0	2.6	1.4
Natural bush and waterways	1.9	1.2	1.0	0.0
Protecting environment/keeping New Zealand clean, green	5.6	3.9	6.9	3.8
Urban sprawl/urban environment	2.4	3.3	5.1	0.6
Population pressure and Tourism	2.2	3.9	3.6	9.8
Sustainable management of resources	2.5	4.5	8.7	4.8
Land/sea use	0.0	0.0	1.8	5.6
Over fishing/fish stocks	1.9	2.1	0.6	0.6
Environmental education	3.8	2.4	0.2	0.6

9.3 APPENDIX 3: SPECIAL TOPIC DATA

Table 1. Main sources of environmental information.

Sources of environmental information ...	First main source	Second main source	Third main source
	Percentage response		
Internet	10.1	7.7	10.8
Lectures and talks	3.7	2.4	3.1
Magazines	7.4	13.1	18.4
Newspapers	36.0	29.1	17.9
Radio	6.2	17.1	19.5
Scientific journals	3.3	3.3	4.0
Television	29.4	24.8	24.2
Other	3.8	2.5	2.0

Table 2. Respondents' perceived reliability of sources of environmental information.

Reliability of environmental information from ...	N	Very reliable (1)	Reliable (2)	Neither reliable nor unreliable (3)	Somewhat unreliable (4)	Very unreliable (5)	Don't know	Mean (1-5)	Std. Dev.
		Percentage response							
businesses	787	2.4	9.9	30.9	29.0	8.4	19.4	3.38	0.93
government departments	832	16.9	48.8	15.1	8.8	1.9	8.4	2.23	0.93
inter-governmental organisations	810	8.3	38.5	19.5	9.6	3.5	20.6	2.51	0.98
lobby groups	826	14.5	40.6	18.5	13.1	3.8	9.6	2.46	1.05
the media	835	3.4	30.2	34.3	20.8	4.7	6.7	2.93	0.94
regional councils	828	7.6	44.0	23.7	11.4	2.7	10.7	2.52	0.92
scientists	829	27.6	43.8	8.3	1.8	0.6	12.2	1.83	0.75

Table 3. Priorities for the New Zealand government.

Government activity ...	N	1 (Highest Priority)	2	3	4	5	6	7 (Lowest Priority)
		Percentage response						
a strong defence system	781	3.3	2.0	2.7	4.2	7.7	13.8	66.2
a fair level of superannuation and income support	781	4.2	4.5	7.6	14.1	19.6	33.2	16.9
a high quality education system	785	22.7	28.9	23.2	14.6	5.6	4.2	0.8
a high quality environment	782	10.1	10.7	18.0	19.7	21.2	14.7	5.5
a low crime rate	781	6.0	9.0	12.9	16.8	25.7	22.3	7.3
a strong economy	783	28.2	13.2	14.9	18.1	13.8	8.9	2.8
a high quality health system	786	25.8	32.1	20.9	11.8	6.0	2.4	1.0

Table 4. Personal priorities.

Perceived importance of ...	N	Very important	Important	Neither important nor unimportant	Unimportant	Very unimportant	Don't know
Percentage response							
quality of life	855	82.5	16.6	0.7	0.0	0.0	0.2
quality of education	852	56.2	38.4	4.5	0.7	0.1	0.1
quality of the natural environment	850	49.6	45.6	4.2	0.2	0.0	0.2
the public health system	856	60.0	34.3	4.6	0.8	0.0	0.2
level wages and salaries	852	31.5	52.9	13.4	1.6	0.0	0.6
level of economic growth	850	32.2	49.2	15.4	2.7	0.1	0.4
crime prevention	856	49.4	42.6	6.4	0.8	0.4	0.4

Table 5. New Zealand's performance.

Respondents perceived performance in	N	Very good	Good	Adequate	Bad	Very bad	Don't know
Percentage response							
quality of life	863	23.9	48.0	25.1	2.7	0.0	0.3
quality of education	865	7.2	40.5	40.3	10.8	0.7	0.6
quality of the natural environment	863	10.8	47.9	36.3	4.4	0.1	0.6
the public health system	865	2.9	17.0	46.7	28.1	5.0	0.3
level of wages and salaries	865	0.6	13.4	56.5	24.0	3.7	1.7
the level of economic growth	865	1.2	21.8	56.3	14.1	1.0	5.5
crime prevention	863	0.6	9.6	38.7	39.6	10.1	1.4

Table 6. Implications in New Zealand of achieving environmental sustainability.

Respondents' perception	N	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Don't know
Percentage response							
enhance economic growth	855	14.62	43.74	27.72	6.90	0.23	6.78
improve quality of life	862	25.64	54.41	14.39	2.44	0.12	3.02
lower living costs	858	7.69	19.93	36.25	25.99	1.86	8.28
ensure access to recreational resources	860	19.88	56.16	15.81	3.14	0.47	4.53
reduce pressure on limited resources	856	21.50	49.42	17.06	5.49	0.47	6.07
enhance New Zealand's clean green image	860	43.02	46.51	5.93	1.51	0.00	3.02
reduce climate change impacts	859	22.24	33.76	21.54	11.76	2.44	8.27

Table 7. Effectiveness on maintaining environmental quality.

Respondents perceived effectiveness of	N	Very effective	Effective	Neither effective nor ineffective	Bad	Very bad	Don't know
Percentage response							
changes in individual behaviour	860	43.0	41.5	8.3	2.9	0.3	4.0
actions by business	859	37.6	43.4	10.7	3.1	0.7	4.4
local government action	858	39.0	44.3	9.3	3.5	0.7	3.1
pressure or lobby group campaigning	858	19.1	49.8	19.3	6.2	0.7	4.9
central government action	860	32.7	43.3	14.5	3.8	0.9	4.8
international treaties	860	12.9	36.3	24.1	11.3	7.0	8.5

Table 8. Number of cars, vans or light trucks at respondent's address.

Number of vehicles	Petrol, LPG or CNG vehicles owned by the respondent or family	Petrol I, LPG or CNG vehicles provided by an employer	diesel vehicles owned by the respondent or family	diesel vehicles provided by an employer
0	9.0	79.9	84.2	94.5
1	41.0	15.6	12.4	4.4
2	35.6	3.4	2.5	0.6
3	10.3	0.8	0.5	0.1
4	2.8	0.2	0.2	0.1
5	0.9	0.1	0.1	0.2
6	0.2		0.1	
7	0.1			
Number of respondents	878	879	879	879

Table 9. Respondents' usage of bicycles and public transport.

	N	No	Yes
Percentage response			
Bike usage	880	74.0	26.0
Public transport usage	879	68.3	31.7
Public transport usage for activities other than work	880	78.2	21.8

Table 10. Number of trips per month.

Number of Bike trips per month	Percent response	Public transport trips to and from work per month	Percent response	Public transport trips for activities other than work per month	Percent response
0	76.7	0	89.0	0	80.1
1	3.9	1	2.6	1	8.0
2	3.4	2	1.3	2	3.6
3	1.8	3	0.3	3	1.3
4	2.8	4	0.8	4	2.4
5	1.3	5	0.2	5	1.0
6	1.3	6	0.2	6	0.3
7	0.3	7	0.1	7	0.1
8	1.3	8	0.1	8	0.2
9	0.3	9	0.1	9	0.2
10	1.6	10	0.9	10	0.8
12	0.7	12	0.1	11	0.1
14	0.1	15	0.3	12	0.5
15	0.7	20	1.4	14	0.1
16	0.1	22	0.2	15	0.1
17	0.1	24	0.2	20	0.8
18	0.1	25	0.2	40	0.1
20	1.1	30	0.1	52	0.1
24	0.1	32	0.2	100	0.1
25	0.5	40	1.0		
30	0.6	48	0.1		
36	0.1	50	0.1		
40	0.3	60	0.1		
45	0.1	65	0.1		
50	0.1				
52	0.1				
60	0.5				
Total	880	Total	879	Total	879

Table 11. Reasons for not using reasonably accessible public transport to and from work.

Reason for not using public transport ...	Percent response
Public transport time does not match work hours	17.3
car is better option	40.6
walking is a better option	13.7
poor transport routes	5.1
retired	12.7
work from home, transport not necessary	5.6
carpool	0.5
bicycle	3.0
scooter	1.0
Need to take kids to school before work	0.5
N	197

Table 12. Willingness to pay for road use impacts.

	N	Agree	Disagree	Don't know
		Percentage response		
Full cost of vehicle use should be paid by vehicle owners	858	23.5	59.1	17.4

Table 13. Support for payment methods.

Payment methods ...	N	Strongly support	Support	Neither support nor oppose	Oppose	Strongly oppose	Don't know
		Percentage response					
Higher passenger fares or freight charges	837	2.4	20.7	23.9	33.7	13.9	5.5
Introduction of road user charges for all vehicles	838	6.9	27.8	17.2	26.0	16.6	5.5
Increase road user charges for existing users	829	4.2	19.1	25.5	29.4	16.3	5.5
Higher fuel taxes	836	3.3	15.0	11.4	38.9	27.5	3.9
Higher registration fees	842	3.4	16.7	17.2	35.7	23.2	3.7

Table 14. Perceptions of targeting road use impacts.

	N	Strongly supportive	Somewhat supportive	Neither support nor oppose	Somewhat opposed	Strongly opposed	Don't know
		Percentage response					
Road user charges	830	12.5	32.7	14.5	20.0	15.8	4.6
Speed Reduction	828	25.2	25.5	11.0	18.4	16.4	3.5
Fuel use efficiency standards for new cars	831	49.5	33.8	7.0	3.1	2.0	4.6
Exhaust gas standards for all cars	831	41.5	32.6	11.6	4.7	4.0	5.7

Table 15. Perceptions of the quality of different transport systems.

System ...	N	Extremely good	Good	Adequate	Poor	Extremely poor	Don't know
		Percentage response					
The quality of New Zealand's roading system	844	4.6	28.6	42.2	21.7	2.6	0.4
The quality of my region's roading system	846	4.4	32.5	37.5	20.6	4.8	0.2
The quality of New Zealand's bus transport system	845	1.1	14.9	37.2	31.8	8.5	6.5
The quality of my region's bus transport system	851	4.6	18.2	28.7	27.1	15.9	5.5
The quality of New Zealand's rail system		0.6	6.3	19.3	36.4	27.8	9.6
The quality of my region's rail system	835	2.2	6.1	15.3	26.7	40.1	9.6

Table 16. Perceptions of traffic congestion.

	N	Much less of a problem	Less of a problem	About the same Percentage response	Worse	Much worse	Don't know
New Zealand's traffic congestion is becoming ...	856	0.58	1.40	9.23	53.50	33.29	1.99
My region's traffic congestion is becoming ...	856	1.99	3.15	26.52	40.07	27.45	0.82

