

## **New Zealanders' perceptions of the environment and quality of environmental management**

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**Abstract:** This study reveals that preferences for allocation of government spending on aspects of the New Zealand environment are related to concerns for the state of the environment and quality of management. Drawing upon selected data from a survey of New Zealand perceptions of the environment and its management, it is found that moderate increases in funding were preferred for seven aspects of the environment. Investigation of perceptions of quality and availability found most people had few concerns. However, people were concerned about how parts of the environment are changing. Levels of concern differed with regard to perceptions of current quality of management and changes in quality of management. Investigation of associations between perceptions and preferred national budget allocation found that changes in most perceptions would impact upon preferences for funding allocation. In addition, for some aspects, differences between preferred institutional arrangements for management were related to preferred levels of funding allocation.

### **Introduction**

New Zealanders perceive their country as clean and green. This paper investigates this perception by drawing upon selected data from a survey of New Zealanders' concerns about the environment and their views about its management. The question of whether the New Zealand environment is perceived as clean and green is addressed, and emphasis is given to explaining support for changes in government allocation of funds for the environment. These changes are explained by examining perceptions of seven aspects of the environment. The seven aspects are: fresh waters, coastal waters and beaches, native forests and bush, marine reserves, wetlands, marine fisheries and soils. The perceived condition of the seven environmental aspects was assessed in terms of perceived quality, availability and change in state over time. Further assessments were made of the perceived quality of current management and changes in management quality over the previous five years. Each of the seven aspects was also assessed in terms of preferences for arrangements for their management. To explain changes in allocation, each measure of preference is compared to preferences for changes in allocation of government spending. Favourable or unfavourable perceptions are shown to result in corresponding calls for changes in funding allocations.

### **The survey**

The survey was designed to gather public perceptions, attitudes and views about the environment and its management. The survey was conducted between January and March 2000 with 2000 questionnaires posted to householders randomly selected from the New Zealand electoral roll. The survey received an effective response rate of 48 % (N = 894). The sample had a margin of error at the 95% confidence interval of approximately three per cent.

Measures were derived from question sets assessing; preferred allocation of government expenditure on environmental management and government services,

perceptions of environmental quality, availability and change over time, perceptions of the response by management and preferences for institutional arrangements for the management of the environment.

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

Perceived condition of the environment was measured using three sets of questions addressing respectively quality, availability and change of state over the previous five years. The first set was preceded by the instruction: *Please indicate what you think the state of each of the following is.* Followed by: *The quality or condition of New Zealand's...* Aspects of the environment were then presented with a five-point scale provided for measurement of each, anchored by *very good* and *very bad*.

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

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

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

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

Preferences for who to should manage resources were measured with the invitation: *There are many ways to manage resources. Please indicate your preferences by*

*ticking one box for each line.* Resource areas were presented with five possible management arrangements for respondents to select.

## **Results**

### **Introduction**

Descriptive results are first presented for preferences for change in the allocation of government spending on eleven environmental and non-environmental areas. These results are followed by the presentation of investigations into six aspects of the environment. Perceived state is assessed using perceptions of quality, availability, and change in state over five years. Perceptions of management are assessed using perceptions of the quality of management and perceived change in the quality of management over five years. Preferred management was assessed through the choice of five management arrangements. Relationships between measures of perception and preferences for changes in allocation of government spending are examined using correlation analysis. Comparison of means for preferred allocation of government spending between preferred management options were analysed using ANOVA.

### **Preferences for changes in the allocation of government spending**

Preferences for changes in the allocation of government spending for eleven items are provided in Table 1. As shown in the table, in non-environmental areas respondents, in general, considered more funds should be allocated for health, education, crime prevention, roads and transport, superannuation and civil defence. Respondents considered fewer funds should be allocated to defence and income support. In terms of the natural environment, the majority considered more should be spent on pest and weed control, endangered species, air quality and fresh waters. In general, respondents considered there should be only modest increases in spending on coastal waters and beaches, native forests and bush, marine reserves, wetlands, marine fisheries and soils. The largest increase in spending allocation was given to health, education and crime prevention, with over thirty per cent of respondents wanting far more spending on these three areas. In comparison, less than ten per cent of respondents wanted far more spending on aspects of the environment, apart from spending on fresh water (11.6%).

Further examination of measures of preferred budget allocation using correlation analysis, however, found that respondents tended to provide individual assessments of preferred allocation on an item by item basis rather than considering reallocation within a fixed budget. Examples of these responses are provided in Table 2. It is evident from this table that allocations of the budget for health, education and crime prevention were positively associated with preferences for allocations to the environment. It is also evident that many respondents disregarded the instructions and provided separate assessments of spending for individual items. Descriptive results are therefore interpreted as indications of strength of preferences for spending allocation for individual items. While the amount of allocated spending for each item will be an inaccurate representation of respondents' preferences, relative importance between items will not be affected.

Table 1: Preferences for allocation of government spending

	N	Spend far more	Spend more	No change	Spend less	Spend far less	Mean (1-5)	Std. Dev
		(1)	(2)	(3)	(4)	(5)		
		%						
Health	871	43.1	41.2	14.6	0.8	0.3	1.74	0.76
Education	857	35.5	48.9	14.6	0.8	0.2	1.81	0.72
Crime prevention	871	36.2	45.5	17.3	0.9	0.1	1.83	0.74
Pest and weed control	849	11.1	47.7	38.9	2	0.4	2.33	0.71
Endangered species	863	17.5	38	39.7	3.8	0.9	2.33	0.84
Air quality	865	15.3	36.6	46	2	0.1	2.35	0.76
Roads and transport	863	14.3	39.2	42.9	2.8	0.9	2.37	0.79
Fresh waters	860	11.6	39.3	47.9	0.8	0.3	2.39	0.71
Superannuation	863	14.1	33.5	45.5	5.6	1.3	2.46	0.85
Beaches and coastal waters	861	7	38.7	52.3	1.6	0.5	2.5	0.67
Native forests and bush	859	8.6	36.8	50.2	4.1	0.3	2.51	0.72
Marine reserves	856	5.8	33.2	57.1	3.3	0.6	2.6	0.68
Wetlands	851	6.5	31.8	55.6	5.4	0.7	2.62	0.72
Marine fisheries	853	4.7	29.1	61	4.3	0.9	2.68	0.68
Soils	849	3.3	26	65.6	4.5	0.6	2.73	0.62
Civil defence	863	4.4	23.1	64.7	6.3	1.6	2.78	0.7
Defence	865	6.1	22.1	37.5	21.3	13.1	3.13	1.09
Income support	866	6.8	15.8	44	24.1	9.2	3.13	1.01

Table 2: Relationships between allocations of expenditure

	Change in the allocation of health expenditure	Change in the allocation of education expenditure	Change in the allocation of crime prevention expenditure
Change in the allocation of fresh water expenditure	0.16*** (n=852)	0.12** (n=842)	0.15*** (n=854)
Change in the allocation of beaches and coastal waters expenditure	0.14*** (n=855)	0.16*** (n=844)	0.13*** (n=856)
Change in the allocation of native forests and bush expenditure	0.16*** (n=853)	0.20*** (n=842)	0.10** (n=854)
Change in the allocation of marine reserves expenditure	0.09** (n=848)	0.12** (n=838)	0.10** (n=849)
Change in the allocation of wetlands expenditure	0.10** (n=840)	0.13*** (n=830)	0.04 (n=842)
Change in the allocation of marine fisheries expenditure	0.16*** (n=845)	0.12*** (n=837)	0.14*** (n=847)
Change in the allocation of soils expenditure	0.13*** (n=841)	0.14*** (n=835)	0.12*** (n=843)

Note: Significance levels: \*\*p < 0.01, \*\*\*p < 0.001

## Quality of the environment

The first of three measures of the perceived state of the environment measured perceived quality of the environment. As shown in Table 3, the perceptions of quality for six aspects of the environment were generally considered to be good to adequate. Of the environmental aspects presented, native forests and bush were considered to be in the best condition and marine fisheries were considered to be the worst, although the mean score for both are still within the adequate to good range.

Table 3: Perceived quality of the environment

	N	Very good	Good	Adequate	Bad	Very bad	Don't know	Mean (1-5)	Std. Dev
		(1)	(2)	(3)	(4)	(5)			
%									
Fresh waters	875	12.1	36.7	36.5	12.7	2	33	2.56	0.93
Coastal waters and beaches	873	12.7	38.1	36	11.6	1.5		2.51	0.91
Native forests and bush	870	20.8	40.4	26.4	10.7	1.6	14	2.32	0.97
Wetlands	872	7.1	33.3	4.1	15.4	3.1	22	2.74	0.91
Marine fisheries	875	7.1	34.5	37.6	17.6	3.1	19	2.75	0.93
Soils	862	11	43.7	36.4	7.7	1.3	32	2.45	0.84

Relationships between perceived quality and preferences for funding allocation were tested using correlation analysis. The results of these tests are provided in Table 4. As shown in the table, the results indicate significant ( $p < 0.001$ ) relationships between perceived quality and preferences for funding allocation for each of the six aspects of the environment. For example, respondents who perceived the quality of an aspect of the environment to be poor also tended to have preference for more funding to be allocated to the aspect.

Table 4: Relationships between perceived quality and preferences for funding allocation

	Correlation	N
Fresh waters	-.16	813
Coastal waters and beaches	-.23	825
Native forests and bush	-.19	828
Wetlands	-.23	716
Marine fisheries	-.14	751
Soils	-.22	760

Note: Significance level for all results  $p < 0.001$

## Availability of natural resources

Five aspects of the environment measured for perceived quality were also measured for perceived availability. Results are shown in Table 5, with availability ranging from adequate to low for marine reserves to adequate to high for fresh waters. The area of marine reserves was, in general, perceived to be low and the quantity of

wetlands was judged to be less than adequate. The amount of native forest and bush, the quantity of marine fisheries and the amount of fresh waters were considered to be more than adequate.

Table 5: Perceived availability of natural resources

	N	Very high	High	Adequate	Low	Very Low	Don't know	Mean (1-5)	Std. Dev
		(1)	(2)	(3)	(4)	(5)			
		%							
Amount of fresh water	851	11.7	43.4	34.1	8.9	1.9	42	2.46	.88
Amount of native forests and bush	855	9.5	40.0	35.5	12.9	2.0	16	2.58	.90
Area of marine reserves	849	3.0	16.5	45.4	29.3	5.9	139	3.19	.88
Quantity of wetlands	855	3.6	21.4	47.0	24.1	3.9	183	3.03	.87
Quantity of marine fisheries	846	4.5	29.6	45.1	19.1	1.8	127	2.84	.84

The results of tests for relationships between perceived availability and preferences for funding allocation using correlation analysis are provided in Table 6. As is evident from the table, only one relationship, between perceived availability of wetlands and preferences for funding of wetlands, was found to be non-significant ( $p > 0.05$ ). Relationships between perceived availability and preferences for funding allocation for each of the remaining five aspects of the environment were significant ( $p < 0.001$ ). This indicates that perceptions of problems of availability were related to preferences for more funding.

Table 6: Relationships between perceived availability and preferences for funding allocation

	Correlation	N
Fresh waters	-.17***	781
Native forests and bush	-.13***	810
Marine reserves	-.23***	693
Wetlands	-.25***	658
Marine fisheries	-.04	700

Note: Significance level: \*\*\* $p < 0.001$

### Perceived state of the environment compared to 5 years ago

Results for the measurements of perceptions of change in the state of the environment are provided in Table 7. As shown in the table, the state of marine fisheries was considered to have become worse over the last five years. The state of fresh waters, coastal waters and beaches were also, in general, negatively assessed. The remaining aspects of the environment were considered to have undergone little change over the last five years with an indication of minor improvement in the state of marine reserves.

Table 7: The perceived state of the environment compared to five years ago

	N	Much better	Better	No change	Worse	Much worse	Don't know	Mean (1-5)	Std. Dev	
		(1)	(2)	(3)	(4)	(5)				
		%								
Fresh water	775	2.5	13.5	46.5	32.8	4.8	68	3.24	.83	
Coastal waters and beaches	787	2.0	15.8	43.1	33.4	5.7	65	3.25	.86	
Native forests and bush	787	3.2	23.6	42.7	26.9	3.6	62	3.04	.88	
Marine reserves	633	3.5	31.6	44.4	18.8	1.7	212	2.84	.83	
Wetlands	601	2.0	20.1	53.6	22.0	2.3	239	3.02	.77	
Marine fisheries	653	2.1	13.8	37.5	41.8	4.7	197	3.33	.85	
Soils	681	1.9	14.5	62.6	18.8	2.2	70	3.05	.70	

Assessments of the state of the environment compared to five years ago were compared to preferences for funding allocation. The results of correlation analysis are provided in Table 8. While the analysis found significant relationships ( $p < 0.05$ ), only weak relationships were found for marine fisheries and native forests and bush. Unlike other relationships, favourable perceptions of the state of marine fisheries over the past five years were related to calls for more funding of this resource, though this relationship had a low level of significance.

Table 8: Relationships between perceived state compared to five years ago and preferences for funding allocation

	Correlation	N
Fresh waters	-.19***	752
Coastal waters and beaches	-.22***	766
Native forests and bush	-.07*	763
Wetlands	-.16***	590
Marine fisheries	.08*	643
Soils	-.14***	654

Note: Significance levels: \* $p < 0.05$  \*\*\* $p < 0.001$

### Perceptions of current management

Table 9 shows responses for perceived quality of management of the environment. In general, the environment was considered to be adequately to well managed, however, the management of coastal waters and beaches, and marine fisheries was considered to be adequate to poor.

Table 9: Perceptions of current management of the environment

	N	Very well managed (1)	Well managed (2)	Adequately managed (3)	Poorly managed (4)	Very poorly managed (5)	Don't know	Mean (1-5)	Std. Dev
Fresh waters	846	3.7	22.5	50.6	19.7	3.6	89	2.97	.84
Coastal waters and beaches	846	2.7	18.9	47.3	26.6	4.4	58	3.11	.85
Native forests and bush	852	5.8	30.8	41.7	18.4	3.2	42	2.82	.91
Marine reserves	853	3.4	26.6	52.8	14.3	2.9	202	2.87	.80
Wetlands	842	2.6	24.7	48.7	21.0	3.1	222	2.97	.83
Marine fisheries	848	2.9	17.0	42.9	31.6	5.6	190	3.20	.89
Soils	847	1.9	22.3	54.8	17.8	3.2	157	2.98	.78

Relationships between perceived quality of management and preferences for funding allocation were tested using correlation analysis. The results of these tests are provided in Table 10. The results show significant relationships between perceived quality of management and preferences for funding allocation for each of the six aspects of the environment. For example, respondents who perceived the quality of management of an aspect to be poor also tended to prefer more funding to be allocated to the aspect.

Table 10: Relationships between perceptions of current management and preferences for funding allocation

	Correlation	N
Fresh waters	-.22***	740
Coastal waters and beaches	-.3***	678
Native forests and bush	-.13***	768
Wetlands	-.3***	607
Marine fisheries	-.13**	651
Soils	-.22***	671

Note: Significance levels: \*\*p < 0.01 \*\*\*p < 0.001

### Management compared to five years ago

Results for measures of perceived change in the quality of management of the environment are provided in Table 11. In general, respondents considered that no change or a slight improvement in the quality of management had occurred in the last five years. A slightly majority considered the management of marine fisheries to be worse. In contrast, the management of native forests and bush was, in general, perceived to be better than five years ago.

Table 11: Quality of management compared to five years ago

	N	Much better	Better	The same	Worse	Much worse	Don't know	Mean (1-5)	Std. Dev	
		(1)	(2)	(3)	(4)	(5)				
		%								
Fresh waters	837	2.9	17.6	49.5	13.9	3.5	107	2.97	.81	
Coastal waters and beaches	845	2.8	19.2	45.4	18.7	3.4	88	3.01	.84	
Native forests and bush	843	4.3	30.4	41.9	12.8	2.0	73	2.76	.83	
Marine reserves	842	2.5	24.0	35.7	10.6	1.8	214	2.80	.81	
Wetlands	841	2.3	17.4	40.0	11.1	1.5	234	2.89	.77	
Marine fisheries	843	2.6	15.9	35.7	19.0	3.2	199	3.06	.87	
Soils	840	2.3	13.5	51.2	10.7	1.0	180	2.93	.68	

Relationships between the quality of environmental aspects compared to five years ago and preferences for funding allocation are provided in Table 12. This table shows significant ( $p < 0.001$ ) correlations between three of the six comparisons. The results show that respondents who considered the quality of management for fresh waters, wetlands and soils to have improved also tended to consider that fewer funds should be spent on these aspects of the environment.

Table 12: Relationships between management compared to five years ago and preferences for funding allocation

	Correlation	N
Fresh waters	-.17***	713
Coastal waters and beaches	-.06	642
Native forests and bush	-.02	751
Wetlands	-.15***	596
Marine fisheries	-.04	636
Soils	-.18***	739

Note: Significance levels: \*\*\* $p < 0.001$

### Preferences for management

Preferences for management were measured by having respondents select one of the five arrangements for management shown in Table 13. The results provided in the table, show that respondents in general favoured management by central government, central and local government or by individuals, communities, iwi and government. Management arrangements that omitted central or local government had less support, with few respondents preferring management by individuals and firms.

Tests for relationships between preferences for management and preferred spending allocation found two significant results (ANOVA Sig of F,  $p < 0.001$ ). Respondents who preferred management of native forests and bush by individuals and firms preferred greater allocation of spending on this resource (mean = 2.4, sd = 1.14). Those who preferred management by central government preferred a lower allocation of spending (mean = 2.7, sd = .71). A difference was also found between preferences for management of wetlands. Respondents who preferred wetland management by

individuals and firms considered less should be spent on wetlands (mean = 3.0, sd = .91), whereas those who preferred management by central government preferred a greater allocation of spending on this resource (mean = 2.74, sd = .72).

Table 12: Preferences for management

	N	Individuals and firms	Individuals, firms, iwi and communities	Individuals, communities, iwi and government	Local and central government	Central government
		%				
Fresh waters	850	2.9	7.5	36.4	41.6	11.5
Beaches and coastal waters	849	2.7	11.4	41.0	35.3	9.5
Native forests and bush	850	2.4	8.0	43.9	28.2	17.5
Marine reserves	840	2.7	5.0	31.9	33.0	27.4
Wetlands	824	2.9	6.9	37.6	36.5	16.0
Marine fisheries	835	3.5	6.3	30.4	29.3	30.4
Soils	838	8.7	10.6	32.6	37.5	10.6

## Discussion and conclusion

This study set out to understand New Zealanders' perceptions of their environment and has centred on explaining support for changes in government allocation of funds for the environment. Examination of perceptions of the quality of the environment and its management and exploration of linkages between these perceptions and preferred allocation of funds for seven aspects of the environment, reasons for these preferences have been identified. Willingness to increase funding allocation for the environment was shown to be low when compared to preferences for funding of government services such as health, education and crime prevention.

Table 14 summarises the key results. In the table, the seven aspects of the environment are ordered by mean scores for spending allocation. In general, respondents considered more additional funding should be allocated to fresh waters than any of the other aspects of the environment. Soils were seen as the item needing the least additional spending. Perceived quality was judged to be adequate to good for all aspects and a change perceptions of quality for each aspect is shown to affect respective preferences for funding allocation. The five measures of availability produced varied results with marine reserves seen as having less than desirable availability. All measures of availability were related to preferences for their funding allocation. Quality was judged to have improved most over the last five years for marine reserves, with no change for native forests and bush or wetlands. The quality of fresh waters, beaches and coastal waters and marine fisheries was perceived as being worse than five years ago. Apart from marine reserves, all of the measures were related to preferred allocation of funds. The quality of management of beaches and coastal waters was perceived to be poor, though these perceptions were unrelated to preferred allocation of funds for this resource. Wetlands were perceived to be poorly managed, with other aspects seen as being adequate to well managed. Quality of management over the last five years was perceived to be largely unchanged, though the quality of marine reserves was perceived to have become worse and some improvement in management quality was perceived for native forests and bush. Only

perceptions of management over time for fresh waters, wetlands and soils were related to preferred allocation.

Table 14: Summary of Key Results

Aspect of the environment	Mean for spending allocation (low score = more spending)	Quality	Availability	Change in quality over five years	Quality of management	Change in quality of management over five years
Fresh waters	2.39	Adequate to good *	Adequate to high*	Worse*	Adequate *	No change *
Beaches and coastal waters	2.50	Adequate to good *		Worse *	Poor	No change
Native forests and bush	2.51	Adequate to good *	Adequate to high *	No change *	More than adequate *	Better
Marine reserves	2.60		Low to adequate *	Better	More than adequate	Worse
Wetlands	2.62	Adequate to good *	Adequate *	No change *	Adequate *	No change to worse*
Marine fisheries	2.68	Adequate to good *	Adequate to high *	Worse	Poor *	No change
Soils	2.73	Adequate to good *		No change *	Adequate*	No change *

Note: \* = significant correlation ( $p < 0.05$ ) with spending allocation.

The results highlight that many New Zealanders perceive problems with the state of the environment and its management. These perceptions, while linked to preferences for allocation of funding, do not necessarily fully explain differences in allocation. For example, fresh waters, judged to warrant the highest additional allocation of funding, was judged positively on all criteria apart from change in quality over the last five years, which was judged to have deteriorated. In comparison, lower allocations of additional funding were given to marine fisheries and wetlands, which received unfavourable evaluations for more than one criterion. This may have arisen because of the negative evaluations of management. People may be unwilling to “reward” poor management with additional funding.

Management preferences favoured institutional arrangements that involved local and central government. Only management of native forests and bush and management of wetlands were associated with funding allocation. Those who preferred management by individuals and firms preferred more spending on native forests and bush. The rationale for this arrangement is unclear, though it is possible that this association may be related to support for entrepreneurial operations such as adventure tourism or may involve rent seeking on behalf of respondents. People who preferred management of wetlands by central government wanted more spending on this resource. Given that lack of protection has historically led to degradation of wetlands, recognising that more should be done for this resource may well be related to calls for protection by government legislation.

This study has shown that the allocation of spending on the New Zealand environment is related to concerns for the state of the environment and quality of its management. For seven aspects of the natural environment, the majority considered that relatively more funding should be allocated for fresh waters, with preferences for modest increases in spending on coastal waters and beaches, native forests and bush, marine reserves, wetlands, marine fisheries and soils. Investigation of perceptions of quality

and availability found the majority had few concerns, however, more concern was found for change of state for fresh waters, beaches and coastal waters and marine fisheries. There were also varied levels of concern for quality of management and change of quality. Changes in most of these perceptions will impact upon preferences for funding allocation. In addition, changes in preferences for funding allocation will impact upon preferences for institutional arrangements for management of wetlands and native forests and bush.

The study raises important issues for allocation of funds to improve environmental quality. Allocations to areas that are in decline may not be politically popular and could therefore thwart policies designed to enhance sustainable management of the environment. This calls for further investigation of the bases on which people are willing to support allocation of funds to environmental measures in order to better understand motivations and to be able to gain acceptance of sustainable management initiatives requiring increases in funding. The study also highlights the importance of the natural environment to New Zealanders. While they evaluate our environment positively, they are concerned about its quality and its management and in general favour further allocation of resources for environmental management.