

**Final Report**

**The Rotorua Lakes  
Evaluation of Less Tangible Values**

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**A report prepared for  
Environment Bay of Plenty**

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**Nimmo-Bell**  
& COMPANY LTD

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Responsibility for the final product rests with the authors.

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## **1. Executive Summary**

A survey of the less tangible values of the Rotorua Lakes has obtained a good level of response from Rotorua District and the rest of Bay of Plenty residents and Auckland anglers. The survey is fairly representative of the population based on sex and household income but has over-represented Tauranga district in the rest of BOP sample. Based on the number of respondents and the population of households, the survey results have a confidence level of 90% with a margin of error of less than 10%.

Both Lake Rotorua and Lake Rotoiti have poor water quality as rated by Rotorua and the rest of BOP. The lake water degradation has been blamed on septic tank sewage, farming, industry and city sewage. About half of the residents say that the government and the polluter should pay for lake water quality improvement. Local government has an additional responsibility as a polluter (i.e. as the entity running the city sewage). This shows that, given city sewerage is no longer as significant a contributing factor, there is a need for an education and awareness campaign to address misconceptions on the sources of pollution.

In terms of addressing the issue of lake water degradation, both Rotorua and the rest of BOP perceive incentives to change practices, regulations/restrictions and education as effective while voluntary change to behaviour is slightly effective to effective.

Passive attributes ranked ahead of active attributes in terms of important aspects of the lake. This signifies the importance of the intangible aspects of lake water quality. This has also been reinforced by the view of those willing to pay that 'the lakes are worth preserving regardless of the cost.'

The presence of algal blooms affects the use of the lakes for more than half of the respondents. A greater proportion of Auckland anglers are affected compared to Rotorua and the rest of BOP. This effect translates to a reduction of days spent for recreational activities in the lakes. This reduction, in turn, translates to an economic impact for Rotorua. It is estimated that foregone revenues from Auckland anglers (representing 27% of total anglers in the Rotorua District) may total \$0.8 million a year.

In regard to willingness to pay for lake water quality improvement, Rotorua has a higher proportion of respondents who are willing to pay relative to the rest of BOP. In both samples, less than half of the respondents are willing to pay. In dollar amounts, Rotorua's WTP is calculated at \$91.24 per year while the rest of BOP's WTP is \$11.85 per year. The weighted WTP for the region is \$32.21. Based on the number of households in the region, the aggregate amount of regional rates that could be raised each year is estimated at \$2.8 million. Due to

differences in WTP amounts for Rotorua and the rest of BOP, a practical consideration is whether or not to apply differential rates.

We advise caution in the use of the quantitative findings of the report (e.g. WTP amounts, economic impact). We consider the survey is generally representative of the behaviour of the larger population with a 90% confidence level within certain ranges. In the case of Rotorua's WTP of \$91.24, it can be said that there is 90% confidence that the amount is between \$97.81 and \$84.67.

Additional amounts may be raised for those willing to pay as more than half the respondents stated that the lake is worth preserving regardless of cost. The survey, however, is not robust enough to determine if these respondents belong to a particular grouping (i.e. recreational users or those living by the lake did not yield higher or statistically significant WTP amounts).

Lastly, the importance of the lakes to Auckland anglers is demonstrated by the highest willingness to pay of all categories at \$245.78 with 62% stating a willingness to pay.

Over 85% of respondents answered the last and open-ended question on final comment(s). The high response rate on this item illustrates the level of interest and concern, if not passion, of the respondents to the Rotorua Lakes. The two key themes that can be distilled from the comments are: (1) that EBOP has not fulfilled its mandate in protecting the lakes, and (2) that EBOP should get into 'action' rather than continue 'talking.'



## **2. Introduction**

### **2.1. Background**

At a meeting of the Rotorua-Rotoiti Focus Group and the consultants Nimmo-Bell & Company Ltd convened by Environment Bay of Plenty and held on 13 November 2003 a number of participants raised issues relating to evaluating less tangible values of water quality degradation on the district and region. These issues were expressed as follows:

- That some aspects of activity is more easily financially assessed than other less tangible values
- It was agreed that Fish and Game's "fishery Information" – especially angler numbers was critical
- It was noted that lake-side residences and lake recreation were important to tourism
- That contingent valuation was a technique that could be used to help assess the impact of degraded water quality but that the technique was contentious due to its qualitative nature
- That contingent valuation techniques to assess "opportunity costs" should be included in the Terms of reference (TOR)
- That the "cost" of doing nothing relative to current water quality problems is important as the actions of one sector can cause costs to another sector, e.g. farming may not be impacted but tourism could be
- That the contingent valuation approach was important when considering the cost of taking actions and that due to lake closure there was a significant reduction in anglers and there was an out of region angler perception that all Rotorua Lakes were dead
- That any assumptions needed to be clearly stated. Values that cannot be readily assessed in \$ terms also need to be stated (e.g. value of eco-systems)
- That it was important to get on and do the job and avoid paralysis by analysis?
- That the community would be happy if the consultants followed a vigorous process of analysis.

## 2.2. Objectives

As a result of the need to address these issues the terms of reference for the 'Economic evaluation of land use change options for Lakes Rotorua and a Rotoiti' were amended to include the following statement"

*In receiving the Lake Okareka work, some members of that Working Group raised the issue of the 'environmental cost' and how regard should be given to this.*

The group has asked that the consultant utilise contingent valuation techniques to evaluate some of the less tangible values and associated opportunity costs.

This report addresses the above terms of reference.

## 2.3. Literature review

The most recent assessment of the social and economic importance of the Rotorua Lakes was presented to the Rotorua Lakes Symposium in 2001 (Horgan, 2001). This rather brief overview reviewed how the Rotorua lakes have shaped the history of this region. It noted that the lakes are clearly important as recreational and tourism related resources where the value of the lakes is shaped by all four of the usual value streams - direct consumptive, direct non-consumptive, indirect and existence / option. The paper noted that the value of the lakes for recreation and tourism served as one of the major issues in negotiations between Te Arawa and government over the lakes. The paper explored the economic values associated with the lakes and their relationship with residents and visitors. It also noted that commitment to a land based wastewater treatment scheme for urban Rotorua indicated the importance of this lake, and maintenance of its quality, to the local community. The capital costs were some \$10-16 million higher and running costs 100% greater than the cheapest alternative option.

Weber et al (1992) conducted a survey that indicated a widespread willingness-to-pay to improve the quality of the water in Lake Rotorua, even when households do not use the lake. They concluded that the off-farm non-market values (existence, recreation and aesthetic values) of soil conservation to residents in the region were about \$2.2 million per year and far exceeded the on-farm net benefits. They also estimated the impacts on tourism could be as high as \$2 million per year.

Shaw (1990) estimated that anglers spent \$13 million in the Rotorua Lakes district on their sport in the 1986-87 season. This equates to over \$22 million in current dollar terms. In another study, Andrews (2000) estimates that the freshwater recreational fishing industry brings more than \$25 million to the Bay of Plenty Region.

However this revenue to the Rotorua district is under threat. Pitkethley (2003) reported that the bloom of blue-green algae during the 2002-03 summer season caused a major reduction in fishing. The most seriously affected lake was Rotoiti, but blooms also occurred in other lakes in the central North Island. Rotoiti, has been the second most fished lake in New Zealand after Taupo with 40,000 visits. In 2001-02 Rotoiti slipped to third place, but still attracted 43,000 visits. But all this changed over the summer 2002-03 period and visits dropped by an estimated 65%. During the height of the bloom, Pitkethley states that the stench was eye-watering and the fishing was generally hard.

The impact of the bloom on Rotoiti has carried over into the 2003-04 season and on open day a count of anglers by Fish and Game showed numbers were down 50% (Smith, 2003). This compares with Okataina and Tarawera, which were down by 20%. Smith puts the overall reduction to a mid-week start and poor weather, but it does not explain the much greater fall in anglers on Rotoiti. Smith is concerned that the negative perceptions given in the media have turned anglers, particularly from Auckland, away from the lakes and they may be hard to get back. In the eight months since the bloom, licence sales in the region have dropped by around 30% compared to previous seasons. The concern is that if the blooms become an ongoing feature of the lakes there will be a significant impact on the local economy.

#### ***2.4. Contingent valuation survey approach***

The analysis carried out by Weber et al in 1992 provides a useful starting point for an up dated analysis that focuses on deterioration of water quality rather than the wider soil conservation issues for the region.

A contingent valuation approach is used to elicit behaviour and value. As there has been a recent significant change in the status of the lakes we are able to use revealed preference analysis as well as look into the future through stated preference analysis.

We carried out a stratified random sample postal survey of 1,000 households in Rotorua District and the rest of Bay of Plenty Region. We also included a sub-sample of Auckland based trout anglers who purchased licences in the 2001-2 season prior to the algal blooms.

Postal surveys typically have response rates of between 30% and 40% and the sample size was set to ensure significance of the inferences over this range. We allowed for a low initial response and provided for two follow up mail outs to non-respondents (see appendix 3). We assured respondents that all information provided would not be attributed to any individual but were able to identify respondents to remove their names from follow up requests to complete the survey. In conjunction with Environment Bay of Plenty we decided to provide a \$100 incentive to ten respondents to return the completed questionnaire. In addition, a public relations exercise was carried out by Environment Bay of Plenty in support of the survey to inform people of the importance of participating (see appendix 2).

The preliminary research and preparation for the survey was undertaken in January 2004. The survey was timed to take place when most people are home from their holidays (late January and early February 2004).

### 3. Survey design and execution

#### 3.1. Sampling

The stratified postal survey had a sample of 1,000 households. The survey was stratified as follows:

Bay of Plenty (BOP) residents

- Rotorua
- Rest of BOP

Anglers

- Auckland anglers

Based on the total population of BOP households (Statistics New Zealand 2001 Census) and the fishing licenses<sup>1</sup> issued during 2001-02 fishing season (Fish & Game New Zealand - Eastern Region), the sample sizes required for 90% confidence level, 10% error (confidence interval) and 30% survey response rate are:

Table 1. Sample size

Category	Population size	Required responses (90% confidence level and 10% error)	Required sample size (30% response rate)
Rotorua	22,254	68	227 ~ 350
Rest of BOP	64,536	68	227 ~ 420
Auckland anglers	5,461	67	224 ~ 230
Total			1,000

The required sample sizes have been inflated to higher quantities to cover for lower than expected response rate and/or to achieve higher confidence level and lower error level in the event of satisfactory response rate.

Among three database sources (telephone book, electoral rolls and BOP rate-payers), we chose to draw the random sample from the BOP region rate-payers database for the following reasons:

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<sup>1</sup> Fishing licenses with Auckland addresses only which represent about 27% of Rotorua Lakes' anglers (Shaw, 1990).

- Some names are not published in the telephone book and the electoral rolls.
- The geographical boundary coverage for both the telephone book and the electoral rolls are not exactly the same as the BOP region.
- The telephone book includes a mix of residential and commercial customers.
- The properties in the BOP rate-payers database are within the boundaries of the region. We could identify most residential properties and exclude commercial and industrial properties.

As some residential properties were not occupied by the rate-payer (i.e. rental property) the survey was generically addressed to the 'head of the household' and not the rate-payer.

We decided to limit the sample of anglers to Auckland and BOP residents (excluding the rest of New Zealand and international) as they account for majority of Rotorua Lakes anglers and the most likely to be exposed to recent publicity on the lakes. Furthermore, as we are after the behaviour of regular anglers, the random sample only included license categories under adult/family season, adult week and adult winter season. The ones excluded were adult 24 hours and the youth types. The Auckland angler sample was randomly drawn from the fishing licenses issued by Fish & Game Eastern Region during the fishing season ending September 2002. This fishing season was prior to the appearance of algal blooms and was chosen to trace any effect on behaviour after a visible change in water quality.

### **3.2. Pilot survey**

A pilot survey was conducted to elicit feedback on the design, presentation, length and response rate of the survey questionnaire and cover letter. The range of respondents that participated in the pilot survey is:

- Staff of Environment Bay of Plenty
- Academe
- Environmentalist
- Maori Trust
- Rotorua resident
- Bach owner
- Staff of Fish & Game New Zealand
- Nimmo-Bell staff.

### **3.3. *Cover letter***

The cover letter starts with an appeal for help and an emphasis on the importance of input from the respondents. It then explains the background on lake water quality and the purpose of the survey. This part of the letter is brief and factual so as not to introduce any bias. The letter closes with an offer of prize reward for participation.

### **3.4. *Questionnaire***

The survey questionnaire has focused on the two major and critical Rotorua Lakes – Lake Rotorua and Lake Rotoiti. Five sets of questions were presented to respondents.

The first set of questions explores the perceptions of the respondent to lake water in terms of:

- Lake water quality
- Sources that affect water quality
- Importance of the lake
- Alternatives/substitutes for the lakes.

The second set of questions delves into the usage of the lakes in the following manner:

- Importance of lake activities
- Amount of usage
- Effect of algal blooms on usage
- Effect of algal blooms removal on usage.

The third set of questions is exclusively for trout anglers. It asks the respondent to differentiate fishing experiences between 2002 (pre-algal blooms) and 2003 (during algal blooms).

The fourth set of questions attempts to quantify the value of the lakes and the reasons behind the value. The value is quantified through the willingness-to-pay methodology. Instead of choosing in a range of amounts per year, each respondent has been given a specific amount to pay every year. The respondent can either say yes or no to the annual amount asked. By giving only one amount, the method mimics normal market transactions (e.g. an item in a shop or supermarket has a price tag). The five amounts chosen in a geometric progression series are (\$/per year):

- \$5
- \$15
- \$45
- \$135
- \$405

These amounts have been randomly distributed among the survey respondents (i.e. this question is not identical for all questionnaires as it can be only one of the five dollar amounts). The scenario described for the willingness to pay( WTP) is through an increase in rates, rent or taxes. These are applicable for owner occupied dwelling (rates), for renters (increase in annual rent is same as rates increase) and anglers (personal taxes).

The fifth set of questions focuses on socio-economic aspects of the respondent's household. The answers to these questions will verify the representativeness of the survey response to the respective target population. These socio-economic aspects can also be used to determine differences in behaviour or value towards the lake.

We stressed the confidentiality of individual responses and the anonymity of the respondent in two areas of the questionnaire in order to maximize the response rate.

The survey questionnaire and cover letter are presented in Appendix 1.

### **3.5. *The survey implementation***

The first mail-out of the survey letter and questionnaire started on February 11, 2004 when most people have returned home from any extended holiday. After 2 weeks, a second mail-out occurred due to an unusually high rate of return-to-sender. To increase the response rate, EBOP issued two press releases (refer to Appendix 2). Also, we sent two reminders during the survey period the first of which was a postcard and the second a full set of papers including covering letter, questionnaire and return envelope (refer to Appendix 3). The survey was formally closed on March 15<sup>th</sup> 2004.



## 4. Analysis and results

### 4.1. Survey profile

#### Response rate

The postal survey attained a delivery rate of 97.5% (975) after two mass mail-outs. Within two reminder mailings, the response rate from the delivered questionnaires was 35.7% (348). This response rate is higher than the typical 20-30% response rate of postal surveys. The ten \$100 prize rewards, EBOP publicity and reminders all combined to achieve the satisfactory response rate. After the official close of the survey, 17 late respondents (1.7%) were still received but could no longer be included in the survey tabulation.

Table 2 Response rate

<b>Response rate</b>			
	Number	% of delivered	% of mail-out
Valid respondents	348	35.7%	34.8%
Invalid respondents	7	0.7%	0.7%
Late response	17	1.7%	1.7%
No response	603	61.8%	60.3%
<b>Subtotal delivered</b>	<b>975</b>		<b>97.5%</b>
Return to sender	25		2.5%
<b>Total mail-out</b>	<b>1,000</b>		<b>100.0%</b>

#### BOP respondents by district

According to survey design, Rotorua is over-represented in the sample of BOP Region (51.2% of respondents versus 25.6% in 2001 Census) in order to analyse Rotorua as a stand-alone sample. Looking at the rest of BOP as a separate sample, the survey returns show Tauranga is over-represented relative to Whakatane and other districts. This may be due to the higher level of awareness or usage of the Rotorua Lakes to the households in Tauranga relative to other districts.

Table 3 BOP respondents by district

<b>BOP respondents by district</b>				
District	Number of households	Percent of total households	Survey respondents	% of total BOP respondents
Rotorua	22,254	25.6%	129	51.2%
Tauranga	34,911	40.2%	95	37.7%
Whakatane	11,328	13.1%	14	5.6%
Others	18,297	21.1%	14	5.6%
<b>Total households</b>	<b>86,790</b>	<b>100.0%</b>	<b>252</b>	<b>100.0%</b>

Source: SNZ 2001 Census

### Demographics of respondents

By sex classification, the survey is representative of the Rotorua and the rest of BOP populations. The SNZ 2001 Census proportions of male and female are within the confidence interval of the survey. For instance, the male share of population in Rotorua is 47.6% according to the 2001 Census. This figure is within the confidence interval of 42.0% to 48.5% for the Rotorua survey sample.

Table 4 Survey respondents by sex (15 years old and older)

<b>Survey respondents by sex (15 years old and older)</b>					
Category	Survey	% of total	Census 2001	Lower limit	Upper limit
<b>Rotorua</b>					
Male	110	45.3%	47.6%	42.0%	48.5%
Female	133	54.7%	52.4%	50.8%	58.7%
<b>Rest of BOP</b>					
Male	105	46.9%	47.7%	43.4%	50.3%
Female	119	53.1%	52.3%	49.2%	57.1%

Note: Lower limit and upper limit calculated based on confidence interval of respective samples

Male and female were counted from adult members of households

By household income, both the Rotorua and the rest of BOP samples are representative of income groups in the population except for the \$20,001 to \$50,000 income group. This group is slightly over-represented in the survey.

The Auckland angler sample comparison with the Auckland Census has been shown in order to illustrate the difference between anglers and the Auckland population. A large majority (86.1%) of Auckland anglers belong to the more than \$50,000 income group compared to 38.7% in the Auckland census.

Table 5 Survey respondents by household income

Category	Total Household Income				Total
	Less than \$20,001	\$20,001 - \$50,000	\$50,001 or More	Not Stated	
<b>Rotorua survey</b>	26	48	37	18	129
% of Total	20.2%	37.2%	28.7%	14.0%	100%
Rotorua census	19.1%	30.8%	28.6%	21.5%	100%
Lower limit	18.7%	34.5%	26.6%	12.9%	
Upper limit	21.6%	39.9%	30.7%	15.0%	
<b>Rest of BOP survey</b>	27	45	34	17	123
% of Total	22.0%	36.6%	27.6%	13.8%	100%
Rest of BOP census	22.8%	32.7%	25.9%	18.6%	100%
Lower limit	20.3%	33.9%	25.6%	12.8%	
Upper limit	23.6%	39.3%	29.7%	14.8%	
<b>Auckland angler survey</b>	1	6	68	4	79
% of Total	1.3%	7.6%	86.1%	5.1%	100%
Auckland census	15.7%	24.5%	38.7%	21.1%	100%
Lower limit	1.1%	6.9%	78.2%	4.6%	
Upper limit	1.4%	8.3%	94.0%	5.5%	

Note: Lower limit and upper limit calculated based on confidence interval of respective samples

Source: SNZ 2001 Census

The survey respondents by ethnicity is not directly comparable to the SNZ Census data due to differences in methodology. The Census ethnicity profile allows identification with more than one ethnic group resulting in more than 100% total of ethnic groups compared to the population (e.g. Rotorua ethnic groups in Census total 115%). Another factor accounting for the difference is the way people interpret their ethnicity. A larger proportion of survey respondents see themselves as 'Other' ethnic group when a closer look at their comments will allow classification as either NZ European or NZ Maori.

Despite the differences, the NZ European and NZ Maori in the Rotorua and the rest of BOP samples are only slightly off from Census data except for the under-representation of the NZ Maori ethnic group in the rest of BOP.

Similar to findings in the household income analysis, Auckland anglers sample is biased towards the NZ European ethnic group (88.6% vs. 68.5%).

Table 6 Summary respondents by ethnicity

<b>Survey respondents by ethnicity</b>						
Category	NZ		Pacific		Other	Total
	European	NZ Maori	Peoples	Asian		
<b>Rotorua survey</b>	78	41	1	1	6	127
% of Total	61.4%	32.3%	0.8%	0.8%	4.7%	100%
Rotorua census	71.7%	35.6%	4.1%	3.2%	0.3%	115%
Lower limit	57.0%	30.0%	0.7%	0.7%		
Upper limit	65.8%	34.6%	0.8%	0.8%		
<b>Rest of BOP survey</b>	102	11	0	1	9	123
% of Total	82.9%	8.9%	0.0%	0.8%	7.3%	100%
Rest of BOP census	80.6%	25.1%	1.8%	1.9%	0.2%	110%
Lower limit	76.8%	8.3%	0.0%	0.8%		
Upper limit	89.1%	9.6%	0.0%	0.9%		
<b>Auckland angler survey</b>	70	2	0	2	5	79
% of Total	88.6%	2.5%	0.0%	2.5%	6.3%	100%
Auckland census	68.5%	11.6%	14.0%	13.8%	1.2%	109%
Lower limit	80.5%	2.3%	0.0%	2.3%		
Upper limit	96.8%	2.8%	0.0%	2.8%		

Note: Lower limit and upper limit calculated based on confidence interval of respective samples

Source: SNZ 2001 Census <sup>(1)</sup>

(1) Includes all of the people who stated each ethnic group, whether as their only ethnic group or as one of several ethnic groups. Where a person reported more than one ethnic group, they have been counted once in each applicable group.

### Confidence interval of survey samples

Due to the high level of response rate and high number of survey questionnaires mailed out, the survey has achieved responses over the desired minimum. With more respondents per sample, the confidence interval (margin of error) has narrowed from 10% to 7.2%, 7.4% and 9.2% for Rotorua, rest of BOP and Auckland angler samples, respectively.

Table 7 Confidence interval of survey samples

<b>Confidence interval of survey samples</b>				
Category	Number of households or anglers	Required responses 90% confidence level and 10% error	Survey respondents	Confidence interval
				90% confidence level
Rotorua	22,254	68	129	7.2%
Rest of BOP	64,536	68	123	7.4%
Auckland anglers	5,461	67	79	9.2%

Source: SNZ 2001 Census and Eastern Region fishing licenses 2001/02

#### **4.2. Bay of Plenty opinion and behaviour**

##### **Location of respondent versus use of the lakes**

Most residents from both Rotorua and the rest of BOP use the Rotorua lakes. Due to proximity, a slightly higher concentration of Rotorua residents (93.8%) use the lakes compared to the rest of BOP. However, this slight difference is not considered statistically different due to the confidence interval of the survey. Applying the survey confidence interval (section 4.1.4) to the usage rate of the lakes, the lower limit of Rotorua at 87.0% would overlap with the 92.6% upper limit of the rest of BOP.

Table 8 Location of respondent versus use of the lakes

##### **Location of respondent versus use of the lakes**

##### **Q-5. How do you use the lakes at present?**

If you do not partake of any recreational activity at the lakes, choose "1-not important at all"  
(4 point scale with 1 as 'not important' and 4 as 'extremely important' )

Location	Yes	% of Total	No	% of Total	Total
Rotorua	121	93.8%	8	6.2%	129
Rest of BOP	106	86.2%	17	13.8%	123

Note: Yes are those with minimum rating of 2

No are those with maximum rating of 1

##### **Opinion on lake water quality**

Both lakes received a poor rating (between 3 and 3.5 rating) from Rotorua and the rest of BOP. The opinion from the survey shows a slightly poorer rating for Lake Rotoiti. Again, this poorer rating for Lake Rotoiti is not considered statistically different. In Rotorua, there is more awareness of Lake Rotorua water quality compared to Lake Rotoiti water quality as shown by the level of 'unsure' responses. In the rest of BOP, the respondents have similar water quality awareness levels on both lakes.

Table 9 Opinion on water quality of the lakes

**Opinion on water quality of the lakes**

**Q-1a and Q-1b. What do you think of water quality in Lake Rotorua and L**

(4 point scale with 1 as 'good' and 4 as 'very poor' while 5 was 'unsure')

	Lake Rotorua	% of total respondents	Lake Rotoiti	% of total respondents
<b>Rotorua</b>				
Average score	3.04	94.4%	3.34	83.7%
Unsure	7	5.6%	20	16.3%
Total respondents	126	100.0%	123	100.0%
<b>Rest of BOP</b>				
Average score	3.13	76.7%	3.41	78.3%
Unsure	28	23.3%	26	21.7%
Total respondents	120	100.0%	120	100.0%

**Opinion on sources of lake water degradation**

The results show similarities in opinion between Rotorua District and the rest of BOP on sources of lake water degradation. Among 7 potential sources, four had an average score of important to extremely important. These four are farming, city sewage, septic tank sewage and industry. Urban and road stormwater, forestry and geothermal/geological sources were considered only slightly important.

Among the four important to extremely important sources, city sewage was the highest ranked by the rest of BOP and the fourth highest in Rotorua District. This opinion is interesting considering the huge investment made a decade ago in a treatment facility for the safe release of city sewage into the forest. Farming is the second highest ranked source by both Rotorua and rest of BOP.

Table 10 Sources of lake water degradation

**Sources of lake water degradation**

**Q-2. Which sources do you feel have an effect on lake water quality**

(Average score along a 4 point scale with 1 as 'not important' and 4 as 'extremely important' while X was 'do not know')

Sources (ranked)	Rotorua		Rest of BOP	
	Average score	Rank	Average score	Rank
Septic tank sewage	3.39	1	3.25	3
Farming	3.32	2	3.39	2
Industry	3.30	3	3.22	4
City sewage	3.25	4	3.54	1
Forestry	2.71	5	2.74	6
Urban/road stormwater	2.68	6	2.79	5
Geothermal/geological	2.22	7	2.41	7

### Value and importance of the lakes

There are also similarities in opinion on value and importance of the lakes for both Rotorua and rest of BOP residents. All 6 attributes except traditional food supply (i.e. traditional food gathering) were considered important to extremely important. Passive attributes like fresh air, unspoilt environment and aesthetics/beauty are the top-ranked attributes. Active attributes like healthy (bountiful) trout fishery and recreational activities follow in importance. Traditional food supply did not rank as highly as other attributes due to its exclusivity to Maori practices.

Table 11 Value and importance of the lakes

#### Value and importance of the lakes

##### Q-3. What aspects are important to you when you visit the lakes

(Average score along a 4 point scale with 1 as 'not important' and 4 as 'extremely important' while X was 'do not know')

Attribute (ranked)	Rotorua		Rest of BOP	
	Average score	Rank	Average score	Rank
Fresh air				
Average score	3.69	1	3.70	1
Do not know	1		7	
Total respondents	120		117	
Unspoilt environment				
Average score	3.57	2	3.66	2
Do not know	0		7	
Total respondents	123		119	
Aesthetics (Beauty)				
Average score	3.56	3	3.56	3
Do not know	0		7	
Total respondents	121		116	
Healthy trout fishery				
Average score	3.32	4	3.22	5
Do not know	1		7	
Total respondents	118		111	
Recreational activities				
Average score	3.12	5	3.28	4
Do not know	0		7	
Total respondents	120		112	
Traditional food supply				
Average score	2.46	6	2.51	6
Do not know	2		10	
Total respondents	116		111	

### Importance of recreational activities

With regard to the importance of recreational activities in the lakes, picnicking is the highest ranked with a rating important to extremely important for both Rotorua and rest of BOP. Picnicking is closely followed by swimming, walking/photography and scenic driving. It is notable that among the three secondary activities, scenic driving is slightly ahead of the other two for the rest of BOP.

Table 12 Importance of recreational activities

#### Importance of recreational activities

#### Q-5. What recreational activities do you or any member of your household partake at the lakes and indicate their level of importance?

(Average score in 4 point scale with 1 as 'not important' and 4 as 'extremely important' )

Activity	Rotorua		Rest of BOP	
	Average score	Rank	Average score	Rank
Picnicking	3.1	1	3.1	1
Swimming	3.0	2	2.8	3
Walking and/or photography	2.8	3	2.8	3
Scenic driving	2.7	4	2.9	2
Trout angling	2.4	5	2.1	4
Motorised boating	2.0	6	1.9	6
Lakeside living	2.0	6	1.8	7
Everyday driving	1.9	7	1.6	8
Kayak/rowing	1.8	8	2.0	5
Traditional food gathering	1.7	9	1.5	9
Bird watching	1.5	10	1.8	7
Yachting	1.4	11	1.5	9
Wind sailing	1.3	12	1.5	9
Others	1.3	12	1.1	11
Jet skiing	1.2	13	1.3	10
Shooting	1.2	13	1.3	10

Note: In calculating the average, a rating of 1 was assumed for survey respondents who did not indicate a rating for a particular activity.

Other recreational activities ('others' in Table 12 above) are presented in Appendix 4.



### Current activities on the lakes

Among the recreational activities, picnicking is the most popular activity. Aside from picnicking, activities that are undertaken by a majority of people (more than 50% of respondents) are walking/photography, swimming and scenic driving. Table 13 (Current activities over past 12 months on the lakes by household) also illustrates that some activities are undertaken more intensively (statistically more intensive) by Rotorua compared to rest of BOP due to proximity. Since not all activities are undertaken more intensively by Rotorua residents, this table partly explains the lack of statistical difference in the use of the lakes in section 4.2.1 (Table 8 - Location of respondent versus use of the lakes).

Table 13 Current activities (over past 12 months) on the lakes by household

Activity (ranked)	Rotorua		Rest of BOP	
	Number of households	% of users	Number of households	% of users
Picnicking	95	78.5%	69	65.1%
Walking and/or photography	80	66.1%	55	51.9%
Swimming	79	65.3%	57	53.8%
Scenic driving	76	62.8%	62	58.5%
Motorised boating	49	40.5%	42	39.6%
Trout angling	49	40.5%	35	33.0%
Everyday driving	38	31.4%	12	11.3%
Kayak/rowing	35	28.9%	29	27.4%
Lakeside living	22	18.2%	10	9.4%
Traditional food gathering	21	17.4%	10	9.4%
Yachting	18	14.9%	8	7.5%
Bird watching	15	12.4%	15	14.2%
Jet skiing	12	9.9%	6	5.7%
Shooting	10	8.3%	6	5.7%
Wind sailing	8	6.6%	6	5.7%
Others	7	5.8%	3	2.8%

Other recreational activities<sup>2</sup> ('others' in Table 13 above) are presented in Appendix 5.

<sup>2</sup> Appendices that contain responses to open-ended questions are not categorised according to Rotorua, rest of BOP and Auckland angler samples.

### Frequency of activities

In the next table (Table 14), the frequency of lake usage in terms of recreational activities is analysed. The average (mean) and median are shown in order to illustrate the difference where a few avid respondents pull up the average for a particular activity. The median is the number of days where at least 50% of the respondents have undertaken that activity as a minimum.

Although picnicking has the highest relative importance and the most popular activity, the median number of days is only 10 days for Rotorua and 5 days for the rest of BOP. Activities with the highest median days for Rotorua (20 days) are swimming and bird watching. For the rest of BOP, the activities with the highest median days are traditional food gathering<sup>3</sup> (12 days) and trout angling (10 days).

Table 14 Number of days per year per activity by household

**Number of days per year per activity by household**

Activity (ranked median days)	Rotorua		Rest of BOP	
	Average number of days	Median number of days	Average number of days	Median number of days
Swimming	31.5	20	19.7	6
Bird watching	73.7	20	23.8	5
Motorised boating	29.8	12	20.8	6
Trout angling	30.4	12	19.2	10
Walking and/or photography	42.9	12	11.6	5
Shooting	17.9	11	15.3	6
Kayak/rowing	22.9	10	15.8	5
Traditional food gathering	43.8	10	16.8	12
Picnicking	20.9	10	13.8	5
Scenic driving	24.6	10	17.3	8
Jet skiing	6.2	5	14.0	5
Yachting	12.8	5	8.5	5
Wind sailing	5.3	4	24.5	8
Everyday driving	189.6	200	52.4	30
Lakeside living	258.1	365	34.6	21
Others	168.6	60	10.0	10

Note: Above activities ranked by median days except everyday driving, lakeside living and others

<sup>3</sup> Traditional food gathering is a predominantly Maori related activity for collection of food items from the lake such as koura and eels.

### Effect of algal blooms

The majority of Rotorua District and the rest of BOP respondents are affected by the presence of algal blooms. There is no statistical difference between those affected by algal blooms in Rotorua versus the rest of BOP, however more people in the rest of BOP (17.5%) are unsure if they are affected by the algal blooms compared to Rotorua (11.2%).

Table 15 Effect of algal blooms

#### Effect of algal blooms

##### Q-7. Does the presence of algal blooms affect your use of the lakes?

	Yes	No	Unsure	Total
Rotorua	86	25	14	125
% of total	68.8%	20.0%	11.2%	100.0%
Rest of BOP	71	23	20	114
% of total	62.3%	20.2%	17.5%	100.0%

The effect of algal blooms is manifested in the change of lake usage behaviour. Over the last 12 months water in the Rotorua Lakes has been characterised by the presence of algal blooms and section 4.2.2 (Table 9 - Opinion on water quality of the lakes) has confirmed the impression of the poor state of lake water quality. The usage frequency for the scenario **without algal blooms** has been asked in Q-8 of the questionnaire as future behaviour if algal blooms were never present (please refer to Appendix 1 for questionnaire). On the other hand, Table 14 (Number of days per year per activity by household) in section 4.2.7 has been used as the scenario **with algal blooms** and the methodology on evaluating the effect of algal blooms is further explained in footnote of the next table (Table 16).

Table 16 Change in usage of households affected by algal blooms

**Change in usage for households affected by algal blooms**

Activity (ranked by median days)	Rotorua						Rest of BOP					
	Additional number of days w/o blooms		% change in number of days w/o blooms		Number of days usage (average)		Additional number of days w/o blooms		% change in number of days w/o blooms		Number of days usage (average)	
	Average	Median	Average	Median	With blooms	w/o blooms	Average	Median	Average	Median	With blooms	w/o blooms
Swimming	22.3	20	128%	200%	17.4	39.6	14.0	6	75%	150%	18.7	32.7
Wind sailing	24.1	15	756%	-	3.2	27.3	11.5	13	65%	371%	17.8	29.3
Picnicking	12.2	12	70%	150%	17.6	29.8	9.1	6	68%	150%	13.4	22.5
Motorised boating	16.7	10	97%	100%	17.3	34.0	12.2	12	53%	240%	23.2	35.4
Trout angling	19.2	10	104%	100%	18.6	37.8	11.2	6	58%	86%	19.2	30.4
Walking and/or photography	9.1	10	31%	100%	29.2	38.3	10.6	6	91%	150%	11.6	22.3
Scenic driving	18.5	8	124%	114%	14.9	33.4	7.3	4	39%	50%	18.8	26.1
Yachting	5.9	8	71%	150%	8.3	14.1	6.4	4	146%	-	4.4	10.8
Jet skiing	7.8	5	282%	200%	2.8	10.5	6.9	3	59%	75%	11.6	18.4
Traditional food gathering	42.5	4	687%	67%	6.2	48.6	15.7	17	171%	425%	9.2	24.9
Kayak/rowing	7.7	3	44%	30%	17.4	25.1	10.5	13	60%	325%	17.6	28.1
Bird watching	42.1	2	362%	25%	11.6	53.7	15.3	13	53%	250%	28.5	43.8
Shooting	1.8	2	60%	60%	3.0	4.8	10.2	16	76%	620%	13.3	23.5
Everyday driving	39.1	120	23%	69%	169.7	208.8	6.2	6	10%	55%	60.3	66.5
Lakeside living	72.7	0	36%	0%	200.8	273.5	15.5	14	60%	100%	26.0	41.5
Others	260.0	260	650%	650%	40.0	300.0	17.8	12	237%	185%	7.5	25.3

Note: The number of valid answers is less than the number who answered Yes to 'affected by algal blooms.' Invalidated answers are for respondents who answered qualitatively (e.g. 'heaps more days') to Q-8. Thus, data for 'average days with blooms' is different from the average in the table 'Current activities (over past 12 months) in the lakes.' For respondents who placed new activities in scenario without blooms, a value of zero days was assumed in their 'with blooms' scenario.

Blank entries under '% change' column are for activities where it is an entirely new activity undertaken by most respondents in 'without blooms' scenario.

Table 16 analyses the behaviour of those households affected by blooms. Under Rotorua, the first and second column presents the additional days (average and median) that households will use the lakes if there were no blooms. The third and fourth columns illustrate additional days in terms of percentage increase. The fifth and sixth columns show the average number of days usage under 'with blooms' and 'without blooms' scenario which is the source data for the first column. The columns under rest of BOP have been similarly presented as Rotorua. Others are presented as Appendix 6.

In Rotorua, swimming, also the top activity in the 'with blooms' scenario in section 4.2.7 (Table 14 - Number of days per year per activity by household), has the highest additional median days of 20. A number of activities had an increase of 100% or more in average and median days such as swimming, wind sailing and trout angling. The blank entry in wind sailing in percentage change in median days shows the uptake is mainly due to respondents who would not undertake windsailing in the 'with blooms' scenario.

In the rest of BOP, the top activities with the highest change in median days are traditional food gathering (also the top activity in section 4.2.7, table 14) and shooting. Just like in the Rotorua behaviour, a number of activities (though a slightly different combination of activities) will enjoy an increase of 100% or more in median days.

Comparing the 'change in usage' table (Table 16) to that in section 4.2.7 (Table 14) specifically in terms of average days, it can be seen that people affected by algal blooms have lower usage rate than the typical Rotorua or rest of BOP average. For instance, take the trout angling activity for Rotorua. In the table in the previous page (Table 16), the average days 'with blooms' is 18.6. In section 4.2.7 (Table 14 is 'with blooms' and includes both affected and unaffected by blooms) for the same 'with blooms' scenario, average days for trout angling is 30.4.

#### Effectiveness of potential approaches

The preferred approaches with an average rating of effective by both Rotorua and the rest of BOP are regulation/restrictions, incentives to change practices and education. Voluntary change in behaviour is seen as slightly effective to effective.

Table 17 Effectiveness of potential approaches

#### Effectiveness of potential approaches

**Q-14. Please indicate your views on the effectiveness of different approaches of achieving improved lake water quality.**

(Average score in 4 point scale with 1 as 'not effective at all' and 4 as 'extremely effective' while x is 'do not know')

Approach (ranked)	Rotorua		Rest of BOP	
	Average	No. of respondents	Average	No. of respondents
Incentives to change practices	3.2	103	3.2	90
Regulation and/or restrictions	3.2	103	3.3	104
Education	3.1	108	3.0	104
Voluntary change in behaviour	2.7	102	2.5	94
Others	3.5	11	2.9	12

As 'Others' are personal suggestions, respondents would tend to rate each highly. There is also no common theme in the suggestions. Other approaches are presented as Appendix 7.

#### 4.3. Bay of Plenty Willingness-to-Pay

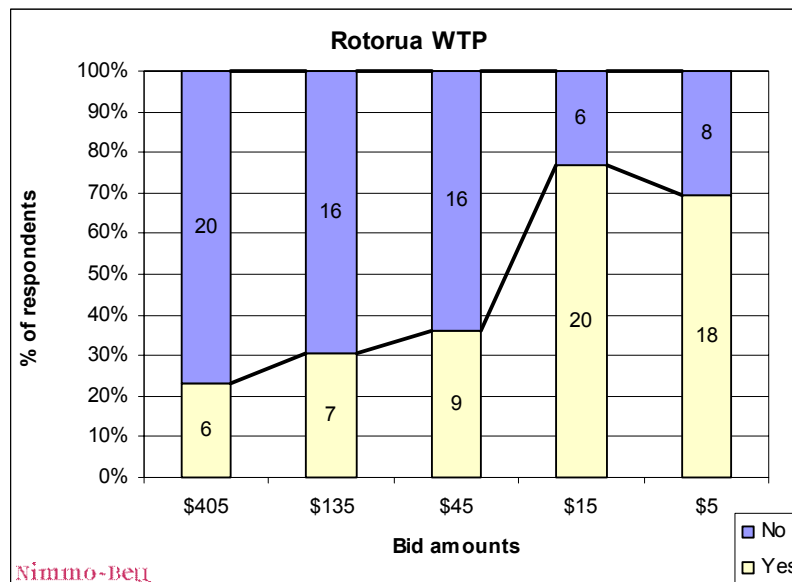
WTP by location

In Rotorua, 48% of respondents are willing to pay an amount (ranging from \$5 to \$405 per year in additional rates or rent) to improve lake water quality. As expected, a bigger proportion of people are willing to pay as the amount asked goes lower (from a low of 23% to a high of 77%). However, this trend is broken at the \$5 level as less people (69%) answered 'yes' compared to 77% for the \$15 level.

Table 18 Rotorua willingness to pay

<b>Rotorua Willingness to Pay</b>				
Bid amount	No	Yes	Total	% Yes
\$405	20	6	26	23%
\$135	16	7	23	30%
\$45	16	9	25	36%
\$15	6	20	26	77%
\$5	8	18	26	69%
<b>Total</b>	<b>66</b>	<b>60</b>	<b>126</b>	<b>48%</b>

Chart 1 Rotorua willingness to pay

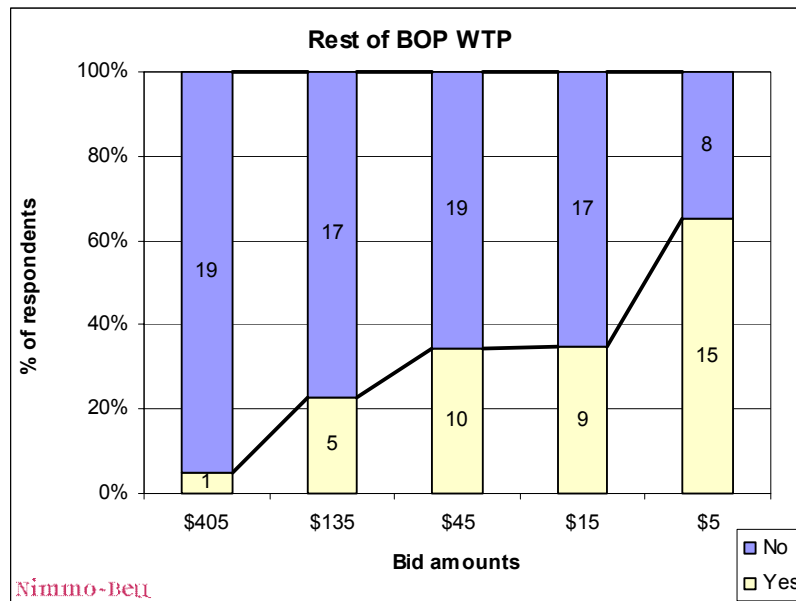


In the rest of BOP, only 33% are willing to pay increased rates or rent. The table (Table 19 - Rest of BOP Willingness to Pay) also shows a trend of increasing willingness to pay as the dollar amount drops except in the \$45 and \$15 amounts where 'yes' percentages are similar. In each of the dollar amount, the rest of BOP has lower percentage of people willing to pay compared to Rotorua although similar percentages are observed in the \$45 and \$5 levels.

Table 19 Rest of BOP Willingness to Pay

<b>Rest of BOP Willingness to Pay</b>				
Bid amount	No	Yes	Total	% Yes
\$405	19	1	20	5%
\$135	17	5	22	23%
\$45	19	10	29	34%
\$15	17	9	26	35%
\$5	8	15	23	65%
<b>Total</b>	<b>80</b>	<b>40</b>	<b>120</b>	<b>33%</b>

Chart 2 Rest of BOP willingness to pay



Applying logistic regression to calculate the median WTP (Hanemann 1984; Kaval and Loomis 2004) with a maximum p value of 0.10 (i.e. confidence level is at least 90%), Rotorua's WTP is \$91.24 while the WTP in the rest of BOP is zero (i.e. people outside Rotorua are not willing to pay).



Table 20 Willingness to Pay by Location

<b>Willingness to Pay by Location</b>	Amount	p value	respondents
Rotorua	\$91.24	0.001	126
Rest of BOP	\$0.00	0.003	120

#### Reasons for WTP

The main reason for those not willing to pay in Rotorua is ‘rates that are already too high’ for 34.8% of the respondents. Another block of respondents, representing 40.9% of those who answered ‘no,’ indicated that others (either government or those who pollute) should pay. Affordability is not a major reason as only 4.5% chose this answer.

In the rest of BOP, the already high level of rates is not the top reason while affordability is an issue for a slightly higher proportion of respondents at 10.0%. The top reason is ‘those who pollute should pay.’ This reason, in combination with ‘government should pay,’ account for 51.3% of respondents indicating others should pay.

Table 21 Reasons for those not willing to pay

#### Reasons for those not willing to pay

**Q-13. If you answered No, why would your household not be willing to pay for a nutrient reduction programme to improve water quality in the lakes?**

Reason	Rotorua		Rest of BOP	
		% of total		% of total
Rates are already too high	23	34.8%	12	15.0%
Those who pollute should pay	15	22.7%	33	41.3%
Government should pay	12	18.2%	8	10.0%
Less money would be left to use for other things that are more important	3	4.5%	8	10.0%
You don't accept the scenario of deteriorating water quality	2	3.0%	0	0.0%
Others will pay anyway	0	0.0%	1	1.3%
Other reasons	9	13.6%	13	16.3%
Various reasons	2	3.0%	5	6.3%
<b>Total</b>	<b>66</b>	<b>100.0%</b>	<b>80</b>	<b>100.0%</b>

Other reasons are presented in Appendix 8.

The majority of those willing to pay can and will still pay more as respondents who answered ‘yes’ to the WTP question indicate ‘the lakes are worth preserving regardless of cost’ as the top reason.

Table 22 Reasons for those willing to pay

**Reasons for those willing to pay**

**Q-12. If you answered Yes, why is your household willing to pay for a nutrient reduction programme to improve water quality in the lakes?**

Reason	Rotorua	% of total	Rest of BOP	% of total
The lakes are worth preserving regardless of cost	36	60.0%	23	57.5%
Preserving the lakes is worth the money that was asked	16	26.7%	17	42.5%
Other reasons	8	13.3%	0	0.0%
<b>Total</b>	<b>60</b>	<b>100.0%</b>	<b>40</b>	<b>100.0%</b>

Other reasons are presented in Appendix 9.

WTP by benefit type

Attributes of the lakes in Q-3 of the survey have been classified according to three benefit types.

Table 23 Classification of lake attributes

**Classification of lake attributes**

Passive benefit:	Aesthetics, fresh air and unspoilt environment
Active benefit:	Recreational activities and healthy trout fishery
Traditional food benefit:	Traditional food supply

In order to qualify as a respondent that value a specific benefit, one of the attributes must have a minimum rating of 3 'important' in Q-3. The resulting WTP for respondents who value particular benefits show varied amounts. In Rotorua, the active benefit grouping has the highest WTP at \$103.80. Rotorua also has higher WTP amounts compared to similar benefit type groupings in the rest of BOP. The active type grouping in the rest of BOP is not willing to pay for improved lake water quality while the traditional food benefit has a slightly higher WTP than the passive benefit grouping.

Table 24 Willingness to Pay by Benefit Type

**Willingness to Pay by Benefit Type**

Benefit	Rotorua			Rest of BOP		
	WTP	p value	respondents	WTP	p value	respondents
Passive	\$86.51	0.001	121	\$11.85	0.003	111
Active	\$103.80	0.002	106	\$0.00	0.01	97
Traditional food	\$55.59	0.04	57	\$15.33	0.06	52

## WTP by usage type

Lake activities in Q-5 of the questionnaire have been classified according to usage types.

Table 25 Classification of activities

### Classification of activities

Recreational usage:	Motorised boating, jet skiing, yachting, kayak/rowing, wind sailing, trout angling, traditional food, swimming, picnicking, walking/photography, bird watching, shooting and scenic driving
Everyday driving usage:	Going to work, shops, etc.
Lakeside living usage:	Lakeside living such as house

In order to qualify as a respondent that undertakes a particular usage, one of the activities must have a minimum rating of 3 'important' in Q-5. Those classified as recreational usage type have WTP values of \$93.22 in Rotorua and a much lower \$29.81 in the rest of BOP. The WTP values for everyday driving and lakeside living are statistically not significant. The WTP for lakeside living in the rest of BOP at \$57.42 is on the borderline of statistical significance. This is weak potential evidence that those living by the lake have higher willingness to pay for an improvement in lake water quality.

The 'not significant' (NS) WTP arises from a number of potential reasons. Some possible reasons are the smaller number of the sub-sample, the even distribution of respondents among the five dollar amounts and inconsistencies in the response pattern (i.e. as amount asked decreases, more people will say yes and with some range bound deviation). For instance, in lakeside living for Rotorua, respondents only number 40 and there was an uneven number of respondents among the different dollar amounts and there was inconsistency of 'yes' pattern in the \$45 and \$5 levels.

Table 26 Willingness to pay by usage type

<b>Willingness to Pay by Usage Type</b>						
Usage	<b>Rotorua</b>			<b>Rest of BOP</b>		
	WTP	p value	respondents	WTP	p value	respondents
Recreational	\$93.22	0.001	118	\$29.81	0.003	101
Everyday driving	NS	0.26	36	NS	0.17	19
Lakeside living	NS	0.18	40	\$57.42	0.10	27

Note: NS is not significant

#### WTP by income level

The WTP behaviour has been analysed according to household income level. However, no pattern can be established as half of the WTP calculations resulted in statistically non significant values. In the \$20,001 to \$50,000 income level, Rotorua has WTP of \$62.05 while the rest of BOP has a lower WTP of \$46.10. The higher income level of more than \$50,000 in the rest of BOP has an even lower WTP of \$34.10.

Table 27 Willingness to pay by income level

<b>Willingness to Pay by Income Level</b>						
Income	<b>Rotorua</b>			<b>Rest of BOP</b>		
	WTP	p value	respondents	WTP	p value	respondents
less than \$20,001	NS	0.14	26	NS	0.25	27
from \$20,001 to \$50,000	\$62.05	0.03	48	\$46.10	0.03	45
more than \$50,000	NS	0.40	37	\$34.10	0.06	34

Note: NS is not significant

#### Aggregate WTP for Bay of Plenty

The WTP for the entire BOP region is based on the WTP results for the Rotorua and the rest of BOP samples. Since the rest of BOP had \$0.00 WTP, it was replaced by the \$11.85 WTP of a very large sub-sample (92.5% of rest of BOP respondents), specifically the passive benefit type grouping in the rest of BOP. With the two WTP amounts weighted based on share of total households in the region, the resulting region-wide WTP is \$32.21 per household. The aggregate willingness to pay in BOP based on 86,790 households is \$2.8 million.

Table 28 Willingness to pay by the Bay of Plenty region

<b>WTP of the Bay of Plenty region</b>			
	Amount	% of total households	Households
Rotorua	\$91.24	25.6%	22,254
Rest of BOP	\$11.85	74.4%	64,536
<b>Weighted WTP</b>	<b>\$32.21</b>		
<b>Aggregate WTP</b>	<b>\$2,795,207</b>		

Note: Although the rest of BOP has 0 WTP, the WTP for the passive benefit type was used as its replacement. This grouping represent over 90% of the rest of BOP respondents.

Source: SNZ 2001 Census

#### 4.4. Auckland anglers behaviour and WTP

##### Difference in fishing experience

Auckland anglers were asked to compare their experience between fishing season ending September 2003 (when algal blooms appeared) and fishing season ending September 2002 when there were no blooms. The fishing experience in Lake Rotorua was almost the same between the two seasons. For Lake Rotoiti, the fishing experience was considered a little worse in the season ending September 2003. In both lakes, the number of respondents represented only 60% to 65% of Auckland anglers as some anglers no longer visited the Rotorua Lakes in the fishing season ending September 2003 while other anglers stated qualitative comments (please refer to Appendix 10 for list of comments).

Table 29 Comparison of fishing season ending September 03 with fishing season ending September 02

##### **Q-10. Comparison of fishing season ending September 2003 with fishing season ending September 2002**

(Average score along a 5 point scale with 1 as 'a lot better' and 5 as 'a lot worse')

	Lake	
	Rotorua	Lake Rotoiti
Auckland anglers	3.26	3.75
Total respondents	47	52

##### Importance of recreational activities

As expected, the recreational activity with the highest importance for Auckland anglers is trout angling with an average rating approaching extremely important. This activity is followed by motorised boating. The activities rated slightly important to important are picnicking, walking/photography, swimming, lakeside living, scenic driving and kayak/rowing.

Table 30 Importance of recreational activities for Auckland anglers

**Importance of recreational activities for Auckland anglers**

**Q-5. What recreational activities do you or any member of your household partake at the lakes and indicate their level of importance?**

(Average score in 4 point scale with 1 as 'not important' and 4 as 'extremely important' )

Activity	Rating
Trout angling	3.6
Motorised boating	3.1
Picnicking	2.7
Walking and/or photography	2.7
Swimming	2.6
Lakeside living	2.4
Scenic driving	2.3
Kayak/rowing	2.1
Bird watching	1.8
Yachting	1.6
Wind sailing	1.5
Everyday driving	1.5
Traditional food gathering	1.4
Shooting	1.3
Others	1.3
Jet skiing	1.1

Note: In calculating the average, a rating of 1 was assumed for survey respondents who did not indicate a rating for a particular activity.

**Effect of algal blooms**

The majority of Auckland anglers are affected by the presence of algal blooms. The percentage affected at 83.6% is higher than the 62.3% to 68.8% in the BOP region.

Table 31 Does the presence of algal blooms affect your use of the lakes?

**Q-7. Does the presence of algal blooms affect your use of the lakes?**

	Yes	No	Unsure	Total
Auckland anglers	61	7	5	73
% of total	83.6%	9.6%	6.8%	100.0%

Similar to the analysis performed on the BOP region samples, the effect of algal blooms in the change of lake usage behaviour is extracted.

**Without blooms**, Auckland anglers will increase trout fishing by an average of 11.8 days with a median answer of 4 days. The additional days is nearly double the average days in the **with blooms** scenario.

Table 32 Change in usage for Auckland anglers affected by algal blooms

**Change in usage for Auckland anglers affected by algal blooms**

Activity (ranked by average)	Additional number of days w/o blooms		Number of days usage (average)		Number of days usage (median)	
	Average	Median	With blooms	w/o blooms	With blooms	w/o blooms
Yachting	17.6	10	8.6	26.1	10	20
Wind sailing	12.5	0	8.9	21.4	10	10
Trout angling	11.8	4	12.3	24.1	10	14
Traditional food gathering	11.3	5.5	8.6	19.9	0	5.5
Jet skiing	11.0	8	1.7	12.7	0	8
Motorised boating	10.7	7	12.2	22.9	7	14
Swimming	10.6	7	10.8	21.5	3	10
Kayak/rowing	9.3	10.5	8.9	18.2	2	12.5
Picnicking	9.1	7	8.8	17.9	5	12
Shooting	6.0	6	6.0	12.0	6	12
Scenic driving	5.0	1.5	7.0	11.9	4	5.5
Walking and/or photography	4.9	8	12.0	16.9	3	11
Bird watching	2.4	0	15.3	17.7	10	10
Everyday driving	13.5	17.5	22.2	35.7	12.5	30
Lakeside living	9.5	6	25.8	35.3	14	20
Others	32.8	27.5	8.8	41.5	5	32.5

Note: For respondents who placed new activities in scenario 'w/o blooms,' a value of zero days was assumed in their 'with blooms' scenario.

## Economic effect of change in behaviour

The Rotorua Fishery Evaluation report (Shaw, 1990) has surveyed mean expenditure per angler type per day in the Rotorua District. This amount has been converted to 2001/02 dollars based on the Consumer Price Index (CPI) reported in Reserve Bank of New Zealand's website. In 2001/02 dollars the mean expenditure ranges from \$116.90 for long term license holders to \$222.00 for shorter term license holders.

Table 33 Mean expenditure per day fished during the 1986/87 season for each license type held by anglers who fished in the Rotorua Lakes

**Mean expenditure per day fished during the 1986/87 season for each license type held by anglers who fished in the Rotorua Lakes (inflated to 2001/02 dollars)**

License type	Mean expenditure per day		Licenses 2001/02 season	
	1986/87	2001/02	Number	% of total
Adult whole season	\$78.7	\$116.9	674	22.2%
Adult month	\$121.2	\$180.1	109	3.6%
Adult week	\$149.4	\$222.0	792	26.1%

Note: Inflation adjustment used the RBNZ inflation calculator and based on the consumer price index (CPI)

1986/87 mean expenditure was based on Table 105 of Rotorua Fishery Evaluation (Shaw, 1990)

License types: Adult whole season was made equivalent to adult season and family in 2001/02. Adult month was made equivalent to winter season in 2001/02

Source: Fish & Game NZ, Eastern Region - for license figures

The mean daily expenditure, combined with the additional average number of days in section 4.4.3 (Table 31 - Does the presence of algal blooms affect your use of the lakes?) and taking into account the proportion affected, were all used to calculate the economic effect of the change in behaviour. The next table (Table 34 - Economic effect of change in behaviour) shows that the total effect is \$0.78 million for one year. This

amount represents not more than 27% of the total economic effect as the survey is only based on Auckland anglers.

Table 34 Economic effect of change in behaviour

<b>Economic effect of change in behaviour</b>	
Total Auckland anglers	79
Total affected by blooms	61
Affected by blooms with valid answer	53
Percentage affected with resulting change in behaviour	67.1%
Average days reduction	11.8
Adult whole season	\$621,694
Adult month	\$154,835
<b>Total economic effect for 1 year</b>	<b>\$776,529</b>

Note: The percentage affected is a conservative estimate since it only counted those affected by the blooms and with valid response in change of usage behaviour.

Average days reduction is the change in behaviour in 'with blooms' and 'without blooms' scenario

Adult week has been excluded since average days reduction is higher than one week.

Calculation for dollar effect is percentage affected x days reduction x licenses x mean direct expenditure on fishing expenditure

The total economic effect represents not more than 27% of the total effect on expenditure since these are Auckland anglers only and long term anglers only.

### Auckland anglers WTP

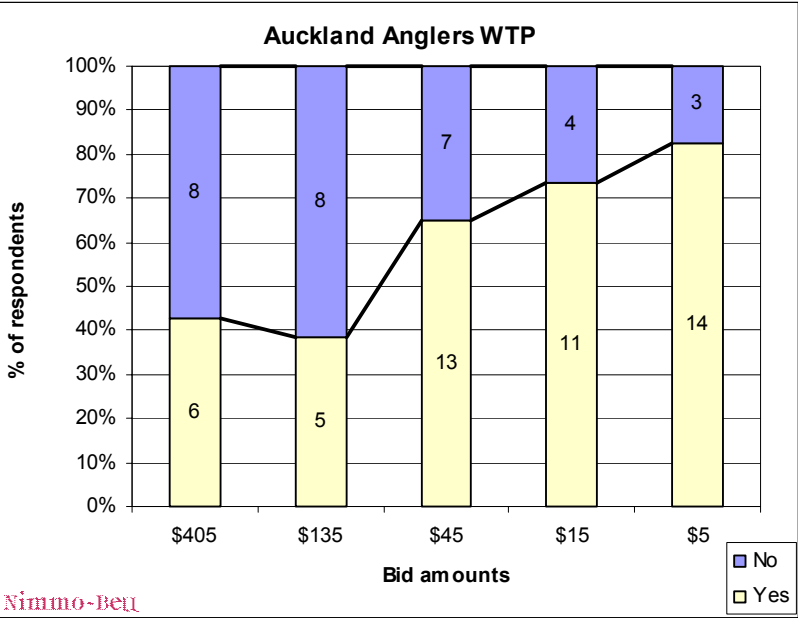
Majority of Auckland anglers (62%) are willing to pay for lake water quality improvement. This group's WTP is the highest calculated at \$245.78.

Table 35 Auckland anglers willingness to pay

<b>Auckland Anglers Willingness to Pay</b>				
Bid amount	No	Yes	Total	% Yes
\$405	8	6	14	43%
\$135	8	5	13	38%
\$45	7	13	20	65%
\$15	4	11	15	73%
\$5	3	14	17	82%
<b>Total</b>	<b>30</b>	<b>49</b>	<b>79</b>	<b>62%</b>



Chart 3 Auckland anglers willingness to pay



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## **Appendices**

### **Appendix 1**

- a) Survey cover letter
- b) Survey questionnaire

### **Appendix 2**

- a) Media release, 18 February 2004
- b) Media release, 4 March 2004

### **Appendix 3**

- a) First reminder
- b) Second reminder

**Appendix 4      Comments from Water Quality of Rotorua Lakes Survey**  
How do you use the lakes at present?

**Appendix 5      Comments from Water Quality of Rotorua Lakes Survey**  
How often does your household use the lakes?

**Appendix 6      Comments from Water Quality of Rotorua Lakes Survey**  
How much use if water quality changed?

**Appendix 7      Comments from Water Quality of Rotorua Lakes Survey**  
How should it be done?

**Appendix 8      Comments from Water Quality of Rotorua Lakes Survey**  
Why is your household not willing to pay for a nutrient?  
reduction program to improve water quality in the  
lakes?

**Appendix 9      Comments from Water Quality of Rotorua Lakes Survey**  
Why is your household willing to pay for a nutrient  
reduction program to improve water quality in the lakes?

**Appendix 10     Comments from Water Quality of Rotorua Lakes Survey**  
Comparing fishing season ending September 2003 with  
fishing season ending September 2002

**Appendix 11     Comments from Water Quality of Rotorua Lakes Survey**  
Final comments

## **Appendix 1**

### **a) Survey cover letter**



#### **Water quality of Rotorua Lakes**

Please help us solve the Rotorua Lakes water quality problem by filling in the attached questionnaire. To recognise your effort and contribution we are offering ten prizes of \$100.00 drawn randomly from people who return completed questionnaires.

Environment Bay of Plenty has commissioned us to undertake a survey on what the quality of Rotorua Lakes means to people. By completing and returning the attached questionnaire your views will be incorporated into policies and actions that will help improve lake water quality.

Over the last two summers algal blooms have appeared on Rotorua Lakes. These are the result of increasing levels of nutrients getting into the lakes and providing food for the algae to grow in huge numbers covering parts of the surface of the lakes. When the algae die they rot, producing unpleasant smells. The Council would like to know what you think about this.

Your household has been randomly selected from the rating list. Please take 10-15 minutes to answer the questions and send the completed form back to Nimmo-Bell in the reply paid envelope as soon as possible.

Your specific information will be kept confidential and will not be given to the authorities or be identified in any way.

Thank you for your input. Your views are important.

Yours sincerely



Brian Bell  
Director (Research leader)

**b) Survey Questionnaire**

**WATER QUALITY:  
WHAT DO YOU THINK?**

**FOR ENVIRONMENT BAY OF PLENTY**

Q-1a. What do you think of water quality in **Lake Rotorua**? [Circle number]

- 1 Good
- 2 Acceptable
- 3 Poor
- 4 Very poor
- 5 Unsure

Q-1b. What do you think of water quality in **Lake Rotoiti**? [Circle number]

- 1 Good
- 2 Acceptable
- 3 Poor
- 4 Very poor
- 5 Unsure

Q-2. Which sources do you feel may have an effect on lake water quality?  
[Circle number or letter]

	Not important	Slightly important	Important	Extremely important	Do not know
Farming	1	2	3	4	X
City sewage	1	2	3	4	X
Septic tank sewage	1	2	3	4	X
Urban/road stormwater	1	2	3	4	X
Industry	1	2	3	4	X
Forestry	1	2	3	4	X
Geothermal/geological	1	2	3	4	X

Q-3. What aspects are important to you when you visit the lakes? [Circle number or letter]

	Not important	Slightly important	Important	Extremely important	Do not know
Aesthetics (Beauty)	1	2	3	4	X
Fresh air	1	2	3	4	X
Unspoilt environment	1	2	3	4	X
Recreational activities	1	2	3	4	X
Healthy trout fishery	1	2	3	4	X
Traditional food supply	1	2	3	4	X

Q-4. If you could no longer go to these lakes, would you go somewhere else? [Circle number]

- 1 Yes [please specify] \_\_\_\_\_

2 No

**Q-5. How do you use the lakes at present?**

What recreational activities do you or any member of your household partake at the lakes and indicate their level of importance using the scale provided below? [Circle number]

(If you do not partake of any recreational activity at the lakes, choose “1-not important at all” and go to Q-7.)

	Activity	Not important	Slightly important	Important	Extremely important
1	Motorised boating (for trolling, water skiing or cruising)	1	2	3	4
2	Jet skiing	1	2	3	4
3	Yachting	1	2	3	4
4	Kayak/rowing	1	2	3	4
5	Wind sailing	1	2	3	4
6	Trout angling	1	2	3	4
7	Traditional food gathering (koura, eels, etc.)	1	2	3	4
8	Swimming	1	2	3	4
9	Picnicking	1	2	3	4
10	Walking and/or photography	1	2	3	4
11	Bird watching	1	2	3	4
12	Shooting	1	2	3	4
13	Scenic driving	1	2	3	4
14	Everyday driving (e.g. going to work, shops, etc.)	1	2	3	4
15	Lakeside living	1	2	3	4
16	Any others [specify]	1	2	3	4



**Q-6. How often does your household use the lakes?**

How many days over the past 12 months have members of your household used the lakes for any of the activities listed? [Enter estimated number of days]

		<b>Number of days in past 12 months</b>
1	Motorised boating (for trolling, water skiing or cruising)	
2	Jet skiing	
3	Yachting	
4	Kayak/rowing	
5	Wind sailing	
6	Trout angling	
7	Traditional food gathering (koura, eels, etc.)	
8	Swimming	
9	Picnicking	
10	Walking and/or photography	
11	Bird watching	
12	Shooting	
13	Scenic driving	
14	Everyday driving (e.g. going to work, shops, etc.)	
15	Lakeside living	
16	Any others [specify] _____	

**Q-7. Does the presence of algal blooms affect your use of the lakes? [Circle number]**

- 1      Yes                      [please go to question 8]  
 2      No                        [please go to question 9]  
 3      Unsure                    [please go to question 9]

**Q-8. How much use if water quality changed?**

If there were never algal blooms at the lakes, how many days per year would members of your household use the lakes for any of the activities listed? [Enter expected number of days]

		Number of days per year
1	Motorised boating (for trolling, water skiing or cruising)	
2	Jet skiing	
3	Yachting	
4	Kayak/rowing	
5	Wind sailing	
6	Trout angling	
7	Traditional food gathering (koura, eels, etc.)	
8	Swimming	
9	Picnicking	
10	Walking and/or photography	
11	Bird watching	
12	Shooting	
13	Scenic driving	
14	Everyday driving (e.g. going to work, shops, etc.)	
15	Lakeside living	
16	Any others [specify] _____	

**Q-9. Are you or any member of your household a trout angler?**

- 1 Yes [please go to question 10]  
2 No [please go to question 11]

**Q-10. Comparing fishing season ending September 2003 with fishing season ending September 2002, would you say that 2003 was ...? [Circle number in any or both lakes]**

	A lot better	Better	Same	Worse	A lot worse
Lake Rotorua	1	2	3	4	5
Lake Rotoiti	1	2	3	4	5

Any comment? \_\_\_\_\_  
\_\_\_\_\_

**Q-11. How much would you pay?**

Would your household be willing to pay \$135 per year in additional rates/rent/tax for a nutrient reduction programme to improve water quality in the lakes? [Circle number]

(If you rent your house, assume that any rates increase will result in an increase in house rental on a yearly basis by the same amount as the rate increase.)

- 1 Yes – I am willing to pay \$135 per year [please go to question 12]  
2 No – I am not willing to pay \$135 per year [please go to question 13]

**Q-12. If you answered Yes, why is your household willing to pay for a nutrient reduction programme to improve water quality in the lakes? [Circle one number only]**

- 1 The lakes are worth preserving regardless of cost  
2 Preserving the lakes is worth the money that was asked  
3 Other reason [please specify] \_\_\_\_\_  
\_\_\_\_\_

**Q-13. If you answered No, why would your household not be willing to pay for a nutrient reduction programme to improve water quality in the lakes? [Circle one number only]**

- 1 Less money would be left to use for other things that are more important  
2 You don't accept the scenario of deteriorating water quality  
3 Those who pollute should pay  
4 Government should pay  
5 Rates are already too high  
6 Others will pay anyway  
7 Other reason [please specify] \_\_\_\_\_  
\_\_\_\_\_

**Q-14. How should it be done?**

Please indicate, using the scale provided below, your views on the effectiveness of different approaches of achieving improved lake water quality. [Circle number or letter]

	Not effective at all	Slightly effective	Effective	Extremely effective	Do not know
Education	1	2	3	4	X
Voluntary change in behaviour	1	2	3	4	X
Regulation and/or restrictions	1	2	3	4	X
Incentives to change practices	1	2	3	4	X
Others [please specify]	1	2	3	4	X

### About You

These last few questions will help us in determining how well the returned questionnaires reflect people living in the region. **Your answers are strictly confidential and will only be used for the analysis of this study. You will not be identified in any way.**

Q-15. How many people are there in your household (including yourself)? [Enter number]

\_\_\_\_\_ Adults (15 years old and over)

\_\_\_\_\_ Children (under 15 years old)

Q-16. What was the total income, before tax, of your household last year? [Circle number]

- 1 Less than \$10,000
- 2 \$10,000 - \$20,000
- 3 \$20,001 - \$30,000
- 4 \$30,001 - \$40,000
- 5 \$40,001 - \$50,000
- 6 \$50,001 - \$70,000
- 7 \$70,001 - \$100,000
- 8 Over \$100,000

Q-17. For each individual 15 years of age or over, please list, starting with yourself, their age, sex and qualification?

Individual	Age	Sex	Qualification (Please circle the appropriate response)				
			No qualification	Fifth form	Sixth form	Polytech, trade or high school certificate	Bachelor or higher degree
Example	35	F	1	2	3	4	5
Respondent (you)			1	2	3	4	5
2			1	2	3	4	5
3			1	2	3	4	5
4			1	2	3	4	5
5			1	2	3	4	5
6			1	2	3	4	5

Q-18. Which ethnic group do you (the respondent) belong to? [Circle number]

- 1 Asian
- 2 New Zealand European
- 3 New Zealand Maori
- 4 Pacific Peoples
- 5 Other Ethnic Group [please state] \_\_\_\_\_

Q-19. Which district is your usual place of residence? [Circle number]

- 1 Rotorua
- 2 Tauranga
- 3 Whakatane
- 4 Other [please specify] \_\_\_\_\_

Finally, do you have any comments on water quality of Rotorua Lakes?

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*detach along dotted line and return with questionnaire*

☐ Please tick the box and fill out this form if you would like to be in the draw for a \$100 prize.

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Phone No.: (\_\_\_\_) \_\_\_\_\_

**THANK YOU FOR YOUR ASSISTANCE. PLEASE BE ASSURED OF THE  
CONFIDENTIALITY OF YOUR RESPONSE. KINDLY PLACE THIS  
QUESTIONNAIRE IN THE REPLY PAID ENVELOPE AND POST TO US.**

## Appendix 2

### a) Media release, 18 February 2004

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## People surveyed for views on lake values

### **For immediate release: Wednesday 18 February 2004**

Bay of Plenty people are being asked how much they value Lake Rotorua and Lake Rotoiti and what they might be willing to pay to improve water quality.

Last week, Environment Bay of Plenty posted out nearly 600 survey forms to randomly selected households in Rotorua and other parts of the Bay of Plenty. It also sent the survey to 230 anglers in Auckland.

Rotorua Lakes Strategy coordinator Paul Dell hopes the survey will “help us understand the value the community places on less tangible qualities, like fresh air or living in an unspoilt environment. Someone who drives around Lake Rotorua to get to work may value it highly because of that, for example.”

The survey’s results will be used to help sort solutions to the problems faced by the linked lakes. People’s views will be worked into future policies and actions, Mr Dell says. “So it is really important that people fill out the questionnaire and return it to us. We want to know what they think so that good decisions can be made.”

The survey asks for people’s views on current lake quality and includes questions about the types and frequency of recreational use and whether that would increase if there were no algal blooms.

It also seeks to find out how much households would be willing to pay extra to help fund a nutrient-reduction programme to improve water quality. Mr Dell says the issue of paying for lakes work is important and potentially volatile. “We want to know if people think the lakes are worth preserving whatever the cost or if they think perhaps that someone else should pay, like the Government or the polluter. Some people may not even accept the scenario of deteriorating water quality, so we want to know that too.”

For more media information please contact Paul Dell on 0800 368 267 or Ana Cotter, communications officer, on 021 929 349. R/media releases 040217ac.doc

**b) Media release, 4 March 2004**



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## **Plea for people to reply to lake survey**

### **For immediate release: Thursday 4 March 2004**

Environment Bay of Plenty wants people to reply to a survey asking how much they value the more intangible qualities of Lake Rotorua and Lake Rotoiti.

Last month, the regional council sent nearly 600 forms to households in Rotorua and other parts of the Bay of Plenty. It also sent the survey to 230 anglers in Auckland.

However Rotorua Lakes Strategy coordinator Paul Dell says not enough people have filled out and returned the survey to give an indication of the community's views. "We urge people to do it – and as soon as possible. We really need the information."

People's views will be worked into future policies and actions, Mr Dell says. "So it is really important that people fill out the questionnaire and return it to us. We want to know what they think so that good decisions can be made."

The survey asks for people's views on current lake quality and includes questions about the types and frequency of recreational use and whether that would increase if there were no algal blooms. It is designed to help Environment Bay of Plenty understand the value the community places on less tangible qualities like fresh air or living in an unspoilt environment.

For more media information please contact Paul Dell on 0800 368 267 or Ana Cotter, communications officer, on 021 929 349. R/media releases 040204ac.doc



## Appendix 3

### a) First reminder

Nimmo-Bell & Co. Ltd  
P O Box 10790  
Wellington

#### **Rotorua Lakes Water Quality Survey**

Last week we sent you a questionnaire regarding Rotorua Lakes water quality.

If you have returned the completed questionnaire in the last few days, we sincerely thank you for your input. If not please do so **today** and have a chance to win a \$100 reward.

If you did not receive the questionnaire or it has been misplaced, please call Amelia on Wellington 04 472 4629 or email [amelia@nimmo-bell.co.nz](mailto:amelia@nimmo-bell.co.nz) and a replacement questionnaire will be sent to you.

**Thank you for giving this urgent priority**

**Brian Bell – Research Leader**

New Zealand  
Permit No. 184950  
Nimmo-Bell  
& COMPANY LTD

Perm

**b) Second reminder**

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Dear Head of Household

**Water quality of Rotorua Lakes**

On Friday 13 February I sent you a letter and a questionnaire asking for your views about the water quality of the Rotorua Lakes.

This survey is being done on behalf of Environment Bay of Plenty. The Council is keen to find out how important it is to you to keep the water in the lakes clean and healthy. Your views are important and will help the Council decide how best to do this.

Your household was randomly selected from a list of ratepayers. Your personal details will be kept confidential – they will not be shared with any other organisation, agency or person.

Another survey form and free post envelope is enclosed. Fill it in and send it back by Friday 19 March and you will go into a prize draw for \$100.

Thanks for your time and effort.

Yours sincerely



Brian Bell  
Director (Research Leader)

URGENT

## **Appendix 4      Comments from Water Quality of Rotorua Lakes Survey**

### **How do you use the lakes at present?**

Q-5.16.

1.	Visitors - take them to the lakefront to enjoy the fresh air and activities
5.	Visitors - We take our visitors from out of the area (some international tourists)
13.	Feeding ducks and children playing on waterside
47.	Lakeside holiday camping
58.	Tranquility
64.	Tourist attraction to show my visitors
75.	Tranquility
78.	Fly fishing from banks
82.	Gathering watercress in streams/creeks
92.	Walking the dogs
94.	Okatina
95.	Tourist operations
110.	Hot pools
121.	17 Wasps
132.	Freedom
135.	Holiday home
161.	Gundog Trialing, Claytarget shooting
185.	Dog swimming
188.	Peace and solitude and hosting overseas guests.
200.	To achieve stagment (@ levels (weed etc)
213.	Looks and smell
225.	Running around the lake-Fletcher Marathon
233.	To do something really constructive on lakes improvement instead of too much red tape ( and making the legal people in mitigation)
246.	We understand our bore water is from underground stream from Rotorua
259.	Single handed recreational activity. Occasional esoteric pursuits
274.	Cycling
288.	Camping
297.	Kids playing (in a safe, unspoilt and unpolluted lakefront)
307.	Peace and quiet.
313.	Lake visitors (overseas and from NZ) to the lakes
314.	Holiday Home
326.	Camping
337.	Leisure time: lunch café, taking house guests for beauty surrounds and walking along lake edge, enjoying watching activities and 'fresh' air.

## Appendix 5      Comments from Water Quality of Rotorua Lakes Survey

### How often does your household use the lakes

Q-6.16.?

1.	Coffee
8.	We have avoided going since the problems with Rotoiti have been publicized.
42.	Beach
47.	Lakeside holiday camping
53.	Dog walking
82.	Gathering water cress
110.	Hot pools
132.	Wash windscreen
161.	Claytarget shooting
188.	Hosting overseas guests
225.	Running around the lake-Fletcher Marathon
246.	Travel on Pyes Pa Road to Rotorua for family, shops or to go to Hawkes Bay etc
249.	Social interaction meeting with locals and visitors
307.	Peace and quiet.
326.	Camping
348.	House is rented to short term holliday makers close to 200 days a year because of lake side location

## **Appendix 6      Comments from Water Quality of Rotorua Lakes Survey**

### **How much use if water quality changed?**

Q-8.16.-

1.	Coffee almost daily
47.	Lakeside holiday camping
53.	Dog walking
64.	Would enjoy my surroundings much more showing tourists/guest the beauty without the shame of Rotoiti in particular.
67.	I exercise my dog at Hannahs bay reserve once/twice a day.
110.	Hot pools
120.	Don't fish Rotoiti
185.	Dog swimming
188.	Hosting overseas guests
192.	We wouldn't change our habits however we would appreciate knowing that the water quality was less toxic and the lake was in fact healthy.
225.	Running around the lake-Fletcher Marathon
250.	Living in Ngo
278.	Camping holidays
307.	Peace and quiet

## Appendix 7      Comments from Water Quality of Rotorua Lakes Survey

### How should it be done?

Q-14.5

1.	Farmers and Agricultural Chemical Manufacturers and Distributors need to be educated about the overuse of Super Phosphates - The overuse of chemicals used on the land that causes an imbalance in the Nutrients in the waterways - The use of superphosphates should be greatly reduced - or stopped - Swerage treatments over @
11.	These lakes must be preserved by ceasing to put nutrients in the lakes - environmental septic tank systems are extremely important - Farming within the close confines of the lake must desist. Over population of Swans should be culled
25.	Fines for breaking/misuse/or disregarding new regulations
26.	DOC schemes etc
28.	right around both lakes needs a good clean out, make sre it doesn'tspoil eating out of the lakes with that have petrol boats or oil
30.	As yet no proof of cause of problems it may be something that will solve itself or need drastic steps (rethink storm water etc)
42.	Abandon lake edge occupation
43.	Golf course
44.	Lake Taupo or Tarawera
47.	Prosecution of polluters if they can be identified
64.	Proactiveness from local, regional, and National Government to lead by example - show that they are serious about doing something by action, not just symposiums, meetings, and talk. Also by not putting back the sewerage pipeline date even further into the future. Also a community focus group including local farmers, iwi, residents, environmental leaders and youth for support or solution based action task force could be an excellent step.
66.	Use purification on waterfront
74.	Farm fencing with financial assistance to farmers out of \$15.00 per year additional rates/rent/tax
95.	Lakes need more flow! Remove the weir at ohau channel and remove the control gates at Okere falls!
106.	Voluntary organisations: i.e. PD. Periodic Detention could be improvised with a Voluntary organisation who would be trained to do the clean up efficiently.
115.	Polluters paying and making monitoring progress public
121.	Green Belts - Effective for runoff and erosion and control of silting up of lake beds. Dredeine of Lake Rotorua (should have commenced 30 years Ago!)
122.	More information needed about major sources of enrichment
129.	If houses and or batches refuse to get their septic tanks checked and maintained they should be closed down and be deemed uninhabitable
130.	Review of chemical methods for short term rehabilitation of systems.
132.	Remove Maori influences in management
135.	Determination of cause without prejudice and specific action required is essential

	without local and national authorities running for cover as too often is the case.
144.	Chemical Treatment
148.	Should be in the interest of users and community to want the lake in the best condition
151.	If someone observes scientific reasons for these adverse effects they should be listened to and something done about it for the benefit of all New Zealanders and Tourism (not put in the bottom of a box.)
174.	Consistent Policy: we would support all action with minimum adverse effect on the surrounding environment. We will NOT support sewerage reticulation schemes for small communities.
184.	I am from out of town!!!!I should pay more for my license!!!!!!
188.	Divert Ohou Channel. Allow a drop in level of lake Rotoiti. Disallow chemical fertilisers. Better drainage of swamp areas rich in nutrients.
192.	Stop forestry farming run off and residues and stop storm water run offs.
196.	Until farm run off of nutrients is stopped possible tree plantings 1-200 metres bordering lake, filtering run off possible farm purchases by government to reinstate quality. Programme plantings by PD centres, conservation department and unemployed. Am sure if certain water reticulation, things may also help.
216.	Ensure regulatory bodies meet their obligations. RDC & EBOP are already charged and funded to protect the environment.
223.	Peoples attitudes will have to change regarding our natural resources, as in not washing them or allowing pollution
242.	Changes in management of some sources of ground water to the lakes
246.	Those who pollute should contribute
249.	Voluntary wont change without education. Regulation etc needed for safety and preservation. Comes back to education in its broadest sense
250.	Fines
259.	Trans-gender urination is a problem. I suggest a unuch programme.
288.	Quality
291.	An accurate assessment of cause(s) needs to be made and action necessary prioritised.
307.	Meaningful prosecution/fine for any unacceptable dumping of waste materials from farms, and/or tourists/visitors to lakeside recreational areas.
313.	The way to change peoples behaviours is for them to have a change of consciousness (higher) so that automatically people "do" what is right-do not pollute and destroy. Education can help.
333.	Subsidise greenbelts around the lakes

## Appendix 8      Comments from Water Quality of Rotorua Lakes Survey

**Why is your household not willing to pay for a nutrient  
reduction programme to improve water quality in the lakes?**

Q-13.7.-

12.	Can't afford it
21.	Also because we aren't local - we can go elsewhere
28.	its not right for any other things of stuff to enter our lakes that pollute
34.	Personally back in the day the water was drinkable, today and because of environmental change, not people change, it is no longer possible that's why the government should pay
58.	Free up all river water taking's and take town water supply from lake to do this would ensure us all to care for the lakes.
64.	I believe the approach to the lakes long-term improvement will require more than a nutrient reduction programme. It will require changes in waste management, farming techniques, septic tank cleanup and much more
65.	This is where tax should go!!!!
76.	Have a shoot up of swans and shags
77.	Never visit rotorua lakes
79.	We are on a pension and one person is sick
91.	Deteriation of the water should have been looked at many years ago and a programme should have been applied then.
110.	Can't afford it
111.	1,3 and 5 apply - also I don't use the lakes or live in Rotorua, As a Tauranga resident there are more projects needed in our own area.
114.	User pays
116.	Do not live in the area now paying arc rates in Auckland and pay for a fishing licence already
121.	I don't believe that it would stay at \$15 per year
122.	Lake Tarawera is more important to me and lake Tarawera is nutrient low
127.	Rotorua City Council were warned about this happening to their lakes way back in the 60s and they choose to do nothing about it
132.	Money paid to EBOP management is to excessive for the work they do
147.	
148.	Those causing the problem should be looked at first
151.	The government should be monitoring all environment issues in NZ along with industries being responsible
153.	I do not live in the area. I am a visiter who buys an annual family fishing license
155.	Cannot afford to pay
160.	Don't have enough money to help
162.	Rates are too high and people who live in Rotorua should pay.
164.	Too much for a non-resident: I dive in Auckland. I'd contribute a lesser amount
171.	Those who pollute should pay and Lake Residents to pay more
172.	Don't live in the local area. Would be prepared to pay increased fishing license though.



**Appendix 8**

## The Rotorua Lakes – evaluation of less tangible values

177.	Out of region issue. We need to look after our district issues
193.	Live in Auckland
200.	I pay for family fishing licences, proportions should help to go for environmental costs
211.	Council should pay. Provide a sewerage plant to stop septic tanks and sewerages going into the lakes.
220.	I already pay a trout license which is becoming too expensive as it is
222.	I am a poor student who doesn't have \$5 to spare
234.	There are plenty of other lakes that I can visit for these leisure activities
237.	I do not live in Rotorua
239.	I don't pay rates, I pay rent and I couldn't afford it anyway
243.	Charge commercial users for money they and the council get from the mighty tourist Industry
246.	Rates here \$1000 PA no sewerage, no water, no lighting etc etc Government could contribute in some way and less to immigrants or off shore giving (eg islands)
253.	I am a superannuant
259.	\$15 buys 1 packet of Winfield Red 20s and a \$5 lucky dip - I would contribute 10% of the lotto winnings
262.	Living alone money is an issue
264.	Only a pensioner and no money left over
269.	User pays
272.	\$50 would be more affordable, 135.00 is just too high
285.	Don't live in Rotorua
294.	Its Rotorua's problem not ours, we have high rates as it is.
295.	Simpler to go to a different lake.
300.	This is going to be a national problem with all lakes.
303.	\$15 is too much to pay should be spread over rates national contribution from all and input for every person regardless of age or income: per capital contribution with slightly higher contribution from industry and persons who reside in the area a visit ie
313.	I am a pensioner-I live from day to day moneywise
321.	All NZ pay taxes and revenue is raised by licences
322.	Money should come from council/EBOP
328.	Historic cause. Capability should be in Place now.
333.	A portion of my rates should be used and non rate payer users of lake should pay as well as polluters.
336.	I am a pensioner and only have that income
348.	Lake edge properties pay more now

## Appendix 9      Comments from Water Quality of Rotorua Lakes Survey

**Why is your household willing to pay for a nutrient reduction  
programme to improve water quality in the lakes??**

Q-12.3. -

17.	Money mainly needed for better science. Lakes go through cycles - refer hydro lakes.
30.	Only if I knew what and how my money was going to be spent not on a continuation of surveys and committies
38.	We already have had a rates increase in last year which I feel is unfair as the residents of Tarewa Road have asked, met and petitioned for different problems to be solved by the council and still nothing has been done.
41.	The burden to clean the lakes should be on us all not just those Environment BOP deem to be the cause
45.	EBOP or Rotorua District Council should pay or recover from the government
47.	Although I am not a resident I would be prepared to pay a levy to preserve and improve my holiday location
64.	I am prepared to contribute financially if this process will actually make a real difference that is sustainable long-term. Would want more information.
67.	and to keep tourism alive
68.	I am Ngati Pikioa decendent and always lived by the lakes and channel
70.	Somebody has to do it
117.	Lake Taupo, Lake Rotoma, Kai Iwi Lakes
135.	The lakes are a national institution that need much wider support than 45 per household will provide
148.	Before paying I would like to know what the money would be spent on
150.	Also people that have introduced extra nutrients should pay too.
151.	If I could afford it, New Zealand generally is worth looking after, even though I don't live in Rotorua
161.	The cost is unimportant. Management of environment is directly related to population and cost
169.	The Lakes are a national treasure for all New Zealanders and tourists
192.	All of the above. New Zealand is fast losing its pristine environmental areas due to poor management. Once these areas are gone they are gone for good.
209.	I rent and don't pay rates
249.	This needs to be a commitment from Government, local bodies and the community together
250.	Environmental reasons
265.	The government should pay though
291.	Willing to pay out amount suggested will not solve the problem and don't believe ratepayers only should fit the bill.
324.	It's a small amount to ask for to better our waters around Rotorua.
326.	Cultural reasons. My duty as Maori for my grandchildren

## Appendix 10      Comments from Water Quality of Rotorua Lakes Survey

**Comparing fishing season ending September 2003 with  
fishing season ending September 2002, would you say that  
2003 was**

Q-10.

2.	I don't fish these lakes
8.	We have stayed away for the last 12 months because of the bloom
14.	Fish were better condition in 2002
17.	Fish of excellent condition a major factor
18.	Have fished Ohau Channell for 30 years will not fish Rotoiti because of present problem. Fish Rotorua after other lakes in the area.
20.	Unable to comment as I was not able to fish Rotorua district last year
21.	We didn't go fishing in 2003 because of poor water quality - too scared!!
23.	Yes basically these lakes have been used and abused far too long these lakes were not like this 15 years ago we should all be accountable
24.	Only fish Tawawera
26.	Only fished Rotoiti once. Water was green and slimy. No fish caught.
37.	Only catch beer tins now, can't see a fish!
42.	Lake extreme edge building and living abandoned
47.	I did not fish this season but observed other with good catches, apparently better than last summer. Fish seemed to be bigger and more fish caught.
51.	I don't fish Rotoiti
58.	Lake quality is much better this season. Dramatic drop in Midgy fly numbers.
62.	Do not fish or use Rotoiti at all because of the very poor water quality
63.	Too much algae
64.	Trolling in Lake Rotoiti is much worse than in previous years
68.	Lake Rotoiti sucks at the moment
70.	Need better fish and more gone down hill big time
74.	The big one still got away.
76.	Don't fish Rotorua lakes only Taupo lake and rivers
80.	No fish in the lakes - don't seem to catch any.
84.	We fish Tarawera
95.	Lake Rotorua are in excellent condition
100.	The water quality and quality of the trout was a concern. Our family members were anxious as to whether the trout were safe to eat.
101.	Trout in good condition.
102.	Havent fished these lakes. Our home is on Lake Tarawera
103.	Skinny fish/looked diseased and sick. A worry about eating them.
106.	I would believe that the quality of the water would improve trout fishing, and trout numbers. I don't know if that would ensure I caught any fish though
109.	Don't fish there anymore, forced to go elsewhere
110.	There are a lot more dead trout being washed up on Rotoiti now days
114.	Not fished for years
116.	Mainly due to the fact that the wind has prevented us from fishing for any length

of time. Weather patterns have changed.
123. Did not fish this season
129. I don't fish either lake full stop because of the algae bloom and will not until the problem is rectified
130. Overall Lake Rotorua is getting better
133. Both very average-quality of fish was poor!!
135. Fishing for ordinary fishermen has deteriorated over the last few years particularly at Rotoiti.
144. Fishing harder and more unpleasant
150. Fish coming out of Rotorua have been in far better conditions than previous years.
161. Fishing seemed hard, possibly due to the fact that I include my whole family wife & two sons when going fishing now
180. Didn't fish there in 2003 due to algae problem
182. Did not fish these lakes in 2002 and 2003 because of the water quality
188. Spawning streams becoming silted up through high lake level and excessive run off from high country and stormwater. Water quality in streams deteriorating.
200. Algae bloom running through out boarder engines and contaminated water tends to clog up pump and cooling system if not @ with fresh water @ time used. IE algae hardens in cooling tubes of engine giving less intake.
207. This is one of Rotoruas incomes, and I cannot understand why council has not a lot tighter control. As in Section Q2
213. No longer trout angler-put off by water quality
215. The bloom is killing fish
216. Water quality was very bad-smelt awful
229. Do not fish on these lakes
238. Not in Rotorua lakes
243. Don't fish lakes
265. I only fish lake Rotoiti.
271. Fish in Rotorua having 'escaped' bloom in Rotoiti
283. Celan it up properly. My kids swim there.
288. Where the deficits was is till to be serously considered. Prevention is beter than creation
291. Fishing has become progressively less prductive over the last few years.
295. Not keen on eating trout out of Rotorua (sewerage) or Rotoiti (Algae).
300. Smaller fish
324. Hard to say, some days were good last year, and some weren't
326. Sinse algal bloom in Rotoiti and Rotorua I have never used these lakes. The scales I have filled in are based on Lakes Tarawera Rotomahana and Rerewhakaitu

## Appendix 11 Comments from Water Quality of Rotorua Lakes Survey

### Final comments

Resp. No.	Comment
1.	For years it has been obvious that the over-use of agricultural chemicals and fertilisers have been causing the main problem - why the Rotorua District Council or the Government did not move to regulate farmers use I do not know - I came to live here from Queenstown and immediately noticed the pollution - that was in 1979 - It has taken over 20 years to find myself filling in a form!! It's a disgrace!
5.	It is a ridiculously BAD situation. These lakes are living treasures - would you do this to your MOTHER your FATHER - your CHILD - why would anyone with any "power" to do anything to rectify this situation allow it to get SO BAD! I am appalled and ashamed of the state these treasures have gotten into. IF YOU CAN DO ANYTHING TO STOP IT PLEASE DO.
6.	As with all lakes rivers etc in New Zealand they should be kept clean and beautiful not only for New Zealander's to enjoy but also tourists, definitely in Rotorua as this is something that keeps our country going.
8.	It is critical that long term the lakes are returned to their natural state. It is an unacceptable situation that New Zealanders should not tolerate. We need to fix it and the origin whatever the cost in time and money.
10.	TERRIBLE.
13.	We are, I feel, one country/one people - so all people should be responsible for change and improvements and education - not just the majority race.
14.	PLEASE FIX IT!
15.	It is quite obvious that the lakes like Rotoma, Okataina and Tarawera that have little or no farm land on their edges are problem free. Rotoehu and Rotoiti give easy access to farm and forest run-off.
16.	It's hard to have 50,000 people in Rotorua Basin and not offer a lake. I was writing articles for Daily Post in 1970 that said the same as experts do today with the same problems (except Rotoiti is worse now). What has changed? Very little.
17.	Lakes go through cycles. Rotorua was once extremely @ weed growth exploded etc. Hydro lakes go through similar cycles - How bad is the problem - is it worth spending money on - science.
18.	Fix the problem now! Do not delay for environmental reason/consents. Action/legislation must be immediate.
19.	The Rotorua region will lose a bit of tourism/other revenue unless the lakes are of an acceptable quality. People are more likely to go elsewhere if they can't enjoy the lakes.
20.	It is imperative that action is taken to remedy the slow death of Rotoiti and the continuing degradation of the water quality in neighbouring lakes.
21.	It's a shame the natural disaster that has occurred because of humans, we and other generations will no longer be able to enjoy the lake as past generations did.
23.	The quality of the lakes are clearly in trouble. Take away the lakes then what do we have?? Boiling mad is always a selling point for our tourism I guess.

25.	We have not used the lakes recently since publicity out on how bad things are - we used to enjoy regular use of lakes also spending money at local outlets whilst there - So this must be having a financial effect also.
26.	It is so wonderful to have the opportunity to fish in the different lakes. However, most seasons the fishing seems harder than the year before. Also the algae bloom puts you off using the lakes at all.
27.	The lakes need to be returned to the quality they were 50 years ago-cost to be shared by all New Zealanders.
29.	The lakes are a treasured gift to us and if we don't look after gifts they are gone forever
30.	For 15 years I lived at the lakefront and observed the lake in its various mood and phases. I never saw anyone from Environment Agencies anywhere near the lake during storms or down pours to observe run off effect. If my observations are of interest they can contact me.
33.	We only hope it improves.
37.	We were extremely dissapointed to see the algae develop in the lake 2002 xmas. The smell at Gisborne Point where we had a house was at times offensive by the water edge.
42.	In comparison to lakes where shores are not populated to the lake edge, water clarity and quality is not as bad.
44.	EBOP has had responsibility to safeguard the lakes for nearly 10 years and have failed to fulfil their statutory obligation. Do the science, identify major causes, identify the culprits, set the standards, and force compliance. Stop playing politics with wasteful surveys like this one. The lake is dying - get in and fix it. EBOP need to establish a team to ensure the problem is rapidly remedied, give them the resources and legal authority. The EBOP politician will never do it because most polluters/land owners are going to dislike meeting their new clean lake responsibilities.
45.	I think there has been negligence on the part of EBOP and RDC. These problems we highlighted in the mid 80's and nothing has been done about it.
47.	Much of the pollution in the lakes is from historic causes that are only now having an obvious effect. The landowners may not be the ones who created the problems leading to pollution - eg fertilizer pollution. The lakes will probably recover if pollution is stopped now.
48.	Responsibility falls squarely with RDC and EBOP. RDC particularly need to immediately initiate actions (not words) to prevent WWTP effluent via Whaka forest entering Lake Rotorua/Ohau Channel into Rotoiti.
50.	I would like to see a full scale effort before it is too late.
51.	Rotorua: for a lake that is reputed to be dying we are surprised at the clarity. We fish all the other lakes except Rotoiti because of its algae reputation.
55.	Our lakes need to be preserved/protected for the future so a range of programmes need to be instigated to work towards their preservation.
56.	Because of our proximity to Rotorua/Rotoiti the condition of the lakes concerns me greatly. I am involved with 2 schools who both frequently use Rotoiti and Okatana and would use them more but the conditions are deteriorating each year. These are a valuable scenic treasure that are being decunated. Unfortunatley it doesn't stop with just Rotorua/Rotoiti, does it?!
57.	I hope our lakes will always stay clean, safe and healthy for everyone to enjoy.

58.	It has improved a little from last year. There doesn't seem to be as many swans (that should be culled) that eat the koura (these could be your lake cleaners). More Koura's (breed them if you have to) much less swan's that crap and contaminate.
61.	Improvement will always be necessary and worth some sacrifice on our part.
62.	Water quality has deteriorated over the last 2-3 years. It has not stopped activity to a large extent - yet - only when warning signs have been posted. Over these Christmas holidays, the lake got much greener in January.
63.	Please don't bottle it and try to sell it we don't want that shit over here.
64.	I am deeply concerned by the poor quality of the lakes - Rotoiti in particular. As a frequent user of the lake (sailing) I have had first hand experience of its deterioration this summer and it is heartbreaking. It is also an embarrassment to host National sporting events on such a polluted body of water. I have definitely limited my activities to things which keep me out of the water, but am sad that in 'clean green New Zealand' I have to do such a thing. We know better, so why as a nation are we so slow to respond, allowing such a major environmental crisis to develop???
66.	My wife and I visited Rotorua on average 5 times a year for usually one week and noticed the steady deterioration of the water on the lakes waterfront in the city which in our opinion requires some action to keep the lake attractive.
67.	I lived all my life at Okawa Bay (Rotoiti) the water was crystal clear. I hope this could happen again.
68.	The water quality on Lake Rotoiti and Rotoehu is appalling. The smell is sickening at the height of the algae bloom. Lake Rotorua is slightly better than the other two.
69.	Don't use the lake because of algae. Also can't use the lake because of the health issues. Can smell the lake from where I live (stinks).
70.	You should do something about it NOW!!!!
71.	I travel to Rotorua every week. Not only is Lake Rotoiti looking sick, it has a bad smell on certain days, particularly in January during very hot weather.
72.	Both cleaning methods and preventative methods should be undertaken
73.	I think that the quality of the water in the lakes are not up to scratch and something should be done about it because of the amount of tourists that come here each year.
74.	Just get on and do something don't waste money on these surveys you know the problem - be leaders and do something now!!!!
76.	Get rid of swans ducks and shags.
78.	I think they are fairly good.
79.	We would like to see it as it was years ago nice and clean not as it is today. The problem has to be fixed ASAP for our next generations.
80.	Something needs to be done very quickly on the quality of our lake water or it will be too late.
82.	In such a beautiful country its sad to see the filthy froth that is sometimes visible on our lakes shores.
83.	Stop procrastinating and get them fixed.
84.	It is vital that steps be taken to rectify the putrid water in Lakes Rotorua and Rotoiti. Much can be done and much can be learned for the benefit of all lakes and this applies not only to Rotorua Lakes.



86.	This letter is the first time I've been made aware that there is a problem. I think raising people's awareness of this issue is important. We on occasion visit the lakes for holidays and it would be a shame if they could no longer be used for recreational activities.
89.	It saddens us to see the water deteriorate.
91.	I think you should impose a programme that will firstly benefit lake water used for swimming, drinking etc. Then work your way around to areas less used by human consumption like lakefront (which by the way is such an eyesore).
93.	Get on with it and fix it and stop the procrastinating - central Government should pay. Lake Rotorua is an embarrassment in this tourist spot and Rotoiti is heading the same way.
94.	Water is life.
96.	Some work has been effective. I refer to Lake Rotoehu which has improved and Lake Rotorua which still seems ok but is very hard shore fishing.
98.	They need to find a solution very soon or they will become too damaged to repair at all.
100.	It is absolutely essential that something is done urgently to stop the septic/industrial/rainwater overflow into the lakes, especially Rotoiti.
102.	Lakeside properties should face the issues of sewerage treatment and more individual treatment plants should be installed.
103.	The water quality has been a problem for 50 years. It is only now that the politicians/beaurocrats have realised how bad it is - get real. We're talking about a national icon here!!! With this survey good luck and keep up the good work.
105.	Beautiful, valuable, great tourist attraction (lakes) algae an increasing problem, won't improve without public awareness: education.
106.	Honestly, I have ignored the problem. I always notice if our lakes have improved, but tend to look the other way when I see it deteriorate. I am aware of Lake Rotoiti. This is very disturbing, but I believe that I personally have not contributed to the local lakes deterioration
110.	I have been put off visiting the region due to its quality. Many people have said it is not worth going to Lake Rotoiti because it is so bad.
114.	Room for a lot of improvement.
115.	To me these lakes represent the health of the land. It is time to be responsible for our actions. To me these lakes are jewels, precious and rare. Beautiful natural treasures with incredible potential for recreation. Nothing is too much in order to restore them. Their Wairua cries and waits...
116.	Rotorua Lake: very dirty, worse than 5 years ago. Rotoiti: Crystal clear 5 years ago, deteriorated since.
117.	Noticed the strange aroma when driving past Lake Rotoiti and to a lesser extent Lake Rotorua. It would be great to get the water quality in these lakes back to the quality of Lake Rotoma. Don't let the quality of Rotoma deteriorate.
118.	I feel that the rather well off farming community is the main contributor to the ailing quality of water in our nearly perfect lakes.
119.	Dissappointment in deterioration.
122.	Water quality of some Rotorua Lakes has obviously deteriorated and the nutrients entering these lakes must be reduced.
123.	The quality of the water of the Rotorua Lakes affects our international image and our national pride in our environment. All steps must be taken to ensure that all



	our water ways are clean.
127.	Local farmers possibly have better settling ponds than the Rotorua Lakes.
128.	All in danger to a greater or lesser degree.
129.	Healthy trout fishery is crucial for the tourism industry (as a regular angler and trying to buy a lake property at present). Positive moves need to be taken immediately as the situation is unhealthy and projects the wrong image for Rotorua. All farmland needs to be fenced to keep cattle away from the lakes. A lot of the septic tanks which are substandard need to be replaced. Anglers on boats need to have chemical toilets. The swans need to go. All of these things will help. It is never too late. I have fished regularly with a friend from Australia for the past 10 years and the quality of the lakes and fishing has diminished dramatically.
130.	Vastly better over last 10 years.
131.	Since I have heard that there was sewerage in lake Rotorua in the past it has turned me off swimming there. Also Rotoiti has a foul smell which turns anyone away. We have to save our lakes for our future.
132.	Water quality as with all other results are the concentrations of toxins, I believe that returning not wanted materials should be returned to their source by those who get them - manufacturers to destroy and mining to return recycle everything by remanufacturing.
133.	Has steadily deteriorated since I first lived at Rotoiti in 1964. Swans are a severely underestimated problem and need to be dealt with - harsh as that may sound from a conservation stand point.
135.	Disintegration of lakes has been apparent for many years and has occurred over the last 12 months. There is the usual lots of talk and cost taking place but as yet no positive plan of action.
136.	It must be improved.
144.	It's disgusting, and Rotoiti has been ruined. No cost is too great to urgently solve this problem. Rotorua - no publicity about how bad this lake is!!! Why?
146.	It looks okay when driving past and I hear there is a problem which does not effect us, but it could damage tourist numbers if it is real bad.
148.	As I have a batch at Lake Tawerera I don't spend much time at the other two lakes mentioned but realise that the same problem could occur.
149.	I feel it will be a great shame to see these lakes die, and believe it is the responsibility of us all to ensure they are looked after.
151.	It is interesting to find people actually exist out there that do care about our environment. Do you happen to be part of Bell Plumbing? They come when you call, Tauranga. Although I do not have a car I've been past Rotorua on a fairly regular basis over the years even camping and staying there occasionally. I value having the lakes.
152.	As the lakes are of national significance - the problem must be solved. All NZ lakes need to be pollution free. Some lakes have been 'wrecked' - this is unacceptable!!!!
154.	I come from Awahou, where as a child most days were spent swimming and diving for Koura in a beautiful unpolluted lake. If the children of today could enjoy the same activities in water of such high quality as it was then, I'm sure more of them would go to the lakes instead of sitting in hot game parlours.
156.	Blue lake is the best lake to go to - nice and clean - only concern is the beer bottles left in the sand and water - sometimes broken glass can be found in the

	sand.
158.	I would like to see an overall goal for all the Rotorua Lakes of improving the water quality as opposed to maintaining status quo.
159.	Fix it before it can be no use at all to anyone. Once it is gone it is very hard to get back.
161.	The responsibility of water quality is the domain of the local council and Government. Should be controlled by education particularly from school age up. If the horse has already bolted regulation and fines for serious offences are needed! Everyone in New Zealand uses these facilities so some funding should come through taxes from government.
167.	I believe farm run-off to be the most significant cause of deteriorating quality of our lakes. Educate the farmers - now. Subsidise their costs of containment and purification if necessary - but just DO IT!!!
168.	Definitely needs something done in Okawa Bay.
169.	I am old enough to remember what a fowl run smells like. On some days Lake Rotorua smells identical. I believe the cause is the huge number of black swans, and to some extent native ducks and teal. If they are deemed to be a cause they should be eliminated. Willow trees are completely out of character with lakes and should be removed or replaced with more suitable - not necessarily but preferably native trees/shrubs.
170.	An embarrassment for tourists to see.
171.	Please do something positive eg a one way ticket for Cliff Lee to go back to the USA.
172.	It's slowly getting worse and that's a shame.
176.	Clearly the quality standard has been falling over the last 20 years. Suggest we cull the black swans.
178.	Essential for tourism and our local quality of lake health that further deterioration is prevented.
179.	I feel due to urban growth around the different lakes that it is causing most of the pollution I think decreasing the amount of domestic housing in the area will also help with pollution and keep the natural beauty. I also think councils have to take a lot of responsibility.
180.	Hopefully things can be fixed before it is too late. A third of the earth's water.
182.	Stop the ongoing pollution, retire the farmland that drains into the catchments. Spread the cost over future generations not mine that did not really cause it in the first place.
187.	The lakes are a National jewel. They must be protected.
188.	The oceanic plateau which includes all the lakes in the Rotorua District was injected with phosphates and other fertilisers to bring land into production at a time when the lakes were mostly in pristine condition. Growth has taken over nature, with disastrous results for the lakes, a return in part to those pristine days, and conditions is the only solution. If its lakes versus what is perceived to be progress then that's a matter of opinion and who is to decide which will apply?
190.	Lived by lake for 52 years, the more residents the worse the pollution.
195.	At times the amount of oxygen weed and sludge does affect enjoyment - particularly when kayaking or swimming.
196.	Recently visited Rotoiti to see an event. Other visitors comment on smell and condition. Comments on amount of public rubbish thrown in lake by boat ramp.

198.	Very poor.
200.	Good to see much more authority and local business taking action and steps to combat water quality in our lakes. Much more involvement is needed to deal with lakes.
207.	I can not understand why council approve building rights on the banks of breeding streams and rivers, native bush cleared around lakes, rivers, streams, then ask the public how to put it right. They should be made to look at themselves.
209.	The foreshore is a mess with the algae bloom, the odour makes one want to throw up. The poor bird life. The lakes spoil the views when one hops out of the car. I wish I had a giant lake to clean it up - owing to my asthma - I must keep away.
212.	Over the last 60 years that I have fished Rotorua-Rotoiti the water condition has ranged from very good to not good, now a strong movement for better water conditions needs to be taken but those of us that live out of the lake district can only play a small part but can still contribute
213.	I feel that the local and regional councils should be more accountable. EBOP have a responsibility to the community.
214.	While we don't often see the Rotorua lakes I believe that water quality in all NZ lakes is a vital environmental issue that justifies research and action from central government whether or not it will win votes. That is our responsibility to all future users of this land.
215.	The lakes are part of our heritage. It is our job as parents to preserve nature and our natural heritage for generations to come.
216.	Water quality in Rotorua and Rotoiti has been well monitored but poorly managed over many years. RDC & EBOP must manage all sources of nutrient into the lakes to minimise their effect on water quality.
218.	Rotoiti: In dire peril, Rotorua: could be next.
222.	People need to be educated on why the water is the way it is. I think it should not be just a community effort to help change the water and stop it deteriorating, but all of NZ as these lakes are part of our country and affect all New Zealanders.
227.	It is a tragedy that this has been allowed to happen in the first place. Ongoing monitoring should have been put in place years ago.
229.	Lakes are a national treasure and preserving the water quality should be funded by central government
230.	I feel it is very sad that our lakes (Rotorua/Rotoiti in particular) are not clean and healthy enough to swim in. It is a sad indictment on our society that for such obvious scenic beauty to the eye, we have allowed it to become virtually polluted. When you see the lakes you think - How beautiful, but when you look closer into the water the beauty is spoiled and loses all appeal. NB: This form was filled in not by the "Head of the Household" but by his wife, thanks.
232.	The issue needs to be dealt with not ignored.
239.	Don't know much about it as I just moved here but the water looks very dirty.
242.	Some years ago it was very poor. Improvements were obtained but recently they seem to have regressed again (particularly lake Rotoiti). The appearance is that there was inadequate followup or energy strategy to initial causes which has been swallowed up. Increasingly doubtful of people makes it essential for ongoing improvements to be obtained.
243.	I would not drink it that's for sure, otherwise it would take more than a stiff scotch to handle it.

244.	28 years ago you could see the bottom of the lake, nowadays all you see is brown muck and algae whatever: People need to be educated or self-educated about how to prevent pollution of lakes (government especially).
246.	For future generations regardless of education, ethnicity or creed the lake water and environment should be kept to a high standard as we enjoyed in past days and present. I have lived in BOP all of my life and am amazed that the lake has deteriorated thus.
248.	It is my understanding that the water in Rotoiti stems from Lake Rotorua, if so to spend much resource in Rotoiti would be inefficient. Rotoruas water should be cleaned up first.
249.	They are a gift to us all and as such we should treasure, care and preserve them to the highest quality so that we all continue to enjoy all facets of their beauty. Education peoples values or responsibility of people to care and preserve their future. Simple as No Litter policies through law and social responsibility through to bigger picture of industry and farming obligations and responsibilities.
250.	Years ago I worked for a doctor typing pages of his articles on water quality in lakes and drove him to and accompanied him to meetings on the subject which was 'hot' then.
251.	I think there is a need to address the poor quality of water - especially whatever it takes to do so. Lessons learned should be used to protect the other lakes.
254.	I believe this council need to be proactive with a broader view with a highly positive approach to insuring a high quality of water for the lakes that would last for future generations to come. Any contaminant added to the water is going to have an effect, the council need to make sure that the effect is not too detrimental to the lakes quality - by putting in some sort of counter measures or even to the point of prohibiting such things ie sewerage.....shit plus water doesn't equal clean. You don't have to be a genius to figure that out.
257.	It's a bloody shame we didn't understand the issues 20 years ago.
263.	A beautiful area of nature steadily being polluted and ruined by man - his ignorance, carelessness, stupidity and just, plain don't care attitude!
270.	Unfortunately we do not use the lakes at all. It is something we hope to do in the future.
271.	Action is needed, not surveys.
274.	Rotorua lakes water quality must be improved. The job should be gotten on without delay. Certain minority groups who may choose to object to this work being carried out, citing cultural sensitivities, should be put in their place as these objections are usually little more than an attempt to stand in the way of progress!!!
277.	Please get it right soon. I stopped going there because of the news on the lakes water quality; or rather lack thereof.
278.	People would use the area more if the condition of the lakes was more inviting. Have had many hours of skiing and holidays in past years also once lived in Rotorua.
280.	Do not use them but understand they have greatly deteriorated.
283.	Poor
286.	We have stopped using the lakes and no longer take holiday weeks at Lake Rotoiti - which we used to do regularly. Now we only take drives and very

	occasionally, stop for a picnic.
288.	It is very unfortunate that our lakes are like this, it definitely needs to be directed professionally, mainly for health reasons and to our tourist economy production. Let's keep it up. Kia-Ora.
314.	Water quality is very poor. The affected lakes need dredging at least 3 times.
318.	Rotorua and Rotoiti very poor we used to go every weekend, but not anymore.
324.	I do feel that it is time someone does do something to better the qualities of our lakes. However everyone needs to do their part.
325.	During Dec/Jan only small parts of Rotoiti were affected by bloom - we therefore shifted our activities elsewhere in the lake to avoid. In general the water clarity was poor, would prefer to holiday at Tarawera in future.
326.	Lake side residents, council, forestry, farming, industry, these are the main reasons for our water quality.
328.	It is not so good.
330.	I do agree that measures need to be taken to improve quality. I have been seriously put off on occasion from spending time there.
333.	Prevention is cheaper than cure, safeguard the other lakes in the region also
335.	Disgusting. When I was a child it was a delight to picnic at the lake-mainly Hinemoa Point - to swim, fish and catch kuras.
337.	Should be clean drinking and otherwise breathing in fumes of rotting weeds or sewerage should not be! Food & drink in café may get fumes café often visited by local elderly. They meet their friends there. Locals proud to show scenery there.
342.	Water quality of lakes in Rotorua District is deteriorating and needs to be addressed. Spend the \$100 on improving water quality.
343.	Like most things more people more waste poor maintenance not keep up other happening around.